INTEGRATED RURAL DEVELOPMENT IN ASIA AND THE PACIFIC

SOUTH – SOUTH LEARNINGS

EDITORS

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CIRDAP

Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

CIRDAP BOOK 2025

Integrated Rural Development in Asia and the Pacific: South-South Learnings

December 2025

Citation:
Chandra Shekara, P., Acharya, G.D., Roy S.M., Prathap, D.P. (Eds.) (2025). Integrated Rural Development in Asia and the Pacific: South-South Learnings. Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP), Dhaka, Bangladesh.

Cover Design
Arif Azam, IT Expert

Published by

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CIRDAP, Dhaka Bangladesh

As a leading Professional in the field of Agriculture, Dr. P Chandra Shekara has more than 35 years of experiences towards integrated rural development especially in the areas namely Agricultural Extension Management, Agri-Entrepreneurship Development, Agricultural Marketing Management and Public-Private-Partnership. Dr. Shekara headed three premier National Institutions in India which work for the Ministry of Agriculture and Farmers Welfare, Government of India: Director General of CCS National Institute of Agricultural Marketing (CCS NIAM), Director General (In-charge) of National Institute of Plant Health Management (NIPHM) and Director General of National Institute of Agricultural Extension Management (MANAGE).

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Dr. Ganga Dutta Acharya brings over 30 years of experience and expertise in sustainable agriculture and policy research on rural transformation, climate resilience, and inclusive growth. He has driven evidence-based policies formulation processes at Nepal's Ministry of Agriculture and the SAARC Agriculture Centre.Dr. Acharya's distinguished career includes authoring SAARC Agriculture Vision 2030, editing the SAARC Journal of Agriculture, coordinating scores of multistakeholder consultation meetings and workshops and contributing to the number of policy documents for agricultural and Rural Development in Nepal and South Asia.

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Dr. Sonal Mobar Roy is currently working as an Assistant Professor at the Center for Wage Employment and Livelihoods (CWEL) at the National Institute of Rural Development and Panchayati Raj (NIRDPR), Hyderabad, India. Dr. Roy earned her master's in Social Anthropology from Lucknow University and her doctorate in Sociology from Indian Institute of Technology Kanpur, one of the premier institutes in India. Her research interests include Sociology of Health and Education, Culture and Tribal Studies, Rural Development, and Ethnography. Her academic trajectory spans ethnographic fieldwork, policy analysis, and capacity-building across diverse domains including health, education, livelihoods, and welfare governance. She has national and international publications to her name and strives to bridge the gap between theory and practice through her writings and research. She is a member of international editorial boards and has been involved in teaching, training, and research at her institute. She has presented papers at universities of repute, such as Oxford University, Imperial College London, and the University of Berkeley, California. She seeks to reimagine the role of the academic as a collaborator, storyteller, and bridge-builder between marginalised communities and knowledge systems.

Dr. D. Puthira Prathap
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Dr. D. Puthira Prathap, a Principal Scientist at ICAR-Sugarcane Breeding Institute, has over 27 years of impactful service in agricultural extension. A 1995 - batch scientist of Agricultural Research Service, and a 'Jawaharlal Nehru Awardee' from the Indian Council of Agricultural Research, he had developed the award-winning CaneInfo portal and co-invented the Soil Moisture Indicator, now widely being adopted by farmers. He has led key projects in water conservation, rural ICT, and tribal outreach. His ICT-based initiatives empowered rural women and youth, while his tribal outreach had enhanced livelihoods. Editor-in-chief of Journal of Sugarcane Research & Journal of Extension Education and author of 100+ publications, he's a pioneer in agricultural knowledge dissemination, earning the 'Tamil Nadu Scientist Award' in 2024 for his exceptional contributions.

Preface

In an era marked by rapid global shifts, widening inequalities, and complex development challenges, the value of shared knowledge has never been more profound. Over the past months, CIRDAP (Centre on Integrated Rural Development for Asia and the Pacific) convened an exceptional series of webinars that brought together practitioners, policymakers, scholars, innovators, and community leaders from across its member countries. These sessions were more than conversations—they were collective reflections on the future of rural development, grounded in lived experience, scientific insight, and regional wisdom. This volume is a sincere effort to preserve, synthesize, and extend those dialogues so they may continue to inform and inspire.

Across forty webinars, diverse themes emerged—food security, climate resilience, gender equality, digital transformation, inclusive governance, entrepreneurship, health systems, disaster preparedness, and more. Each session illuminated a different facet of rural development, yet all were united by a shared conviction: that sustainable progress requires integrated, people-centered, and context-sensitive approaches. These discussions were not abstract or distant; they showcased real stories, real challenges, and real innovations unfolding across Asia-Pacific communities. As such, this compilation is not merely a record—it is a resource, a repository of insights, and a testament to the collective commitment of our region to advance rural transformation.

We extend our deepest appreciation to the distinguished presenters, facilitators, and partner institutions whose expertise, generosity, and passion shaped this series. Their contributions enriched our understanding, challenged our assumptions, and broadened our vision of what integrated rural development can achieve. Their willingness to share experiences—from grassroots initiatives to national policies—has strengthened the spirit of cooperation that lies at the heart of CIRDAP's mission.

We would also like to acknowledge with gratitude the incredible role played by Ms. Hurain Jannat, Communication Officer, CIRDAP, whose dedication and organizational excellence ensured the successful convening of this extensive webinar series, now documented in this compendium. Furthermore, we extend our sincere appreciation to two distinguished external experts, Dr. Sonal Mobar Roy and Dr. D. Puthira Prathap, for their invaluable contributions in editing this volume. Their scholarly rigor and editorial insight have greatly enhanced the quality and coherence of this work.

The lessons captured here reaffirm an essential truth: the journey toward achieving the Sustainable Development Goals (SDGs), especially within rural landscapes, is one that must be walked together. Mutual learning, regional solidarity, and respect for local knowledge are the cornerstones of meaningful and lasting development.

We hope this volume serves policymakers, development practitioners, researchers, students, and all those committed to building resilient, inclusive, and thriving rural communities. Above all, we hope it honors the collaborative spirit, intellectual generosity, and integrated thinking that defined the CIRDAP webinar series.

May this book serve both as a mirror- reflecting where we stand- and as a guide- illuminating the path ahead.

Dr. Ganga Dutta Acharya **Dr. P Chandra Shekara**

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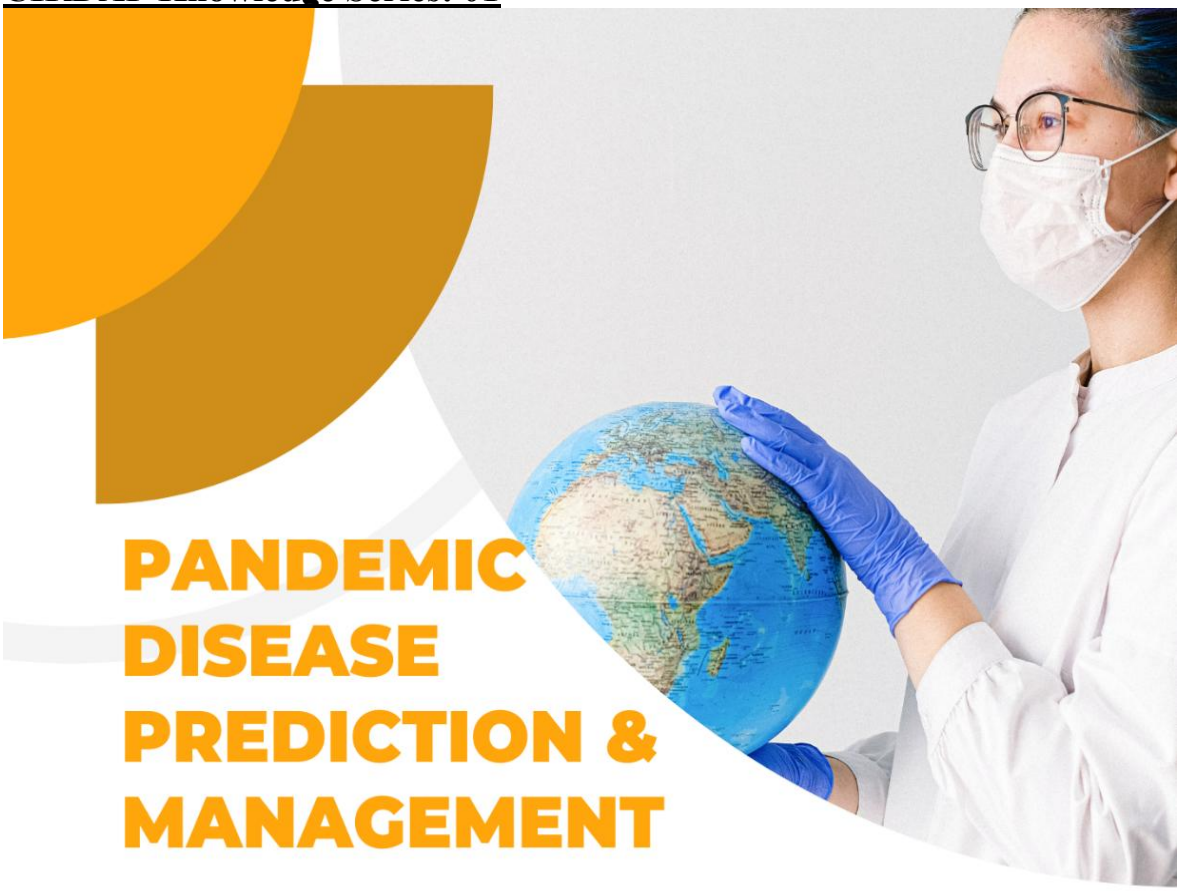

PANDEMIC DISEASE PREDICTION & MANAGEMENT

A case of the outbreak of COVID-19 in Thailand

16 SEPTEMBER 2021
(THURSDAY)

19:00 PM (BANGLADESH TIME)
20:00 PM (BANGKOK TIME)

Presenter

Dr. Nuanchan Singkran, Professor

Faculty of Environment and Resource Studies
Mahidol University, Thailand

Mahidol University

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Pandemic Disease Prediction & Management: A Case of the COVID-19 Management in Thailand

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CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=s0AVkTmmQLo&t=16s

Summary
This webinar presents a detailed analysis of Thailand's experience with COVID-19 through a four-phase outbreak model. Using an SIQR (Susceptible–Infectious–Quarantined–Recovered) framework, Dr. Singkran demonstrated how Thailand implemented strict containment measures-emergency decrees, curfews, quarantines, and vaccination drives-to flatten infection curves.
Comparative lessons from Singapore, Taiwan, and New Zealand revealed that countries combining science-based governance, community participation, and transparent communication achieved effective control. The study underscored the need for multi-stakeholder coordination and data-driven emergency management as key to pandemic resilience.
SDG Linkages: SDG 1,2, 3, 4 8, 10, 12.
Policy Insight: Establish cross-sectoral crisis management frameworks integrating health, economy, and social welfare to future-proof pandemic response.

COVID-19 Pandemic
Caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), the COVID-19 pandemic has been a public health crisis. The infectious COVID-19 (Coronavirus disease 2019) was first identified in Wuhan, China December 2019 and spread across the globe.
Countries around the world had adopted different measures to contain this pandemic. In this paper, Dr. Nuanchan Singkran deals in detail on the COVID-19 outbreaks in Thailand, the spreading sources & trend of outbreak and COVID-19 disease management.

COVID-19 Outbreaks in Thailand
It was in Thailand that the first COVID-19 patient outside of China was identified during January, 2020.The summary of the four COVID-19 outbreaks are presented hereunder.
The daily infections during the four COVID-19 outbreaks are presented in Figure 1.

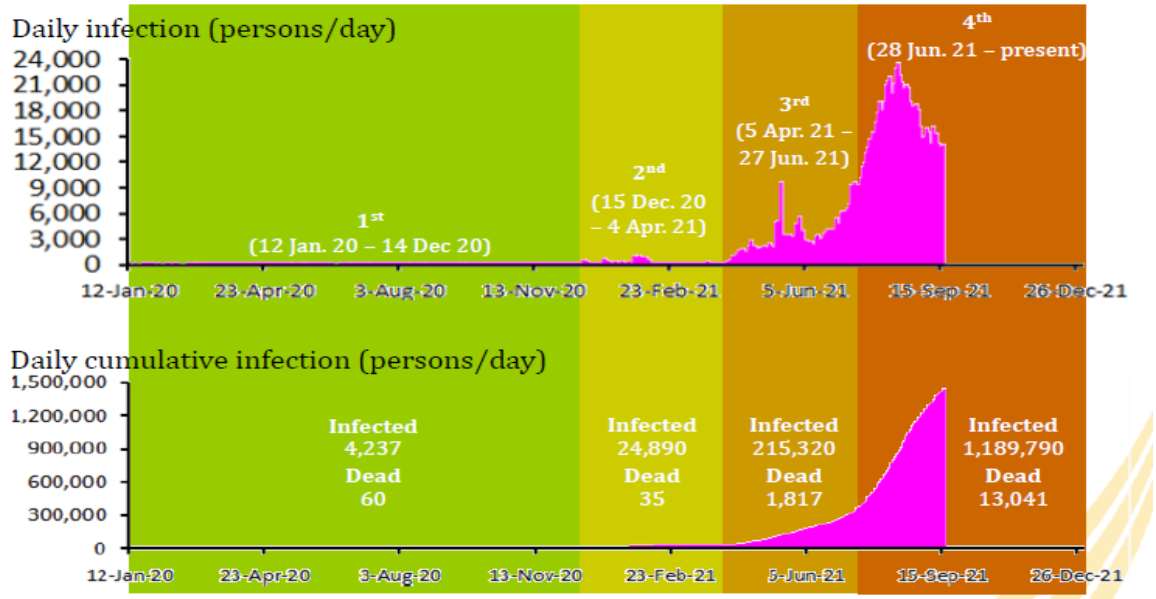

Figure 1 Daily infections during the First COVID-19 outbreak

First Outbreak - 12 Jan. 20 –14 Dec. 20

Spreading source:

The four groups of super spreaders were
People gathered in boxing stadiums in BKK & Nonthaburi.
Night visitors at the entertainment places in BKK.
Workers returned homes in the countryside.
People who came from countries that faced the outbreaks.

COVID-19 variant

Serine (Original variant from Wuhan, China)

Infected peak (cases)

(22 Mar. 20)

Duration (days)

338 (0-1 case/day during the last 7 days of the period)

First Outbreak : Measures taken

- The CCSA (Center for COVID-19 Situation Administration)
- Emergency Decree
- Curfews

>26 Mar. – 30 Apr. 20
(10pm – 4am)
>1 – 31 May 20
(11pm – 4am)
>1 – 14 Jun. 20
(11pm – 3am)

- State & local quarantines
- Social distancing

A susceptible-infectious-quarantine-recovered (**SIQR**) model was used to predict the first outbreak of COVID-19 and is presented in Figure 2.

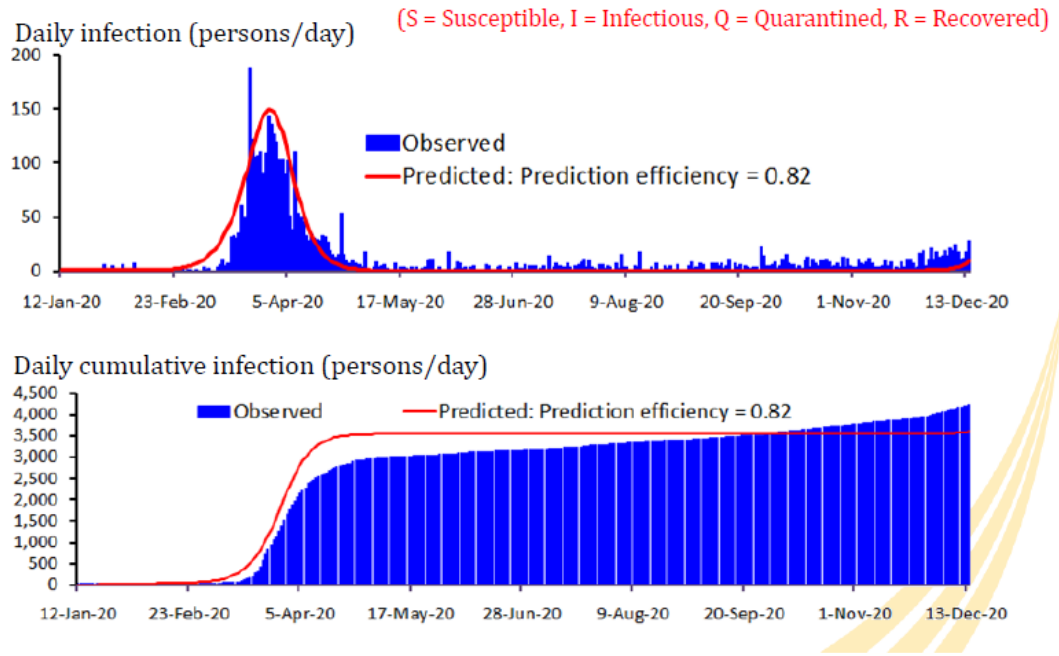

Figure 2. First outbreak prediction using SIQR pop. model

Second Outbreak - (15 Dec. 20 – 4 Apr. 21)

Spreading source:
The four groups of super spreaders were
Fishery workers at the shrimp raft & the Central Shrimp Market, Samut Sakhon Province
Networked fresh markets
People who came from Tachilek, Myanmar.
Gambling place in Rayong Province
COVID-19 variant

GH (mainly)
Beta (a few, Jan. 21)
Infected peak (cases)
959 (26 Jan. 21)
Duration (days)
111 (26 – 96 cases/day during the last 7 days of the period)

The predictions of the second outbreak of COVID-19 using mixed models are presented in Figure 3.

Second Outbreak : Measures taken

- The CCSA (Center for COVID-19 Situation Administration)
- Emergency Decree
- Temporarily lockdown of the Central Shrimp Market
- Curfew in Samut Sakhon (10pm – 5am)
- Bubble & seal
- Field hospitals
- State & local quarantines
- Social distancing
- Vaccination (started on 28 Feb. 21)

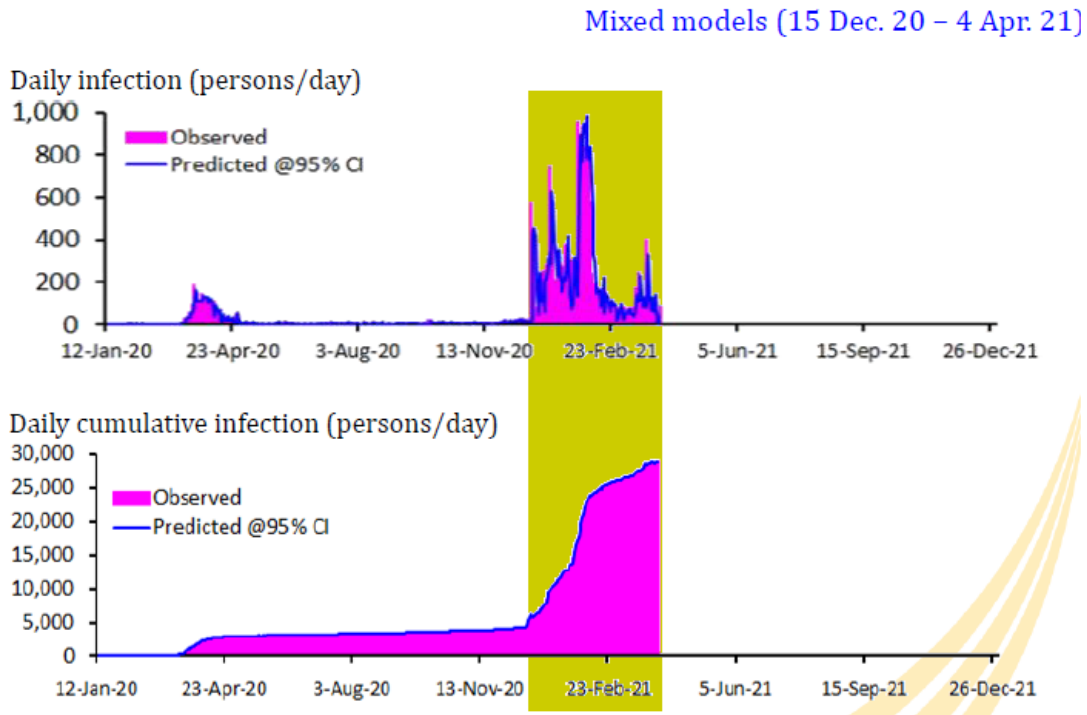

Figure 3. Second outbreak prediction using mixed models

Third Outbreak - (5 Apr. 21 – 27 Jun. 21)

Spreading source:
The groups of super spreaders were
Prisons
Night entertainment places in BKK
Local transmission, particularly visiting hometowns of people during the Songkran festival.

COVID-19 variant

Alpha (dominant)
Delta (some, May 21)

Infected peak (cases)
9,635 (17 May. 21)
Duration (days)
84 (3,174 – 4,161 cases/day during the last 7 days of the period)

Third Outbreak : Measures taken

- The CCSA (Center for COVID-19 Situation Administration)
- Emergency Decree
- Bubble & seal
- Field hospitals
- State & local quarantines
- Social distancing
- Vaccination

The predictions of the third outbreak of COVID-19 using mixed models are presented in Figure 4.

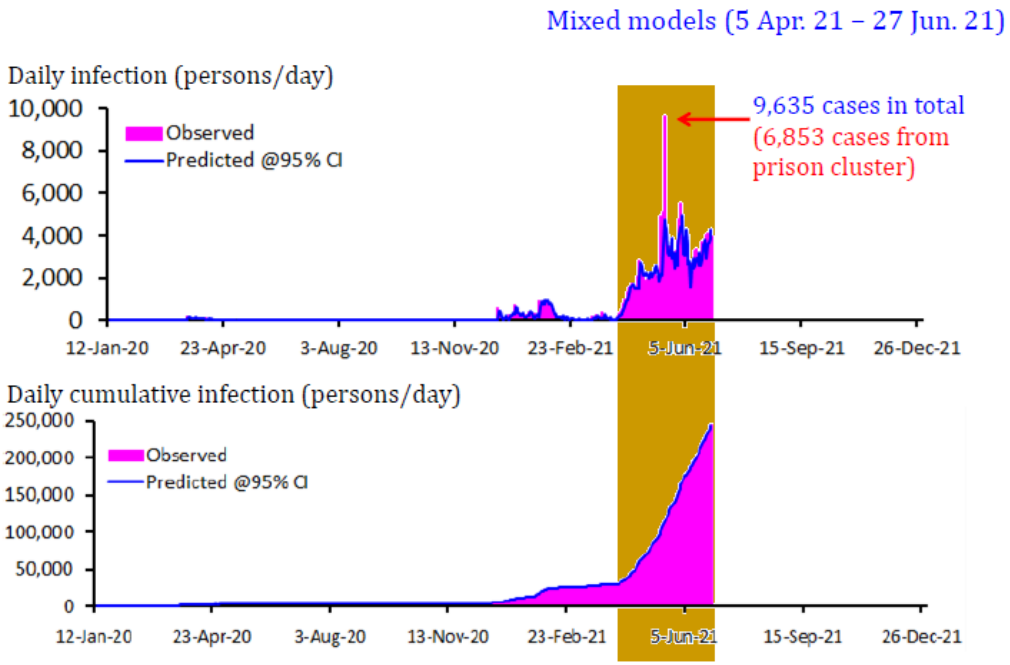

Figure 4. Third outbreak prediction using mixed models

Fourth Outbreak (28 Jun. 21 – present i.e., 16 Sep.2021)

Spreading source:
Households/ communities
Worker camps/ construction sites
Factories/Industrial Estates
Prisons
COVID-19 variant

• Delta (dominant)
• Alpha (fewer)
Infected peak (cases)
23,418 (13 Aug. 21)

Duration (days)
84 (3,174 – 4,161 cases/day during the last 7 days of the period)

The predictions and trend of the fourth outbreak of COVID-19 using mixed models are presented in Figure 5.

Fourth Outbreak : Measures taken

- The CCSA (Center for COVID-19 Situation Administration)
- Emergency Decree
- Curfew in the highest control areas (1 Aug. 21– present, 9pm – 4am)
- Hospitals, home/community isolations
- Field hospitals
- State & local quarantines
- Social distancing
- Vaccination

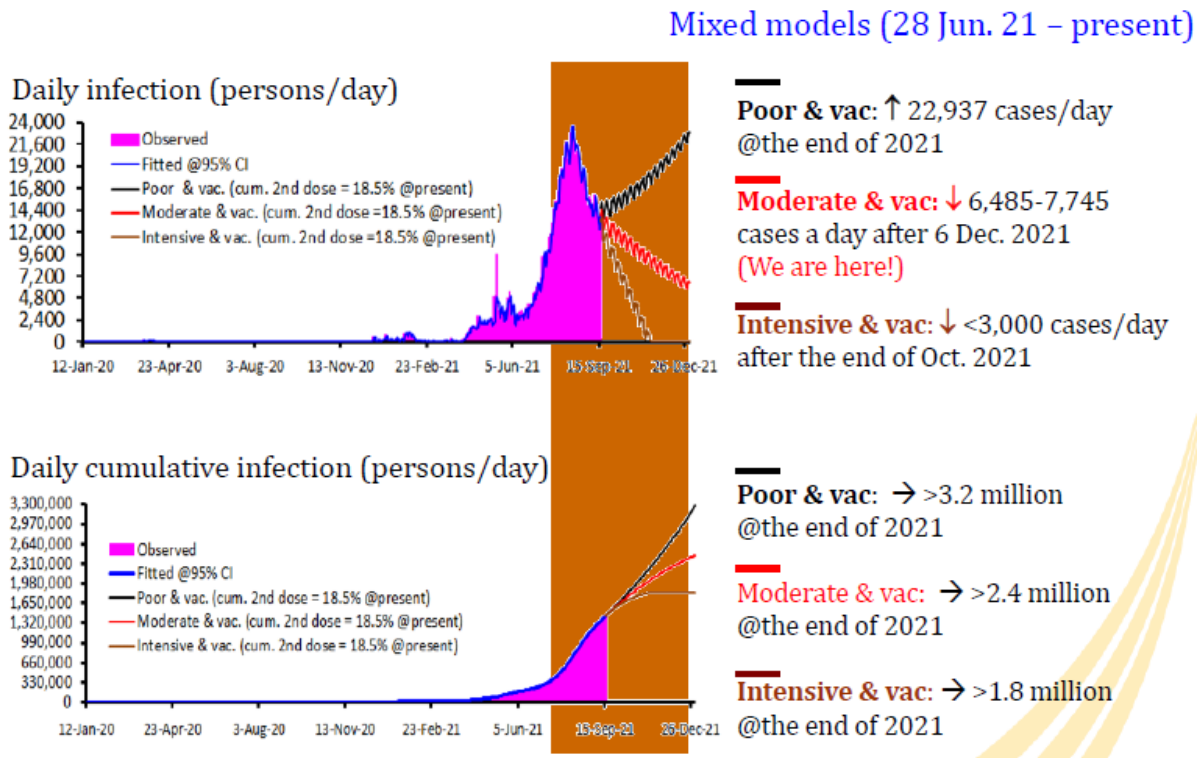

Figure 5. Fourth outbreak prediction and trend using mixed models

COVID-19 pandemic disease management

While managing the pandemic it is imperative to be concerned about the economic and social aspects as well besides public health. The pandemic management in terms of disease /disaster identification, emergency response , recovery, disaster study / risk assessment and preparation and mitigation measures are depicted in figure 6.

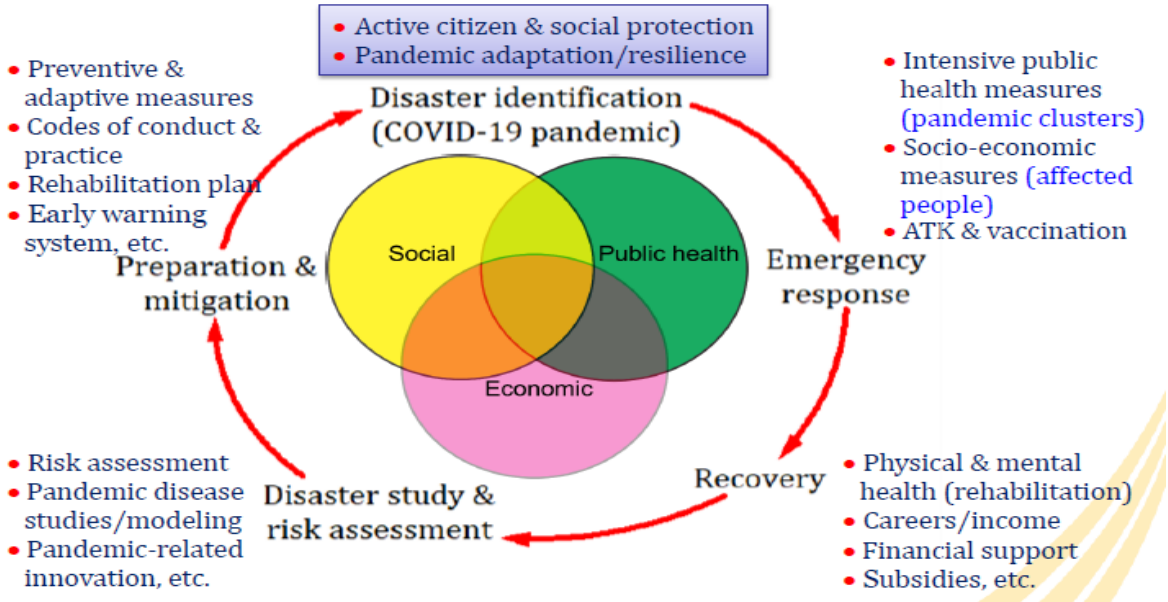

Figure 6. Pandemic disease management

Examples of effective COVID-19 management

Effective COVID-19 management calls for dedicated funding and resource allocations that are needed to support state, local and other health departments. Strengthening the linkages among all levels of state and non-state actors is very important to ensure multi-stakeholder participation in handling this pandemic. A few examples of effective COVID-19 management are given in Table 1 (Panneer et al. 2021)

Table 1 Examples of effective COVID-19 management

Country/ Territory	Method	Pandemic management	Management entity (Stakeholders)	Source
Singapore (116) Cases >Infected: 73,938 >Dead: 58	Collaboration of science & social science	Large scale coordination Institutional timely response Community resilience National level response Effective contact tracing	Government agencies Industry Banks & financial Institutions	Liu et al. (2020) Pan et al. (2020) Kuguyo et al. (2020) Woo (2020) Yan et al. (2020)
Taiwan (152) Cases >Infected: 16,103 >Dead: 839	Networking Proactive testing Border control Transparency	Frequent health checks Public education Relief to business Use of information technology	Multi-layer governance Private organizations Insurance companies Citizens	Wang et al. (2020) Cheng et al. (2020) Huang (2020) Lin et al. (2020) Summers et al. (2020)
New Zealand (186) Cases >Infected: 3,999 >Dead: 27	Lockdown .worldometers	Lockdown measures Travel restrictions Social distancing Rapid and science-based risk assessment Rapid testing and contact tracing Community transmission control measures	Government agencies Public & private hospitals Medical professionals Virologists Public health experts Laboratories Communities Self-discipline Citizens	Baker et al. (2020a) Baker et al. (2020b) Baker et al. (2020c) Cousins (2020) Jefferies et al. (2020)

From the data available on multi-stakeholder participation in combating the pandemic in different countries, we can understand the approaches, methods and strategies followed by different countries. For example, Singapore used the collaboration of scientists including social sciences as a method. As part of this strategy, they used large-scale coordination as an institutional and timely response and partnered with government, industry, banks and financial institutions and worked for community resilience.

Taiwan used networking, proactive testing, border control and transparency as a method to handle the situation. They had frequent health check-ups, public education and relief measures to business as strategies to manage the crisis. Using multi-layer governance, they partnered with local government, private organisations, insurance companies and citizens to manage the COVID-19 situation.

New Zealand had used lockdown as their method. They used lockdown measures, closure of schools, non-essential workplaces, travel restrictions, restrictions on social gathering, social distancing, border control, rapid and science-based risk assessment, rapid testing and contact tracing, community transmission control measures, promotion of hand-washing hygiene, medical preparedness, arranged more ICU & ventilator facilities and safeguarding healthcare professionals as part of their crisis management. They partnered with government, public and private hospitals, medical professionals, virologists, public health experts, laboratories, community, self-discipline and citizens.

Impact of COVID-19 on UN Sustainable Development Goals in the Asia-Pacific Countries

The COVID-19 pandemic will clearly have an adverse impact on the momentum of achievement of the 17 UN SDGs.

COVID-19 will erase some of the commendable achievements made so far regarding some goals which have been directly affected. It will also slow down the progress of other goals due to resetting of priorities.

The SDGs which are most likely to be affected by the pandemic are:

GOAL 1: No Poverty;
GOAL 2: Zero Hunger;
GOAL 3: Good Health and Well-being;
GOAL 4: Quality Education;
GOAL 8: Decent Work and Economic Growth;
GOAL 10: Reduced Inequality; and
GOAL 12: Responsible Consumption and Production.

Hence, Thailand and the world must take lessons from the crisis and envisage building more resilient and stronger societies to absorb such external shocks in future so that there is no further hindrance to the achievement of the UN SDGs by 2030. In aligning with the core principle of the SDGs, the world must continue to take special care of the most marginal and vulnerable segment of the population against the pandemic.

References

Panneer, S., Kantamaneni, K., Pushparaj, R.R.B., Shekhar, S, Bhat, L., & Rice, L. (2021). Multistakeholder Participation in Disaster Management—The Case of the COVID-19 Pandemic. *Healthcare*, *9*, 203. https://doi.org/10.3390/healthcare9020203

CIRDAP Knowledge Series: 02

A Discussion Forum / Webinar on Indian Youth Development Index & Global Youth Development Index with Particular Reference to CIRDAP Member Countries

27 SEPTEMBER 2021

7.00 PM (DHAKA TIME)
6.30 PM (INDIAN TIME)

Click here for Zoom Link

Presenter

Prof. Vasanthi Rajendran

Rajiv Gandhi National Institute of Youth Development (RGNIYD), Tamil Nadu, India

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Venue: Virtual
Via Zoom Conference

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Youth Development Index and Indian Youth

Prof. Vasanthi Rajendran

Rajiv Gandhi National Institute of Youth Development
(Ministry of Youth Affairs and Sports, Government of India), Tamil Nadu, India
Email: vasanthi.rgniyd@gov.in
CIRDAP Official YouTube Link: https://youtu.be/V0VS_lxg0Lc?si=A4hTKHozmClaNHBa

Summary

This presentation examines the **Global Youth Development Index (GYDI)** and its regional application across CIRDAP member countries. Six domains-Health, Education, Employment, Equality, Peace, and Participation-have been used to benchmark youth progress.
Malaysia, Fiji, and Sri Lanka ranked highest, while Afghanistan and Pakistan lagged due to conflict and limited opportunities. India's subnational Youth Index highlighted interstate disparities, with Puducherry and Goa leading.

The webinar emphasized aligning youth policies with SDGs through education, digital skills, and civic engagement.

SDG Linkages: SDG 4, 8 13, 16, 17

Policy Insight: Invest in youth entrepreneurship, mental health, and digital inclusion.

Need for Youth Development Index

The Youth Development Index (YDI) is a resource for researchers, policy-makers and civil society, including young people, to track progress on the Sustainable Development Goals (SDGs) associated with youth development. It is essential to measure and track the progress of youth in various aspects of their lives, such as health, education, employment, and overall well-being. It serves as a valuable tool for policy-makers to review the current status of youth, identify areas needing intervention, and prioritize resources for youth development. The primary objective is to deliver an evidence-based overview of the conditions of youth across the country /world, focusing on opportunities for their development.

Youth Development Index

Youth Development Index is a vital tool which has significantly enhanced the capacity to assess the extent to which youth are engaged to contribute beneficially in their societies, and empowered by enabling policies and tools.

Definition of Youth

No universal definition of the ages that start and end the period called "youth." Young people or youth are often defined more by "who they are not" than by who they are (Furlong and Cartmel, 1997). Often, youth are taken to be a group between childhood and adulthood but the actual age range is debatable. And yet data and policy necessitate defining youth within an age bracket. Regional and international organisations use varying age ranges to categorise young people, and the same is true of national governments

Table 1: Age-group defined as youth by different organizations

Organisation	Age group defined as youth
The Commonwealth	15–29
United Nations Educational, Scientific and Cultural Organization (UNESCO)	15–24
International Labour Organization (ILO)	15–24
United Nations Human Settlements Programme (UN-Habitat) (Youth Fund)	15–32
World Health Organization (WHO)	10–24
World Bank	15–24
Organisation for Economic Co-operation and Development (OECD)	15–29
African Union Commission	18–35
European Commission	15–29
United Nations Security Council Resolution 2250 on Youth, Peace and Security	18–29

Of these, the Youth Development Index uses the Commonwealth Secretariat's definition of youth: young people aged 15–29.

Global Youth Development Index (GYDI)

The GYDI measures six distinct domains that are considered key aspects of youth development:

Health and Wellbeing

Education

Employment and Opportunity

Equality and Inclusion

Political and Civic Participation

Peace and Security

YDI compiles 27 indicators, grouping between 3 and 7 indicators in each domain.

The YDI score is a number between 0 and 1, with 1 representing the highest possible level of youth development attainable across all indicators. A score of 0, therefore, reflects little to no youth development.

The scoring system resembles that of UNDP's Human Development Index (HDI).

Figure 1: Domains of Youth Development Index

Key Findings of Global Youth Development Index – 2020

Conditions of young people have improved around the world by 3.1 per cent between 2010 and 2018, but the progress remains slow.

Triennial rankings of youth development in 181 countries, with 156 of them recording at least slight improvements in their scores.

While the data used in the index pre-dates COVID-19, the report highlights the positive trajectory of youth development which the virus could reverse for the first time unless urgent action is taken to secure the pre-pandemic gains.

Highlights of GYDI- 2020

The index ranks countries between 0.00 (lowest) and 1.00 (highest) according to the developments in youth education, employment, health, equality and inclusion, peace and security, and political and civic participation.

It looks at 27 indicators including literacy and voting to showcase the state of the world's 1.8 billion people between the age of 15 and 29.

Singapore ranked top for the first time followed by Slovenia, Norway, Malta and Denmark.

Chad, the Central African Republic, South Sudan, Afghanistan and Niger came last respectively.

Afghanistan, India, Russia, Ethiopia and Burkina Faso were the top five improvers, advancing their score, on average, by 15.74 per cent.

On the other hand, Syria, Ukraine, Libya, Jordan and Lebanon showed the greatest decline in youth development between 2010 and 2018.

Global Trends

Overall, the index shows advances in youth's participation in peace processes and their education, employment, inclusion and health care since 2010.

Health made the largest gains of 4.39 per cent driven by a 1.6 per cent decline in global youth mortality rates and a 2 per cent drop in each HIV, self-harm, alcohol abuse and tobacco use. Sub-Saharan Africa made the greatest strides in improving the health of young people.

Levels of underemployed youth and those not in school, training or work remained constant.

Advances in equality and inclusion are led by improved gender parity in literacy as well as fewer child marriage cases and pregnancies in girls under. Yet, no progress occurred in women's safety.

- The global education score increased by 3 per cent, with South Asia making the largest improvement of 16 per cent.
- Peace and security improved by 3.41 per cent, resulting from fewer young people dying from direct violence. Somalia recorded the largest gains in the peace and security of young people, followed by Colombia, Sri Lanka, Eritrea and Russia
- Youth participation in politics is the only domain to record a decline in most parts of the world, reporting a deterioration in 102 countries.
- Globally, Sweden leads on education, Luxembourg on equality and inclusion, Indonesia on political and civic participation while Singapore tops the employment, health, and peace and security domains.

Table 2: Top 10 ranked Countries - GYDI - 2020

YDI rank	Country	Region	YDI score
1	Singapore	Asia-Pacific	0.875
2	Slovenia	Europe	0.866
3	Norway	Europe	0.862
4	Malta	Europe	0.859
5	Denmark	Europe	0.858
6	Sweden	Europe	0.857
7	Switzerland	Europe	0.849
8	Netherlands	Europe	0.848
9	Ireland	Europe	0.846
10	Luxembourg	Europe	0.845
10	Portugal	Europe	0.845

Singapore is a top ranked country in the Asia Pacific, while Afghanistan a CIRDAP member country is among the lowest ranked countries.

Youth Development Index in CIRDAP Countries

This section provides information on how the CIRDAP countries viz., Afghanistan, Bangladesh, Fiji, India, Indonesia, Iran, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam fare in terms of YDI.

GDP Per Capita

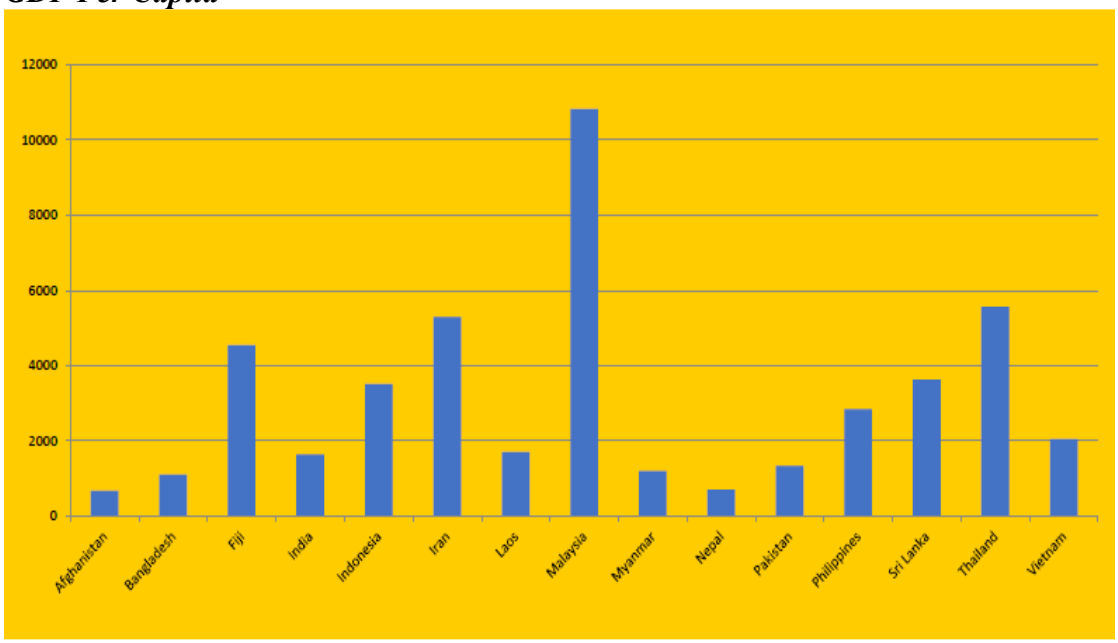

Figure 2: GDP Per Capita in CIRDAP countries (in US Dollars)

Among the CIRDAP member countries, Malaysia, Thailand and Iran have higher GDP per capita.

Literacy Rates

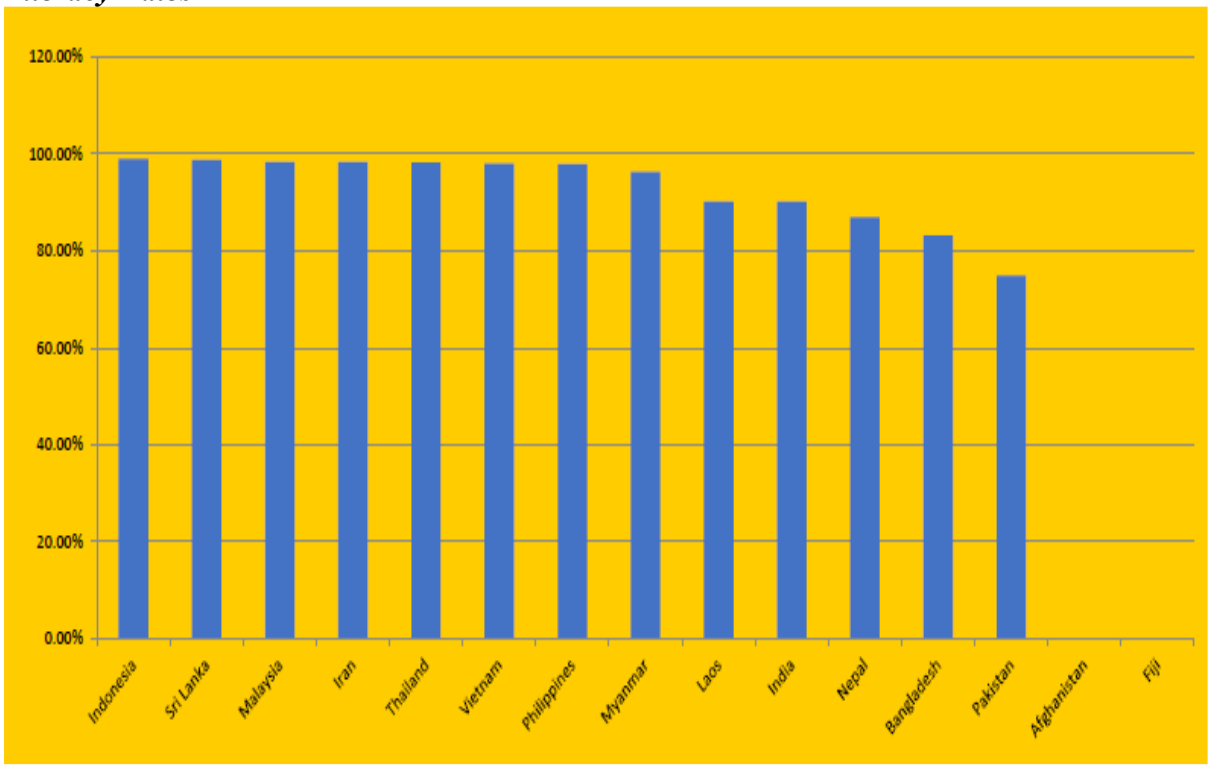

Figure 3: Literacy rates in CIRDAP countries

Among the CIRDAP countries in terms of literacy rates, Indonesia, Sri Lanka and Malaysia are top-ranked while Fiji and Afghanistan are low-ranked.

Human Development Index

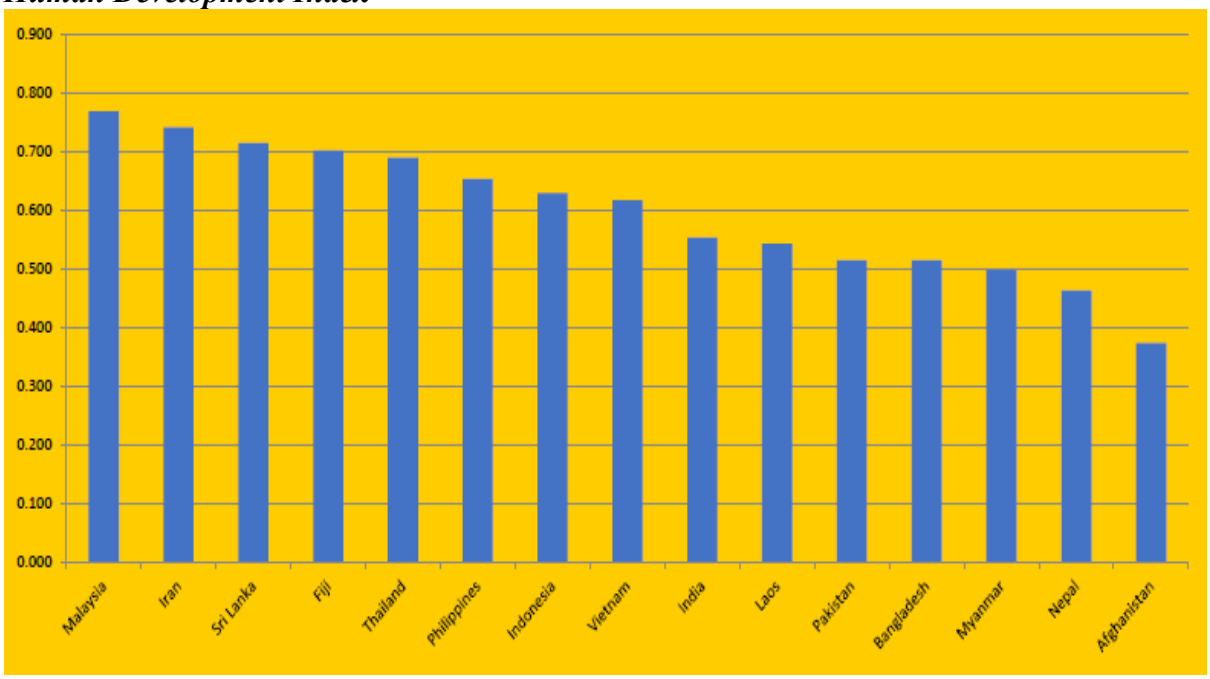

Figure 4: Human Development Index Scores of CIRDAP countries

Among the CIRDAP countries, in terms of HDI (Human Development Index) scores, Malaysia, Iran and Sri Lanka are ranked high, while Nepal and Afghanistan are ranked low.

Youth Development Index of CIRDAP Countries

Table 3: Youth Development Index Scores of CIRDAP countries

Rank	Country	Score
50	Malaysia	0.775
60	Fiji	0.748
61	Sri Lanka	0.747
63	Vietnam	0.744
84	Thailand	0.704
88	Indonesia	0.696
94	Nepal	0.689
99	Iran	0.677
122	India	0.626
126	Bangladesh	0.616
130	Myanmar (Burma)	0.610
133	Philippines	0.603
136	Laos	0.595
162	Pakistan	0.517
178	Afghanistan	0.421

With a score of 0.775, Malaysia tops the region in terms of Youth Development Index while, Afghanistan is ranked the last with a score of 0.421. The CIRDAP countries were categorized in terms of their YDI scores and are presented in Figure below.

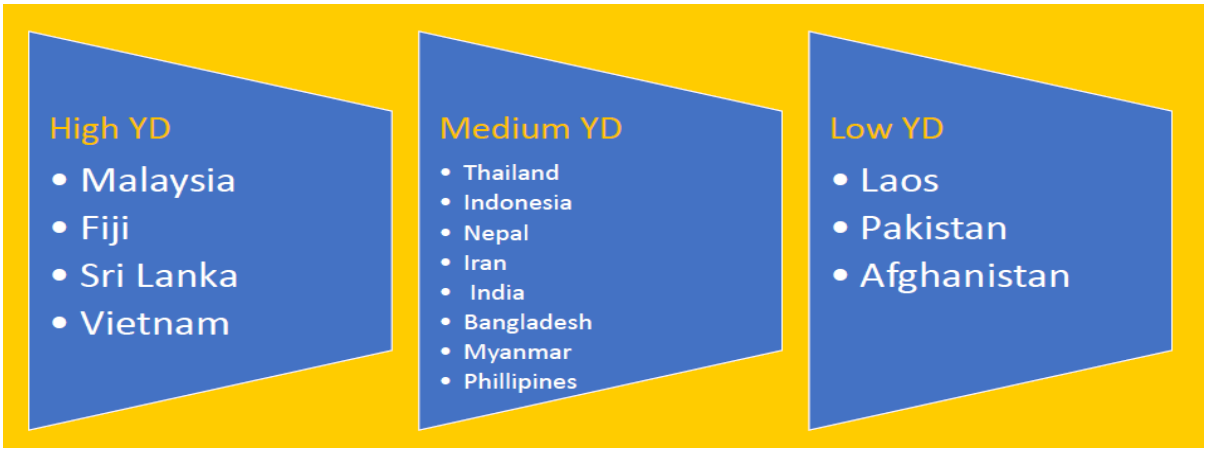

Figure 5: Categorization of CIRDAP member countries according to their YDI scores

Table 4: Overall YDI scores (2020) and Domain scores of CIRDAP member countries

Country	YDI Score	Education Score	Employment & Opportunity Score	Equality & Inclusion Score	Health & Wellbeing Score	Peace & Security Score	Political & Civic Participation Score
Malaysia	0.775	0.830	0.881	0.887	0.724	0.844	0.311
Fiji	0.748	0.822	0.812	0.810	0.727	0.792	0.355
Sri Lanka	0.747	0.769	0.802	0.798	0.778	0.778	0.395
Vietnam	0.744	0.833	0.841	0.887	0.743	0.822	0.280
Thailand	0.704	0.762	0.827	0.878	0.614	0.653	0.315
Indonesia	0.696	0.758	0.588	0.814	0.746	0.795	0.425
Nepal	0.689	0.723	0.610	0.788	0.770	0.759	0.400
Iran	0.677	0.766	0.744	0.763	0.722	0.656	0.132
India	0.626	0.696	0.618	0.610	0.683	0.679	0.332
Bangladesh	0.616	0.705	0.526	0.561	0.809	0.681	0.208
Myanmar	0.610	0.565	0.696	0.813	0.605	0.656	0.198
Philippines	0.603	0.741	0.549	0.824	0.654	0.309	0.350
Laos	0.595	0.627	0.489	0.740	0.654	0.763	0.252
Pakistan	0.517	0.500	0.603	0.640	0.610	0.438	0.060
Afghanistan	0.421	0.457	0.413	0.509	0.556	0.142	0.223

Data in Table 4 shows that Malaysia and Fiji ranked higher in terms of YDI as well as in other individual domains such as Education, Employment & Opportunity, Equality & Inclusion Health & Wellbeing, Peace & Security, and Political & Civic Participation.

Areas of Intervention in terms of YDI

Based on the YDI scores (2020) as well as the individual domain scores, certain areas need immediate interventions. Those areas of interventions are presented in Table 5.

Table 5: YDI Areas of Intervention (Shaded cells) in CIRDAP Member Countries

Global	Country	Education rank	Employment & Opportunity rank	Equality & Inclusion rank	Health & Wellbeing rank	Peace & Security rank	Political & Civic Participation rank
50	Malaysia	59	23	66	**86**	48	**74**
60	Fiji	63	51	**109**	**85**	67	36
61	Sri Lanka	92	56	**117**	58	72	12
63	Vietnam	57	**85**	66	72	52	**92**
84	Thailand	95	42	72	**123**	**114**	68
88	Indonesia	98	**153**	**105**	71	65	1
94	Nepal	111	**143**	**122**	63	81	10
99	Iran	94	84	**128**	88	**111**	17
122	India	119	**139**	**172**	101	106	51
126	Bangladesh	116	**172**	**174**	**42**	105	151
130	Myanmar	**140**	113	107	125	111	**155**
133	Philippines	113	**166**	98	109	**177**	40
136	Laos	**131**	**177**	135	109	78	116
162	Pakistan	**152**	**146**	**165**	124	56	181
178	Afghanistan	**161**	**181**	**178**	**139**	**181**	**141**

The shaded cells in Table 3, shows those domains of CIRDAP countries that need interventions to improve their YDI scores as well as individual domain scores.

India Youth Development Index

The National Youth Policy of 2014 (India) defines young people as individuals in the age group of 15 to 29 years. While the Commonwealth Secretariat has developed a global YDI to track progress on youth development in its member countries the Rajiv Gandhi National Institute of Youth Development (RGNIYD), India has developed a Youth Development Index for India, which has been used to assess the development of youth across various dimensions and identify areas for improvement.

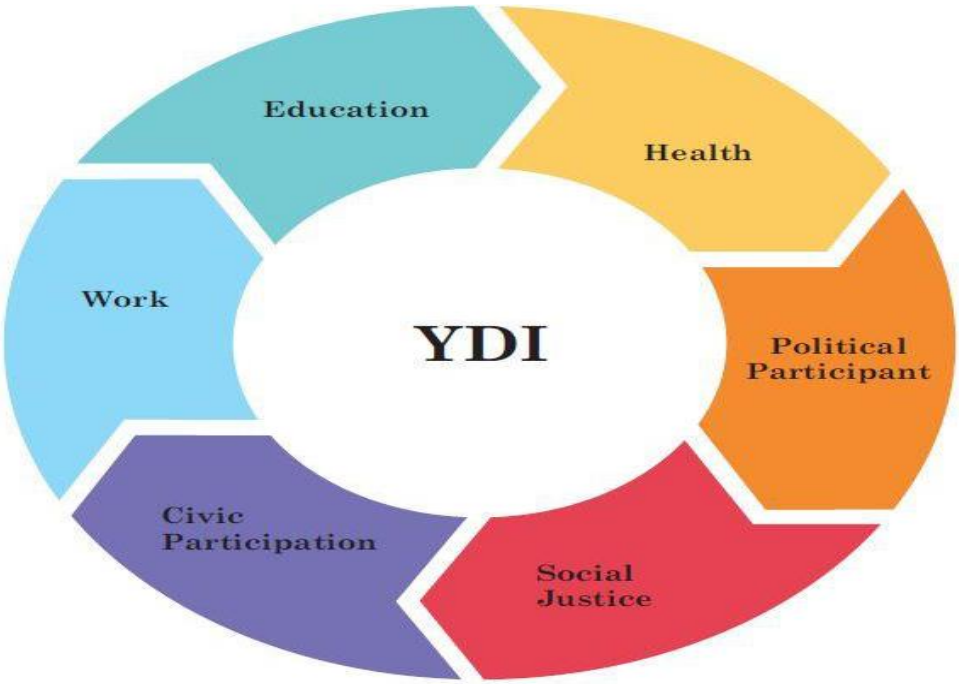

Figure 6. Dimensions of India Youth Development Index (2017)

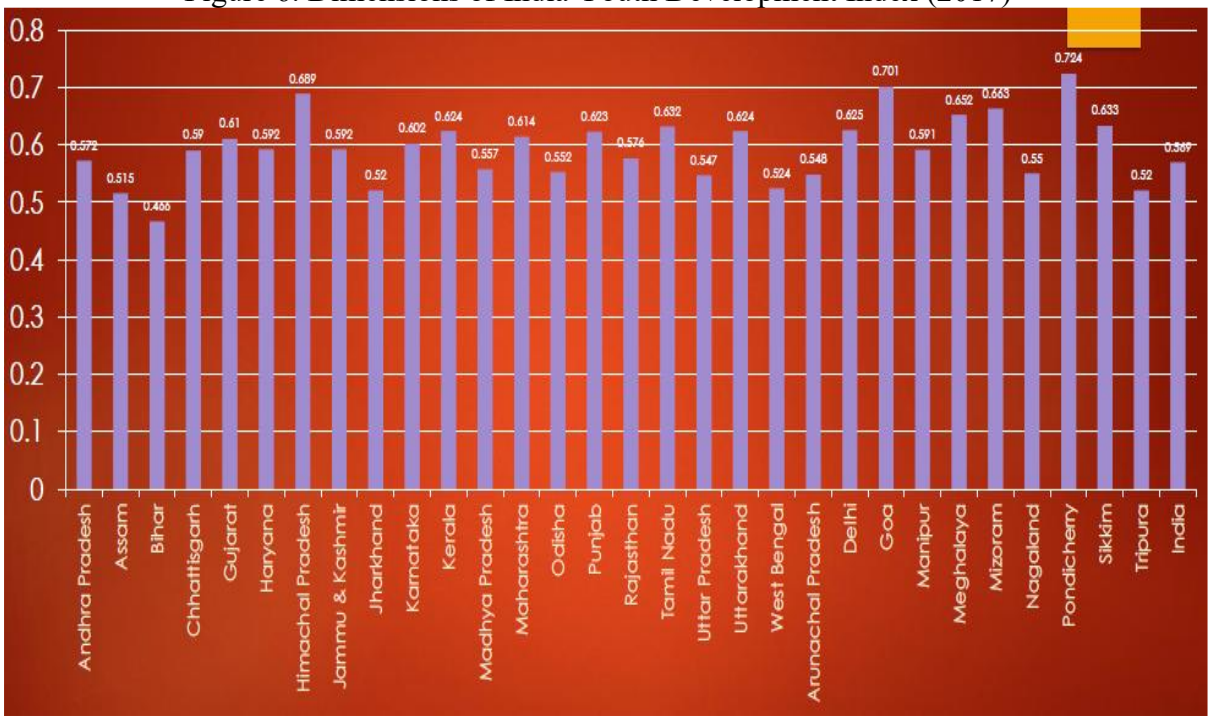

Figure 7: Youth Development Index Scores of Indian States and Union Territories

Among the states and union territories of India, Puducherry, Goa and Himachal Pradesh are ranked high in terms of YDI scores, while Bihar and Assam are low-ranked. Twenty-one states have YDI value greater than the national average.

How could Youth help CIRDAP Member Countries in achieving the UN SDGs:

The Sustainable Development Goals provide an unprecedented opportunity for young people to learn about and take action on issues in society and the world. Young people should be able to undertake their own youth-led campaigns and to collaborate with others to get their views across. An enabling environment is required to make this a reality.

While all the Sustainable Development Goals are critical to youth development, those goals concerning the areas of education and employment, are fundamental to overall youth development. The youth have a major role to play in achieving other Goals—including gender equality, good health, reducing inequality, combating poverty and hunger, and action on environmental issues and climate change. They can contribute significantly in the following areas.

Education: Youth can be educated about the SDGs and empowered to become active participants in their implementation.

Leadership: Young people can become leaders in their communities and contribute to decision-making and problem-solving related to the SDGs.

Advocacy: Youth can advocate for policies and programs that support the SDGs and hold decision-makers accountable. [

Innovation: Young people can develop innovative solutions to address challenges related to the SDGs and contribute to sustainable development.

Partnerships: Youth can form partnerships with other organizations and stakeholders to work towards achieving the SDGs.

Volunteering: Many young people volunteer their time and skills to support organizations working on the SDGs.

Social media: Youth can leverage social media to raise awareness about the SDGs and engage with others to take action.

Environmental Action: Youth are actively involved in environmental initiatives, such as climate action, conservation, and sustainable consumption.

Economic Growth: Youth are playing a role in promoting inclusive and sustainable economic growth, employment, and decent work for all.

Social Justice: Youth are advocating for social justice and promoting peace, justice, and strong institutions.

Conclusion and Recommendations

The global and Indian YDI would be immensely useful to the policy makers, programme implementors, donor agencies, development practitioners, academic, research and youth service institutions. The YDI scores presented in this paper reveals that there is more investment needed in CIRDAP member countries in terms of improving the Lifelong digital skilling of young people, Mental health services, Apprenticeships, Road safety and Youth participation in decision-making to reverse trends which adversely impact them.

References

Furlong, A., & Cartmel, F. (1997). Risk and uncertainty in the youth transition. *Young*, *5*(1), 3-20. https://doi.org/10.1177/110330889700500102

CIRDAP Knowledge Series: 03

Bangladesh's Preparedness to Manage Earthquake Disaster

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CIRDAP Official YouTube Link
https://youtu.be/2VlrjOvj-DU?si=7Vi8NdW6aeBK_lWk

SUMMARY
Bangladesh's seismic vulnerability, though less visible than cyclones, poses immense risk. Prof. Ansary reviews the nation's evolving legal and institutional frameworks—from the **Disaster Management Act 2012** to the **Bangladesh National Building Code 2020**. Risk mapping, micro-zonation, and community-based preparedness initiatives have been detailed, including school safety training and urban volunteer networks.

SDG Linkages: SDG 1, 2, 11

Policy Insight: Integrate seismic risk management into urban planning and rural infrastructure policy.

Bangladesh: A disaster-prone country

Bangladesh is a disaster-prone country of an area of about 1,47,570 sq. km. with population nearing 140 million. The country is well within the tropics and is the largest delta in the world formed by the mighty rivers namely the Ganges, the Brahmaputra and the Meghna. Bangladesh has special geographical feature. It has the Himalayan range to the north. The Bay of Bengal to the south with its funnelling towards Meghna estuary and the vast stretch of Indian land to the west. The combined effects of the role played by these special geographical features have significant bearing on weather system of Bangladesh.

Disasters Affecting Bangladesh

Bangladesh is beset by a myriad of natural disasters, listed below

- Tropical cyclones
- Tidal surges
- Tornados
- Large-scale riverbank erosion
- Floods
- Droughts
- Earthquakes
- Anthropogenic disasters

Cyclones

Cyclone is one of the major disasters significantly affecting the Bangladesh population. Bangladesh is located in a tectonically active region and some of the major cities including Dhaka, Chittagong and Sylhet are at risk of massive destruction by earthquakes from nearby seismic faults. The 1970 cyclone witnessed over 300,000 deaths & loss over $2.5 billion, while the 1991 cyclone witnessed over 140,000 deaths & a loss of over $1.5 billion. The major cyclones that affected Bangladesh since the 18th century are presented in Table 1.

Table 1: Major Cyclones of Bangladesh Since the 18th Century

Year	*Tidal Ht*	*Max. Wind*	*Affected Population*	*People Killed*
1822	-	-	-	40,000
1876	-	-	-	10,000
1898	-	-	-	175,000
Nov 1970	3-7 m	224 kph	4,700,000	300,000
April 1991	6-10 m	225 kph	10,000,000	140,000

Floods

Flood is an annual phenomenon generally affecting the country. Flood-related fatalities are decreasing, but economic losses have been increasing over the years. The major floods of the country and their impact are given in Table 2.

Table 2: Major Floods in Bangladesh

Event	**Impact**
1954 floods	Affected 55% of country
1974 flood	Moderately severe, over 2,000 deaths, affected 58% of country, followed by famine with over 30,000 deaths
1984 flood	Inundated 52,520 sq-km, cost estimated at **US$ 378 million**
1987 floods	Inundated over 50,000 sq-km, estimated damage **US$ 1.0 billion**, 2055 deaths
1988 floods	Inundated 61% of country, estimated damage **US$ 1.2 billion**, more than 45 million homeless, between 2,000- 6,500 deaths
1998 floods	Inundation 68%, 1,100 deaths, inundated nearly 100,000 sq-km, rendered 30 million people homeless, damaged 500,000 homes, heavy loss to infrastructure, estimated damage **US$ 2.8 billion**
2004 floods	Inundation 38%, damage **US$ 6.6 billion**, deaths 700, affected people nearly 3.8 million

Earthquakes

Though Bangladesh has not experienced major earthquakes in recent history there is a high risk, as the country is susceptible to damaging earthquakes. Several large catastrophic earthquakes struck this area in the past few hundred years such as the Chittagong earthquake of 1762 Cachar earthquake of 1869, Bengal earthquake of 1885, Great Indian earthquake of 1897, Srimangal earthquake of 1918 and the Dhubri earthquake of 1930.

Where does Bangladesh stand on preparedness to disasters?

The preparedness of Bangladesh in dealing with major disasters can be discussed along the following points:

- Legal Framework
- Risk Assessment
- Contingency Plan
- Awareness Raising
- Trainings
- Mitigation

Legal Framework

The following acts and guidelines relate to earthquake related legal fframeworks in Bangladesh:

- Disaster Management Act, 2012. (EQ Preparedness and Awareness Raising Committee)
- Disaster Management Policy, 2015 (EQ risk management is mentioned)
- Standing Order on Disaster, 2019 (EQ component has been expanded)
- Bangladesh National Building Code, 2020 (EQ part has been significantly modified)

- Dead Body Management Guideline, 2016
- Debris Management Guideline, 2016
- Incident Management Guideline, 2016
- National Plan for Disaster Management (2021-2025)
- Standing orders on Disaster – 2019

Risk assessment

Recognizing the earthquake vulnerability and risk in Bangladesh, a number of initiatives have been taken by the Government, research institutes, donor agencies, International NGOs and National NGOs regarding Earthquake Preparedness and Management-

Active fault mapping*:*

Active fault mapping is a crucial component of seismic risk assessment, helping to identify areas prone to earthquakes and understand potential hazards. By mapping active faults and characterizing their seismic potential, risk assessments can be refined to predict earthquake likelihood, severity, and potential impact. This information is essential for disaster preparedness, urban planning, and infrastructure development.

Seismic micro zonation*:*

Seismic micro zonation refers to the process of dividing a region into smaller areas with varying potential for earthquake effects, particularly in areas like Chittagong and Dhaka, which are experiencing rapid urbanization. This process considers factors like soil amplification, liquefaction, and other site-specific attributes to assess earthquake hazards more accurately. Prior simulation of damages, damage distribution, loss assessment and ppreparedness plan for risk management are some of the benefits of Seismic micro zonation.

Seismic Zoning Map for Bangladesh

Bangladesh has been divided in to 4 seismic zones, based on the earthquake risk (Fig.1). Zone 4 stands at highest risk.

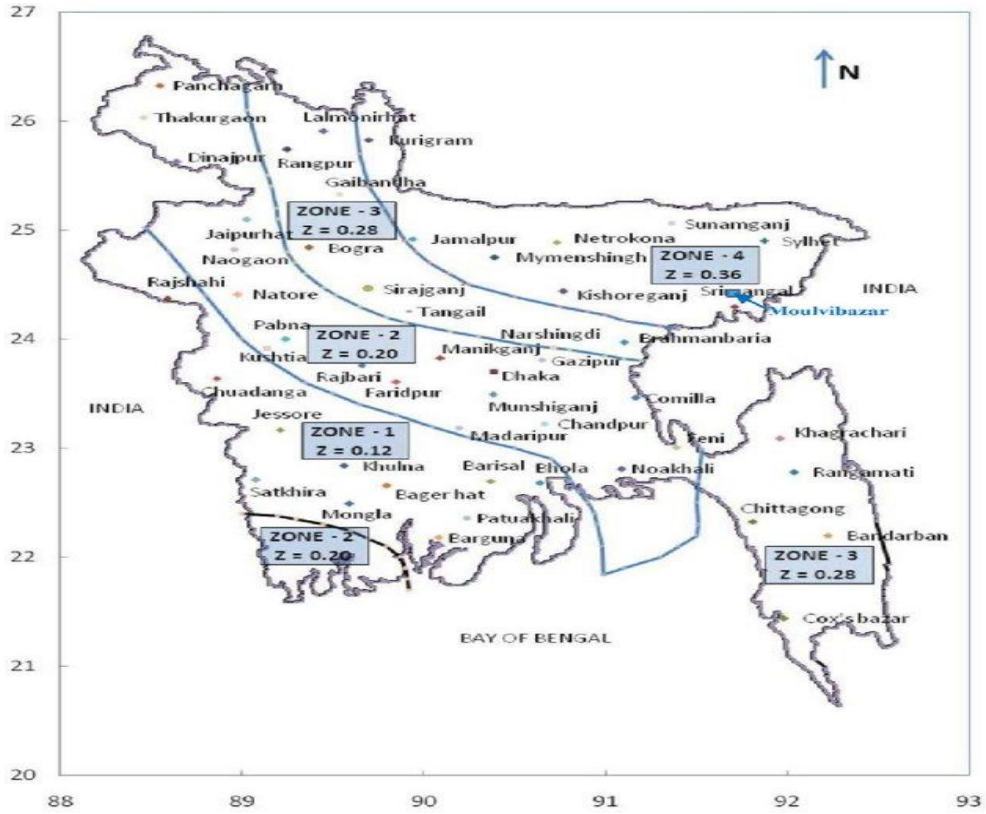

Figure 3: Seismic Zones of Bangladesh

Trapped Populations Maps

The term "trapped population" highlights the vulnerability of individuals and communities who are unable to relocate from areas facing environmental challenges. These maps are a tool for understanding the risks faced by people who are unable to move to safer locations. Through this, it could be inferred that

- ~40% of people in collapsed structures can self-evacuate
- 60% of people in collapsed structures need search and rescue (50% by local community)
- General population will need safe shelter (aftershocks)

Contingency Plans

Once risks are identified and assessed, a contingency plan is developed to address them. This plan outlines specific strategies, procedures, and resources needed to respond to and recover from potential disruptions. It may include emergency response plans, crisis management protocols, business continuity measures, and recovery procedures.

Key Actors (Sectoral team):

- DDM - Department of Disaster Management
- FSCD - Fire Service and Civil Defence
- AFD - Armed Forces Division
- City Corporations
- Health Directorate
- Bangladesh Police
- Life line Authorities
- Different Engineering Departments And,
- 160 Wards in 3 Major Cities

The key strategies to be formulated through these contingency plans would be for:

- Saving lives
- Providing humanitarian assistance
- Restoration of facilities and services

Initiatives for improving Earthquake Preparedness

The following initiatives could help in improving earthquake preparedness in the country.

- Training on School Safety and Evacuation Drills
- Development on urban volunteers
- Training for Masons/ Bar binders and EQ resilient construction materials
- Training on Risk Reduction & Response
- Disaster Response Training and Earthquake Camp for Bangladesh Scouts
- Conduct Disaster Response Exercise and Exchange to knowledge and the practices of national disaster response and to enhance partnership

Projects for Mitigation and Preventive measures for risk mitigation

"Urban Resilience Project": a US$ 179.5 million investment, US$ 173 million financed by the World Bank and US$ 6.5 million by the Government of Bangladesh. The project aims to strengthen the capacity of Government of Bangladesh agencies to respond to emergency

events and to strengthen systems to reduce the vulnerability of future building construction to disasters in Dhaka and Sylhet.

"Urban Building Safety Project: US$ 116 million investment, US$ 100 million financed by JICA and US$ 16 million by the Government of Bangladesh. The project aims to strengthen the building safety in Urban Cities by financing loans for building safety for private buildings through Participating Financial Institutions (PFI), and by improving the building safety for public buildings, thereby contributing to improvement of the social vulnerability of urban cities.

National Resiliency Project (US$ 3 million investment)

Community Based Disaster Management: UNDP Pilot Project in Mymensingh, Bangladesh

Way Forward

The following initiatives could help in disaster-preparedness of Bangladesh, in future.

- Mass Awareness Raising on disaster preparedness
- Enforcement of Building Code
- Private sector engagement on earthquake preparedness, risk reduction & response
- Provide necessary professional trainings for Engineers, Practitioners and Academicians
- Hospital Preparedness including mobile hospital
- Create Earthquake Cell/Center of Excellence
- Establish Earthquake Simulation Hall/Centre
- Commissioning research and bridging with practices
- Institutionalization of volunteers
- Continuous practical training for stakeholders and updating related data and guidelines for earthquake

Impact of Disasters on achieving UN SDGs

Disasters, including earthquakes, significantly impact the achievement of the Sustainable Development Goals (SDGs). Specifically, **SDG 11,** which focuses on making cities and human settlements inclusive, safe, resilient, and sustainable, is directly affected.

Disasters can also impact other SDGs, such as those related to health, poverty, and economic growth.

Disaster risk reduction (DRR) and sustainable development are intertwined, with DRR contributing significantly to achieving several Sustainable Development Goals (SDGs). Specifically, integrating DRR into various SDGs, such as **Goal 1 (No Poverty), Goal 2 (Zero Hunger), and Goal 11 (Sustainable Cities and Communities), enhances resilience and reduces the impact of disasters**, which is crucial for achieving sustainable development

CIRDAP Knowledge Series: 04

Effect of COVID-19 on Rural Women

Mohammad Arfe Elahi[1], Rossukhon Rose Makaramani[2], AGC Babu[3] and Rakhee Boruah[4]

CIRDAP Official YouTube Link: https://youtu.be/XrMlnoGSUZc?si=wUD5Y0xRlObPl0aD

SUMMARY

This comparative study across Bangladesh, Thailand, and Sri Lanka highlights the fact that rural women are among the most affected by COVID-19 disruptions. In Bangladesh, Union Digital Centers (UDCs) acted as vital lifelines—delivering vaccination information, telemedicine, and government services to women entrepreneurs. In Thailand, school closures severely affected rural girls' education; teachers innovated with "mobile classrooms" and home visits to sustain learning. In Sri Lanka, women in tea and garment sectors faced severe livelihood losses, revealing the fragility of informal employment.

The session emphasized gender-responsive social protection, financial inclusion, and recognition of unpaid care work. It also drew attention to the compounded vulnerabilities of women with disabilities who lacked access to information, health, and mobility support.

SDG Linkages: SDG 1, 3, 4, 5, 8.

Policy Insight: Embed gender sensitivity in pandemic recovery planning; expand digital inclusion for women in rural and informal economies.

October 15 marks the United Nations International Day of Rural Women. International Day of Rural Women intends to eradicate discrimination faced by women in rural areas; eradicate poverty; improve malnutrition; to improve health & well-being of women in rural areas; similarly establish more ownership on properties and lands and resources.

Role of UDC (Union Digital Centre) for Empowering Rural Women in Bangladesh

In order to decentralize the delivery of public services in Bangladesh and take them to the door-steps of millions of underserved citizens, the Access to Information (a2i) Programme of the Prime Minister's Office -with technical assistance from UNDP and USAID - established 4,554 one-stop information and service delivery outlets known as Union Digital Centres (UDCs) in all union councils, the lowest tier of the Bangladesh government. A Bangladesh study to evaluate the impact of UDCs (Union Digital Centre) on reducing time, costs and visits (TCV) for availing public services found that, for instance, while it previously took rural citizens 7 to 8 days to acquire birth registration certificates, the number was brought down to less than 8 hours after the advent of the UDCs. Union Digital Centres so far had created 13,372 entrepreneurs in 10 years across the country, who are earning up to $2500 per month. And, **20%** of the entrepreneurs are Rural Women.

Services Provided by UDCs on COVID-19 for Rural Women

The following services are being provided by the UDCs for rural women.

- COVID-19 Telemedicine Services
- Information on COVID-19 and Vaccination
- Awareness campaign on Mask Wearing
- COVID-19 Hospital Facility Information
- Information on Food Distribution through 333
- Free Vaccine Registration through SurokkhaPlatform
- Vaccine Certificate Printing

[1] a2i Project, Prime Minister's Office, Government of Bangladesh
[2] Suan Sunandha Rajabhat University, Thailand
[3] Climate Smart Irrigated Agriculture Project, Ministry of Agriculture, Sri Lanka
[4] The Centre for Disability in Development, Bangladesh

Effect of COVID-19 on Rural girls' Education in Thailand

In Thailand, COVID-19 affected various groups of children, particularly the poor, the disadvantaged, the disabled, the rural girls and those from migrant families. The COVID-19 epidemic has imposed many challenges to the Thai education system across all dimensions, especially inadequate adjustment to the fast and changing world. For the rural girls, besides education, schools also gave them care physically, mentally and socially.

In many provincial areas of Thailand, there has been an adjustment in the education schedule during COVID-19 where teachers play an important role. Some teachers formed ad hoc groups such as the "*Grab Mae Kru"* group, which is a gathering of teachers in Uthai Thani Province of Thailand. The teachers conduct field visits to monitor the well-being of students, and deliver nutritious meals to the child's home and conduct some home-based instruction. Teachers in Uttaradit Province visit students' homes to deliver and collect homework books. The five teaching and learning (T&L) methods utilized during the period were *On site, On line, On demand, On hand* and *On air.* Schools of Thailand also offered initiatives such as 'mobile teachers' and 'horseback teachers' to carry teaching materials in hilly terrain.

Impact of COVID-19 on the livelihood of Sri Lankan Rural Women

Sri Lanka is an island with an area of 65,610 sq.km and a total population of 21.67 million. The Government spends 1.6% of its GDP on health. It has 3.6 beds per 1,000 persons; one Doctor per 1,203 persons; one Nurse per 570 persons in government hospitals while the average life expectancy at birth is 76.8 years.

Role of Rural Women in Household Economy

In Sri Lanka, the rural women's farming and farm-based activities are the major sources of household income. A few home-based informal sector activities are serving as labour in tobacco cultivation, chilli and onion farms, mat weaving, food preparation, rice pounding, chena or highland cultivation, poultry keeping, dress making and selling betel. The rural women are also involved in marketing of local agricultural produce, taking the produce to market, preparing cooked foods, especially rice flour-based foods for sale, running small grocery shops and making & selling handicrafts. These micro economic activities are extensions of women's domestic work that bring only very small profits.

COVID-19 and Rural Women

The most marginalized -rural women-in the Sri Lankan society have borne the brunt of the burden of COVID-19. Women working in the tea, apparel, caregiving and house cleaning sectors have found themselves uniquely vulnerable to the economic consequences of a mass shutdown. As a result of the pandemic, these women have less access to adequate social protection mechanisms, burdened with unpaid care and domestic work and have lost their livelihoods faster. The mobility restrictions imposed due to COVID 19 have severely impacted the socioeconomic security of WHHs (Women-Headed Households) . In short, Covid-19 has left women in Sri Lanka in a uniquely vulnerable position.

Mitigating negative economic impacts of COVID-19 on women

Taking up the following measures would mitigate the negative impact of COVID-19 on women.

- Ensuring women have equal representation in any task force, working group or committee appointed for emergency management.
- Strengthen existing government/nongovernmental hotline services-
- Women to seek immediate assistance in the event of domestic violence

- Appoint officers to handle in a gender-sensitive manner.
- Classify sexual and reproductive health services and gender-based violence services as essential
- Allow such providers free movement to deliver services to affected persons.
- Provide necessary protective equipment and assistance to front line women workers
- Give needy families a monthly livable stipend until the country returns to normalcy
- Provide additional interim relief to plantation workers and migrant workers working in free trade zones.
- Establish a National Special Fund for women who have lost their jobs, lost their income and have been deprived of their salaries
- Provide women with special loans and grants to rebuild the businesses especially self-employment ventures.
- Implement programmes to change the perception that caring and household work are only for women.
- Recognize women's unpaid work in economic indicators.
- Urgently adopt social protection measures to ensure an adequate standard of living including income supplementation, rent subsidies and eviction moratoriums, food subsidies, and free clean water and hygiene measures, including menstrual hygiene.
- Direct income support to women-Introduce economic support packages
- Give cash directly to women who are poor or lack income
- Expand unemployment benefits-lifeline for those struggling to afford day-to-day necessities
- Expand family and child benefits for vulnerable women and their families.
- Support for women-owned and -led businesses
- Women should receive specific grants and stimulus funding, subsidized and state-backed loans
- Governments to source food, personal protection equipment, and other essential supplies from women-led businesses
- Economic relief should more target on sectors and industries where women are a large proportion of workers.

Impact of COVID-19 on Rural Women with Disabilities in Bangladesh

Over 0.37 billion people with disabilities live in the CIRDAP member countries during 2016

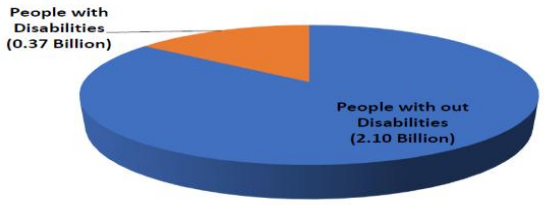

Figure 1. People with Disabilities in CIRDAP Member Countries

In April 2020, the Office of the United Nations High Commissioner for Human Rights (OHCHR) said: 'While the COVID-19 pandemic threatens all members of society, persons with **disabilities** are disproportionately impacted due to attitudinal, environmental and institutional barriers that are reproduced in the COVID-19 response.'

Challenges faced by the Women with disabilities during the COVID-19 Pandemic

- Income reduced
- Suffering from food crisis for not having enough food
- Lack of access to Government benefits

- Less awareness or lack of right information around hygiene, water and sanitation
- Prone to higher rates of communicable diseases like C-19, Leprosy, TB etc
- Unable to access health & rehabilitation services
- Unpaid Care burden
- Not getting an opportunity to get vaccinated
- Multiple layers of discrimination due to gender status, social exclusion, stigma etc

Measures for reducing the impact of COVID on women with disabilities

A **National & Global Responses and Future Plan**–must be fully inclusive and underpinned by the frameworks of the UN Convention on the Rights of Persons with Disabilities (CRPD) and SDGs, and the commitment to 'leave no one behind'.

High Quality Disaggregated Data –Gender, Disability, Rural, Urban

Strengthen agencies of Rural Women with Disabilities–SHG, Organization of Persons with Disabilities -Listening to Rural Women and amplify their voices

Linkage with the Rural Development interventions at grass root level: cooperatives, financial grants –to create access to livelihood opportunities

Education on Nutrition and Foods to cultivate and information on good food , source of easily available nutrition at Rural areas

Support capacity of Rural Women with Disabilities in financial literacy, business skills, entrepreneurship (tailored made programs as per the needs & skills of trainees)

Effect of COVID-19 on Rural Women in achieving UN SDGs

Even though all of the SDGs are intertwined and affect one another, these five SDGs are directly

related to gender as well as have profound impacts on women, especially, when COVID-19 is present in our lives.

The SDGs are as follows:

SDG 1: No poverty

SDG 3: Good health and well-being

SDG 4: Inclusive and quality education and learning opportunities

SDG 5: Gender equality and empowering all women and girls

SDG 8: Decent work and economic growth

CIRDAP Knowledge Series: 05

Innovative Solutions to Soils for Long-Term Food Security & Sustainable Ecosystem

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CIRDAP YouTube Link: https://youtu.be/UQfaQnOLKL0?si=Hqd0OFJ7kClK3Ntc

SUMMARY

The paper centered on Thailand's *Thung Kula Rong Hai* saline-soil rehabilitation programme under the **World Soil Day 2021** campaign. It emphasized soil salinization as a global threat to food security. Measures such as controlled drainage, use of green manure (Sesbania rostrata, sun hemp), windbreaks, and soil amendments have transformed barren lands into productive rice fields. Sustainable soil management contributes directly to **ecosystem restoration** and **climate-change mitigation**.

SDG Linkages: 2, 13, 15.

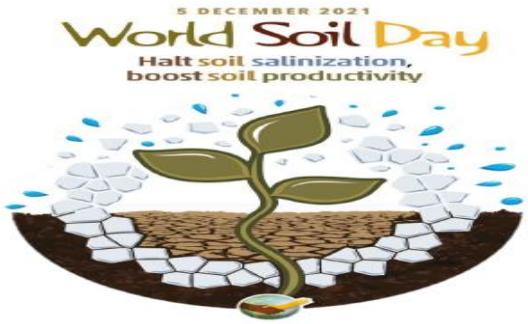
Policy Insight: Adopt national soil-health missions linking farmers, researchers, and local governments; prioritize land-restoration investments.

Background

World Soil Day (WSD) is held annually on **5 December** as a means to focus attention on the importance of healthy soil and to advocate for the sustainable management of soil resources The international day to celebrate soil was recommended by the International Union of Soil Sciences (IUSS) in 2002. Under the leadership of the Kingdom of Thailand and within the framework of the Global Soil Partnership, FAO has supported the formal establishment of WSD as a global awareness raising platform. The FAO Conference unanimously endorsed World Soil Day in June 2013 and requested its official adoption at the 68th UN General Assembly. In December 2013, the UN General Assembly responded by designating 5 December 2014 as the first official World Soil Day.

WSD 2021 and its campaign "Halt soil salinization, boost soil productivity"

The objective of this WSD theme is to raise awareness of soil resources in various dimensions important to the ecosystem and encouraging societies to improve soil health. Soil salinization and sodification are major soil degradation processes threatening ecosystem and are recognized as being among the most important problems at a global level for agricultural production, food security and sustainability in arid and semi-arid regions.



World Soil Day - 2021

Halt Soil Salinization - the Case of Thung Kula Rong Hai in Thailand

Spanning over 800,000 acres and five provinces, **Thung Kula Rong Hai** is a dry area (Thung in Thai) mainly in Roi Et province of Thailand.

Soils :

Soils of Thung Kula Rong Hai are solid alkaline soil, acid soil and infertile soil. The soil lacks organic matter. In the past, transplanting rice seedlings here required bamboo sticks to poke into the soil because the soil was sandy soil. Production gives low yields, resulting in low incomes later on.

Water:

In the rainy season, the Thung Kula Rong Hai area is flooded all over the place. Rice cannot be grown. This is due to the fact that the area in Thung Kula Ronghai covering about 64,000 –80,000hectares is pan basin. In the dry season, it is very dry. Cars cannot access the area because they will get stuck in the sand and in the rainy season they will get stuck in the mud.

Irrigation:

Low quality irrigation water, with inefficient or inadequate drainage causes rapid manmade salinization.

Problems in practising Rice Farming

Most of the people in are farmers and do rice farming only base on rain water mainly. At the Thung Kula Ronghai zone, the average amount of rainfall accounts for 1,300 millimetres. For terrain conditions of Thung Kula Ronghai, the area is plain with large pan basin sloping down from west to east with very low gradient. And this type of terrain which is flat like this, when it faces heavy rainfall in the rainy season, the water logging problems occurs in the paddy field for a long time, causing flood to occur, damaging rice seedlings or rice plants grown in the paddy field**.**

Due to the fact that flood and drought occur alternately during the season of in season rice field of Thung Kula Rong Hai, doing rice farming in Thung Kula Rong Hai gives low yields. Therefore, doing rice farming commercially is not effective. This is one of the reasons why economic downfall occurs throughout.

The soil in Thung Kula Rong Hai lacks fertility because topsoil is very sandy mostly and lacks organic matter. Moreover, part of it is alkaline soil and the condition of having alkaline soil tends to spread more.

Effective Management Measures

The following measures are to be taken on priority basis to improve the farmland area.

- Controlling soil surface excessive water drainage.
- Construct paddy field level roads to ensure transport of good varieties of rice, fertilizers and chemicals required to the paddy field.
- Follow a cropping system that would include Eucalyptus, for additional earning
- Using windbreak during the development period
- Use of soil amendments, green manures such as sun hemp and Sesbania rostrata

Soil and the Sustainable Development Goals (SDGs)

World Soil Day acts as a reminder that caring for our soils is not just an environmental issue, but a critical component of achieving a wide range of sustainable development goals.
The importance of soil stretches across various Sustainable Development Goals:

Goal 2: End hunger, achieve food security, improve nutrition, and promote sustainable agriculture. Soil health is central to this goal.
Goal 13: Take urgent action to combat climate change and its impacts, emphasizing soil's role as a carbon sink.
Goal 15: Life on Land, which seeks to combat desertification, restore degraded soil and land, and halt land degradation.

CIRDAP Knowledge Series: 06

Innovations in Asia: Making Organic Agriculture More Sustainable

Dr. Shaikh Tanveer Hossain
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CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=ZkaK_3f9nsk&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=38

SUMMARY

Dr. Hossain discusses the transformation of organic farming through **technological, ecological, and social innovation**. Examples include precision farming, community-supported agriculture, biological pest control, and digital traceability systems. Case studies-the *organic sack-garden* for household nutrition, *rice-duck integrated farming* for pest control and soil health, and the *Zero Energy Cold Chamber (ZECC)* for post-harvest storage-demonstrated low-cost, replicable models improving smallholders' incomes and sustainability. APO's "Green Productivity" framework connects productivity gains with environmental stewardship across Asia-Pacific.

SDG Linkages: 2, 3, 6, 12, 13, and 15.

Policy Insight: Promote farmer-led innovation platforms; integrate green productivity and value-chain financing for scaling organic systems.

Background

Organic agriculture was originally focused on the use of natural methods; however, the current farmer incorporates both practices with modern technology. Innovations in organic agriculture are reducing environmental impacts, conserving resources, and keeping crops free from synthetic inputs. Key areas of innovations in organic agriculture include precision agriculture, biological pest control, and the use of robotics for tasks like weeding and harvesting. These advancements aim to increase yields, improve soil health, and reduce reliance on synthetic inputs.

Factors Affecting Agricultural Productivity Growth

The factors that affect agricultural productivity growth are listed below.

- Innovation (new technology and knowledge)
- R&D investment
- Extension
- Business innovation in farming practice and management
- Human capital
- Education, training
- Demographic changes
- Social factors (e.g. attitude, retaining young people in the rural community)
- Natural resource management

Changes

- Changes in soil and water availability
- Pests, diseases, weeds
- Public infrastructure
- Transport
- IT and communication

- Market
- Competition
- Market access
- Finance
- Access to financial resources

This chapter discusses in detail the first factor, i.e. innovation, and how it helps in making organic agriculture more sustainable.

Innovation

Innovation is a complex process where multiple actors play different roles. Governments and other key stakeholders, including civil society, farmer organizations, research bodies and the private sector, all have a role to play in creating an environment that enables innovation in agriculture to flourish and generate solutions. Success hinges on connecting the drivers that influence innovation uptake. An innovation could be:

- a new idea, device, or method.
- adopted from other cultures/societies
- viewed as the application of better solutions that meet new requirements, or existing market needs.
- happening when someone "improves on or makes a significant contribution" to something that has already been invented - Steve Jobs was an innovator. Invention is the "creation of a product or introduction of a process for the first time"- Thomas Edison was an inventor.

Types of Innovations

- Social Innovations
- Ecological Innovations
- Technological Innovations

These innovations are interconnected approaches that drive positive change in society and the environment. They often work together, with social innovation addressing societal needs through new approaches, ecological innovation focusing on environmental sustainability, and technological innovation providing the tools and infrastructure for both.

Organic Agriculture Innovations

Social Innovations: New farm models (Community Supported Agriculture) ; New marketing models (farmers markets, Teikei, box schemes, online) ; New knowledge models (farmer-led research, on-farm experiments)

Ecological and traditional knowledge-based innovations: Soil fertility, low tillage, regenerative techniques; Circular systems (nutrients, organic matter, composting, water use); Crop rotation, mixed cropping, Agroforest systems; Biofertilizers and Biopesticides; Preventive livestock health care.

Technological innovations: Precision agriculture and digitalization; Biological plant protection (bio-control, botanicals); Precise irrigation technology; Blockchain, QR technology

Bottlenecks in linking Organic Farmers to Markets

The bottlenecks in linking organic farmers to markets are listed below.

Production

- Poor extension
- Lack of quality inputs

- Low productivity
- Non demand linked production

Supply chain

- Weak road infrastructure
- Lack of storage
- High wastage
- Multiple intermediaries

Processing

- Lack of quality
- Poor returns
- Low-capacity utilization

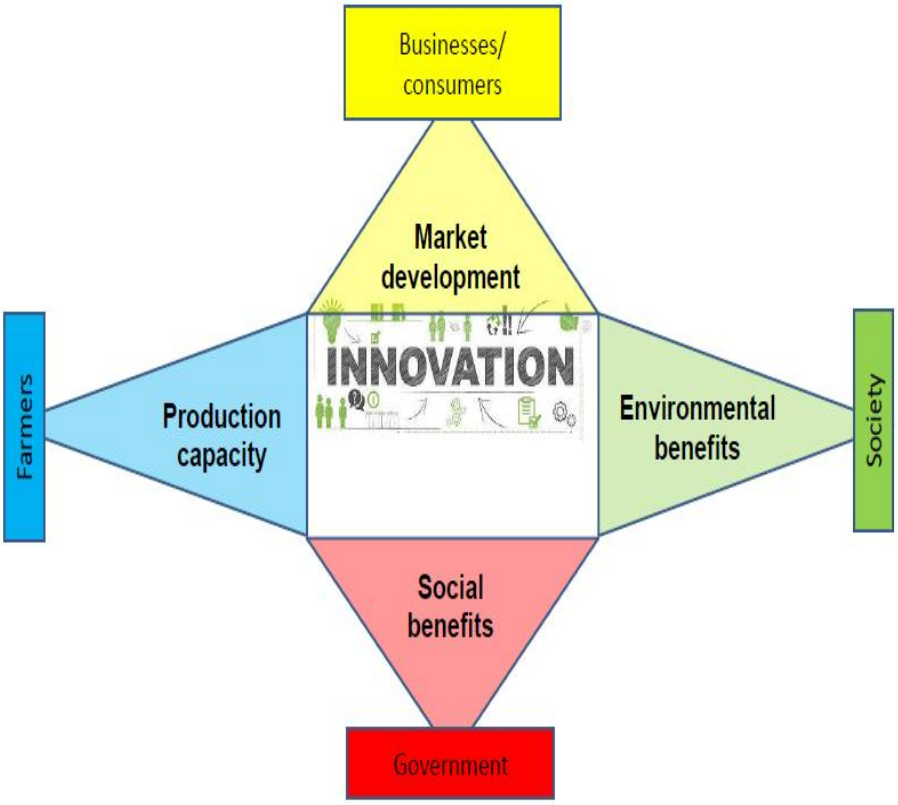
Marketing

- Poor infrastructure
- Lack of grading
- No linkages
- Lack of transparency in prices

An integrated supply-chain would therefore provide access to knowledge, technology, finance and markets leading to shared benefits.

Accelerating Innovation in Organic food and farming systems

A few cases of accelerating innovation in organic food and farming systems are discussed here.



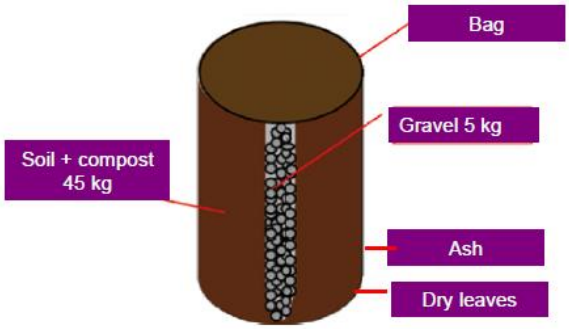
Innovations in Organic Agriculture Model

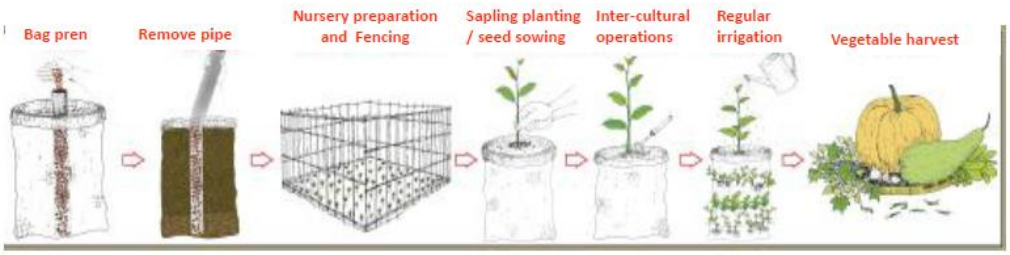
Organic Sack Garden Ensuring Nutrition and Improve the Food Security on Small Scale Households

Organic sack gardening is a method of food production that can significantly improve household nutrition and food security, particularly in resource-constrained environments. It involves growing vegetables in sacks filled with soil, allowing for cultivation in small spaces like rooftops, balconies, or even on the ground. This method is particularly useful in urban areas or regions with limited arable land.

Organic sack garden

Organic sack gardening can be done with little space and using wastewater, while the method is cheap and allows for year-round cultivation. The initiative improves nutrition and food security in a land fraught with poverty and problems related to climate change. It promotes sustainable practices by utilizing recycled wastewater and reducing the need for chemical fertilizers.





Procedure of Organic Sack Gardening

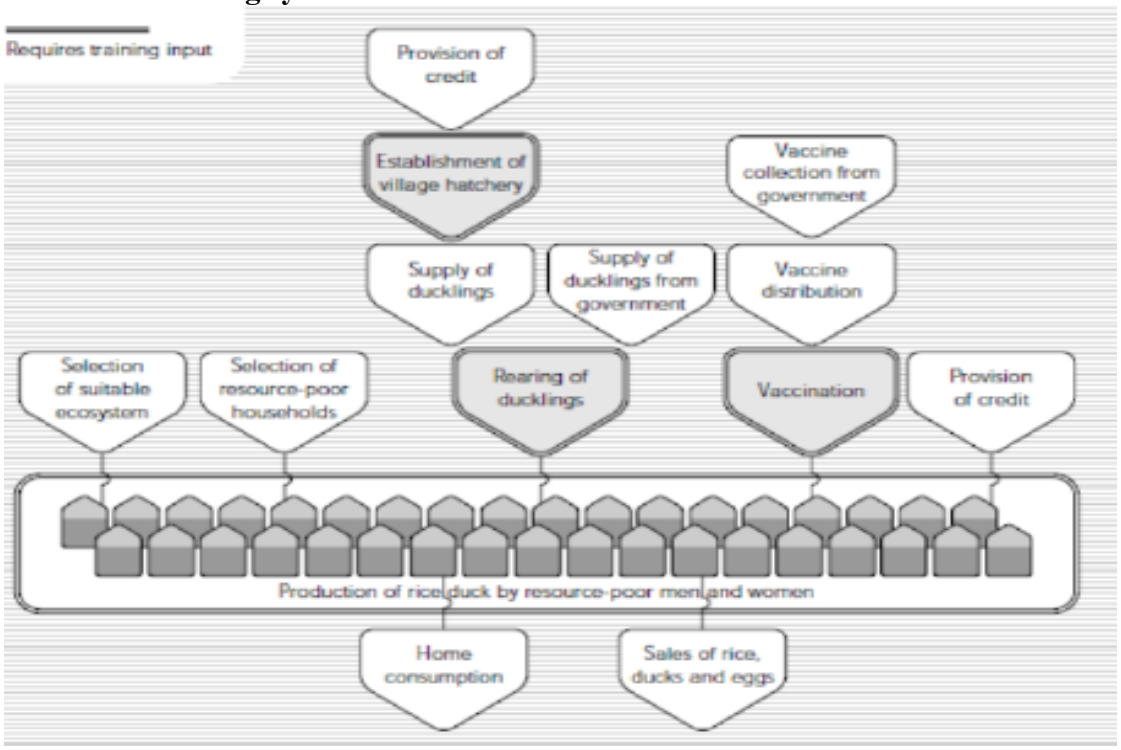
- *Preparation:* Sacks are filled with a mixture of soil, compost, and other organic matter.

- *Planting:* Holes are made in the sides of the sacks to accommodate seedlings or seeds.
- *Care:* Regular watering and maintenance are essential for successful growth.
- *Harvesting:* Vegetables can be harvested as they mature, providing a continuous supply of fresh produce.

2. Environment-friendly Rice-Duck Farming System

The Rice-Duck Farming System is an environment-friendly agricultural method that integrates duck rearing with rice cultivation, offering numerous benefits. This system reduces the need for chemical pesticides and herbicides by utilizing ducks to control pests and weeds. The ducks' activities also enhance soil health, leading to increased nutrient levels and better aeration, which ultimately results in higher rice yields.

Rice-duck farming system



Rice-duck farming system Model

The rice-duck farming system offers a sustainable and economically viable approach to rice cultivation in Bangladesh, benefiting both farmers and the environment.

3. Innovative Zero Energy Cold Chamber for Small-scale Farm Households

A Zero Energy Cold Chamber (ZECC), is a small chamber made out of bricks and sand where farmers can store freshly harvested produce before it is transported to market. The ZECC works on evaporative cooling principles that can be used to provide a cool environment.

The self-life of vegetables as well as their quality can be increased by keeping them in a cool environment. This reduces the rate of deterioration, allows more time for marketing the crop and allows higher quality produce to reach consumers.

The Zero energy Cold chamber

Storage time in summer

The storing time of various vegetables when kept in ZECC during summertime are given in the table.

Vegetables	Room Temperature (Days)	Cool Chamber (Days)
Okra/Ladys-Finger	4	8
Brinjal	4	10
Chilli	2	10
Pointed gourd	4	8
Tomato	4	6
Bitter gourd	6	10
Moringa	4	10

APO (Agricultural Productivity Organization) and Organic Agriculture

The APO champions Green Productivity as a tool for achieving sustainable socioeconomic development in the Asia-Pacific region. To promote Green Productivity in agriculture, the APO has organized several projects over the past few years. It also offers self-learning e-course on organic agriculture.

Organic Agriculture and the Sustainable Development Goals (SDGs)

Organic agriculture plays a significant role in achieving multiple Sustainable Development Goals.

1. Zero Hunger (SDG 2):

Organic agriculture can increase and stabilize yields, improve resistance to pests and diseases, and reduce reliance on expensive chemical inputs, thus contributing to food security and reducing hunger. It promotes sustainable agricultural practices that enhance soil health and productivity, leading to more resilient and reliable food production systems. Organic farming can empower small-scale farmers, particularly in developing countries, by improving their access to markets and increasing their income.

2. *Good Health and Well-being (SDG 3):*

Organic farming minimizes the use of synthetic pesticides and fertilizers, reducing exposure to harmful chemicals for farmers and consumers. It promotes healthier food choices and contributes to improved nutrition by encouraging diverse and nutrient-rich food production. By reducing environmental pollution, organic agriculture also contributes to better public health outcomes.

3. Clean Water and Sanitation (SDG 6):

Organic farming practices, such as using cover crops and crop rotation, can reduce soil erosion and prevent water pollution from agricultural runoff. By minimizing the use of synthetic chemicals, organic agriculture helps protect water sources from contamination, ensuring access to clean water for drinking and sanitation.

4. Climate Action (SDG 13):

Organic agriculture enhances carbon sequestration in the soil, helping to mitigate climate change by reducing greenhouse gas emissions. It promotes more resilient agricultural systems that can better withstand the impacts of climate change, such as droughts and floods.

5. Life on Land (SDG 15):

Organic farming practices, such as promoting biodiversity and reducing pesticide use, contribute to the conservation of ecosystems and biodiversity. It helps maintain healthy soil, which is essential for supporting plant and animal life.

6. *Responsible Consumption and Production (SDG 12):*

Organic agriculture promotes sustainable consumption patterns by encouraging consumers to choose products that are produced in a responsible and environmentally friendly way. It also promotes sustainable production practices by emphasizing the efficient use of resources and the reduction of waste.

CIRDAP Knowledge Series: 07

Ocean in a Changing World-How Can We Help?

Prof. Suchana Chavanich, Professor
Faculty of Science, Chulalongkorn University, Bangkok, Thailand

CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=IKT2dPjEe6M&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=37

SUMMARY

Prof. Chavanich's session, linked to **World Oceans Day 2022**, focused on "Revitalizing Collective Action for the Ocean.". She underlines the ocean's role in regulating climate and supporting livelihoods while warning against over-exploitation, pollution, and coral-reef loss. The presentation reinforces the idea that *an ocean in trouble means humanity in trouble*. Integrated ocean management and community stewardship were highlighted as pathways toward SDG 14.

SDG Linkages: 14

Policy Insight: Institutionalize blue-economy frameworks, protect coastal ecosystems, and invest in ocean literacy.

Theme of World Oceans Day – 2022

The theme for this year (2022) Ocean Day is Revitalizing Collective Action for the ocean; the two terms revitalization and collective action are very endearing and challenging. However deteriorating health of the ocean, acidification, disappearance of coral reefs and mangrove abuse of its living and non-living resources and its impact on our humanity present an enormous challenge to the very survival of the planet we call Earth for the simple fact the ocean is a source of life and human security.

Oceans and UN SDGs

Sustainable Development **Goal 14, "Life Below Water," focuses on conserving and sustainably using the oceans, seas, and marine resources**. This goal is crucial for human well-being and global development, particularly for coastal communities and island nations. It addresses issues like pollution, overfishing, and ocean acidification, aiming to protect marine ecosystems and ensure their sustainable use.

Interlinking with other SDGs

The interdependence of the health of the ocean and urban development are intertwined. In fact the benefits derived from sustainable use of oceans services and resources do not automatically reflect the socioeconomic dimension of an ocean-urban nexus economy. Hence the SDGs and particularly SDG14 cannot be treated as a standalone goal in implementation, but is interdependent on achieving other Goals. The SDGs were created as an interlinked set of mutually reinforcing targets with meeting all of them required to reach the ultimate vision of a sustainable future for our planet and its people.

It is clear to all stakeholders whether urban, costal or islands what transpires in one sector is of consequence in other sectors. We cannot separate climate change from ocean acidification, extreme hurricanes, storm surges to sea level rise, which is an existential threat, from the warming of the planet. The consequent cost is incalculable. Hence, we cannot address the revitalization of the ocean in separation.

Ocean Revitalization

Our celebration of ocean day calls for serious reflection. An ocean in trouble is humanity in trouble. Nevertheless, the capacity of humans for destructiveness is only matched by the

ingenuity of humans for creativity and placing revitalization on the agenda is demonstrative of that attribute.

In pursuing ocean revitalization, we have at hand two strategic avenues with a once in millennium opportunity to create real change, namely the sustainable development goals of 2030 in particular SDG14 and the close possibility of a legally binding international agreement on BBNJ (biodiversity beyond national jurisdiction) - to revitalize the two opportunity it demands a committed and effective multi-lateral corporation which has not been forthcoming of recent times. Multilateral cooperation for capacity building in most aspects of trade and development became even more elusive and challenging. The international community faces a growing demonstrable lack of trust in multilateral cooperation for development, given the deplorable state of regress experienced by most of the humanity, particularly in developing and least developed countries with no economic or social safety nets, and inadequate capacity to meet the targets agreed in the SDGs of Agenda 2030.

What is missing?

Unfortunately, in the past years an effective global ocean financing mechanism at international and national level with priority setting in policy decision has been missing. Availability of targeted and adequate financing is a priority for the desired level of the revitalization process. Facing such realities we have to seek several alternative pathways: starting with public awareness and the role of stakeholders and civil society of the role ocean sustainability plays in their welfare and future.

Way ahead

For the longer term, we need to create a new momentum to ocean literacy through education, awareness creation and long-term capacity development starting from early adjusted children schooling syllabi. Adoption of circular economy processes to reduce the scourge of harmful and toxic substances such as pesticides, chemicals, discards and plastics that is shocking our ocean from and rivers. Accepting eco-system approaches for resolution of adverse impacts on ocean and coasts. The ocean day agenda for managing human relations with an ocean in crisis and benefit from the successful experience of the integrated development approach of the CIRDAP, an international model of cooperation.

Ocean and SDGs: GOAL 14

14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated

fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation

14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

14.A Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries

14.B Provide access for small-scale artisanal fishers to marine resources and markets

14.C Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources.

CIRDAP Knowledge Series: 08

World Rural Development Day – What is it, why does it matter and how to get involved?

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CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=9KAqnX-S1cs&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=36

SUMMARY

Dr. Cherdsak Virapat presents on World Rural Development Day underscoring the significance of commemorating July 6 as a global call to action for integrated rural development aligned with the Sustainable Development Goals (SDGs). Initiated by CIRDAP and proposed to the UN FAO, the day aims to raise awareness of rural communities' vital contributions to food security, ecosystem balance, and socio-economic resilience. With 87% of the world's small farmers residing in Asia-Pacific, the observance seeks to mobilize governments, NGOs, businesses, and citizens to address pressing issues like poverty, undernutrition, and inequality. Through inclusive celebrations—virtual or in-person—featuring awareness campaigns, exhibitions, and policy dialogues, World Rural Development Day fosters global solidarity and accelerates progress toward SDG targets, especially those related to poverty, hunger, and sustainable communities.

SDG Linkages: 1, 2, 11.

Policy Insight: Interconnectedness of rural problems that requires a holistic approach.

World Rural Development Day

World Rural Development Day will be celebrated every 6 July as to inform and to remind everyone on his/her role and responsibility for collaborative actions on integrated rural development as outlined in the SDGs. It is the day to celebrate together to ensure that no one will be left behind and thus rural development shall be everyone duty and responsibility. The date of 6 July has been proposed to UN FAO on 15 December 2020 and to CIRDAP members for establishment. The day is an opportunity to call for global attention and response and to accelerate action on rural development to meet the Sustainable Development Goals in 2030.

It is also a chance to celebrate and appreciate what the rural areas has provided us with resource based and natural beauty that maintain ecosystem balance and support for food production, socio-economic and livelihoods.

Why the World Development Day matters?

Poverty alleviation, food security, nutrition, local governance, trade, livelihoods, access the basic needs, sustainable development and efficient use of natural resources in rural areas are main burning issues of Asia and the Pacific Region and of the world that require special and immediate attention for sustainable development. It is estimated that about 87% of the world's 500 million small farmers are in Asia and the Pacific region.

CIRDAP (*Centre on Integrated Rural Development for Asia and the Pacific*) , a regional, intergovernmental and autonomous organisation, which was established on 6 July 1979 at the initiative of the countries of the Asia-Pacific region and the Food and Agriculture Organization (FAO) of the United Nations, hopes that the Day will help inform the public on important role of rural areas and develop a worldwide movement to improve the quality of

life of the far-reaching marginalized rural people who are living in our prestigious areas in which improving of their well-beings will ensure our human survival.

Why is it relevant in the present scenario?

It is vital to help increase economic activity and employment opportunity in the fight against poverty in rural areas where 500 million small-scale and subsistent farmers are living. According to FAO, almost 690 million people are undernourished in 2019, almost 46% of all children under five of South Asia is underweight. On average, underweight prevalence among children in rural areas is almost double that of children in urban areas in the developing world. According to SDG Progress Report 2021 by ESCAP, the Asia-Pacific Region may achieve less than 10% of the SDG targets by 2030. It is all part of the 2030 Agenda for Sustainable Development adopted by all UN members to end poverty and other deprivations, reduce inequality, spur economic growth, tackle climate change and sustainable management of our terrestrial ecosystems, forests, oceans and resources therein.

Who can get involved?

Everyone can get involved in celebrating World Rural Development Day. CIRDAP & its partners, research institutes, governments, NGOs, businesses and communities all around the world can plan local and global events involving millions of people. World Rural Development Day can be organized virtually as well, meaning anyone can sign up to hear about the relevant talks. CIRDAP expects that millions of people will discuss about it on social media.

How to get involved?

One of the key activities of CIRDAP is establishment of the International Day for Rural Development (World Rural Development Day) on 6 July and organization of events to call for global attention and participation. People can get involved by cchoosing a theme that aligns with the year's focus for World Rural Development Day and organizing events like community field days, awareness campaigns, administering pledges and commitments and discussions that bring rural perspectives into policy conversations, showcasing successful rural development initiatives through exhibitions, festivals etc. By carefully planning and implementing these strategies, a meaningful and impactful celebration of World Rural Development Day can be created that aligns with CIRDAP's mission and promotes sustainable rural development

World Rural Development Day and SDGs

- *Poverty and Hunger*: World Rural Development Day's focus on rural areas directly addresses SDG 1 (No Poverty) and SDG 2 (Zero Hunger), as many of the world's poorest and most food-insecure populations live in rural regions.
- *Sustainable Communities*: The day also aligns with SDG 11 (Sustainable Cities and Communities), encouraging the development of sustainable and inclusive rural communities.
- *Integrated Rural Development*: The celebration emphasizes the interconnectedness of various aspects of rural life, such as agriculture, infrastructure, health, education, and social equity, reflecting the holistic approach of the SDGs.

CIRDAP Knowledge Series: 09

Carbon Sink Capacity of Public Parks and Urban Greening Improvements in a Mega City

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Email: nuanchan.sin@mahidol.edu

CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=u5X8AX3u2rY&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=35

SUMMARY

This webinar explored forests' dual roles in **climate regulation and public health**. Studies from megacities showed that urban parks contribute measurable carbon sequestration while improving community well-being. Integrating biodiversity corridors into city planning was recommended.

SDG Linkages: 3, 8, 11, 13, 15.
Policy Insight: Encourage municipal green-infrastructure policies and citizen participation in tree-planting initiatives.

Background

One of the key variables in sustaining an urban ecosystem is green area management and planning to ensure that the existing green areas are consistent with green area standards to provide services for people. In addition to serving as places for urban-based leisure, recreation, and outdoor activities, green areas are also efficient carbon (C) sinks in where there are expansive built-up areas, numerous industries, and many vehicles, which are C sources, as they emit carbon dioxide (CO2), a harmful greenhouse gas. Similar to other megacities, Bangkok, the capital of Thailand and a main centre of development in Asia, has faced environmental deterioration as a result of its economic expansion and continuous growth, which have led to high consumption levels of resources, energy, goods, and services.

Studies on Urban Greening

During this century, with the global climate change crisis the potential for uurban green areas to mitigate greenhouse gas emissions has been widely studied in terms of carbon sequestration (C_{seq}) of the trees in these areas, particularly in public parks that act as the lungs of urban areas.

In Thailand, carbon sequestration related studies have mainly been conducted in forests, forestry plantations, and agricultural areas studies on urban green areas across the country are limited. Of the 40 major public parks in Bangkok, carbon sequestration studies were performed in only four parks, so far.

Hence, a study was taken up to determine the aboveground densities of Cseq (Cseq-density) and CO2 absorption (CO_2 abs-density) of the trees in 25 major public parks in Bangkok and compare these values among tree subgroups within the two tree groups and among the 25 parks.

Species, number, and density of the observed trees and the relevant details for the 25 public parks in Bangkok

Park code	Total area (ha)	Green area (ha)	Group 1b		Group 2c no. of trees	Total no. of trees	Density (no. ha–1)
			no. of species	no. of trees			
P1	107.9	22.2	47	4,058	149	4,207	190
P2	80.0	44.4	245	3,131	306	3,437	77
P3	61.1	39.1	88	7,422	2,288	9,710	248
P4	57.6	33.7	126	6,468	1,957	8,425	250
P5	11.1	4.7	153	4,552	1,220	5,772	1,228
P6	31.5	21.6	159	4,772	2,464	7,191	333
P7	21.7	8.2	98	1,748	300	2,048	250
P7.1	9.1	6.3	121	2,402	90	2,492	396
P8	24.9	17.5	109	3,284	1,810	5,094	291
P9	25.7	17.3	29	1,054	0	1,054	61
P10	16.0	9.8	46	2,123	155	2,278	232
P11	14.9	4.0	112	964	430	1,394	349
P12	10.8	8.3	57	1,853	23	1,876	226
P13	10.1	6.8	174	1,763	1,642	3,405	501
P14	9.5	8.8	48	2,413	501	2,914	331
P15	8.6	6.6	36	1,858	676	2,534	384
P16	8.4	3.6	55	695	499	1,194	332
P17	8.0	5.4	40	715	618	1,333	247
P18	4.9	2.7	51	694	141	835	309
P19	5.9	3.4	59	737	927	1,664	489
P20	5.4	3.9	60	1,452	11	1,463	375
P21	3.4	2.7	39	403	16	419	155
P22	4.8	2.8	84	550	339	889	318
P23	4.6	2.2	67	659	167	826	375
P24	5.5	3.4	97	780	110	890	262
P25	3.2	1.5	63	725	279	1,004	699
Total	554.6	290.9	542	57,230	17,118	74,348	256f

P2 (Suan Luang Rama IX) was the second largest park (after P1) with the highest diversity of trees in group 1 (i.e., 245 species). However, P2 had a low density of 77 trees ha–1 compared to most parks except P9 (Wareephirom), which had the lowest density of green area at 61 trees ha–1. Although the highest number of trees (9,710) was observed in Wachirabenchatat park of Bangkok, the tree density (248 trees ha–1) in this park was not high compared to the park's green area at 39.1 ha (64% of its total area). Of the parks, Seri Thai park had the highest tree density (1,228 trees ha–1). This moderately sized park (11.1 ha) had 4.7 ha of green area, 153 species of trees in group 1 and 5,772 trees from both groups.

Urban greening to mitigate greenhouse gases in Thailand

The greenhouse gas emissions in Thailand contain the following percentages of gases: 76% CO2, 19% CH4, and 5% N2O, whereas the estimated greenhouse gas emission in Bangkok in 2020 according to the city's master plan on climate change mitigation was approximately 46.44 million t-CO2 equivalents (CO2e). this amount, 14.91, 26.85, and 4.73 million t-CO2e were emitted from the transportation, energy, and wastewater and solid waste management sectors, respectively, whereas 49,279 t-CO2e (i.e. 0.1% of the total emission) was absorbed by the urban green sector.

This study revealed that the trees in the 25 public parks could absorb 83.6% (i.e., 41,219.4 t-CO2) of the total amount of CO2e absorbed by the green sector in Bangkok. Thus, it is important that both trees' Cseq potential and parks' Cseq efficiency should be improved simultaneously with other greenhouse gas reduction measures in the city.

Conclusion

Public parks and urban greening efforts act as vital carbon sinks, helping to mitigate climate change by absorbing and storing atmospheric carbon dioxide. Urban green spaces, including parks, can capture an estimated 1.2 to 1.6 tons of carbon per hectare annually, depending on vegetation type and management. Beyond carbon sequestration, these green spaces also improve air quality by filtering pollutants and reducing the urban heat island effect, contributing to overall urban sustainability.

The 25 studied public parks in Bangkok absorbed 41,219.4 t-CO2 in 2020 or approximately 83.6% of the greenhouse gases absorbed by the city's entire green areas (i.e., 49,279 t-CO2e). However, the absorbed amount of C was trivial, approximately 0.1% of the greenhouse gas emissions (i.e., 46.44 million t-CO2e) in Bangkok in the same year. Thus, multiple measures should be simultaneously implemented to manage both urban C sinks and all green-house gas-related activities. Managing tree density sounds difficult but is possible to do in a public park, where space is manageable because its land use activities can be routinely changed over time by replacing unpopular space-related activities and/or grass areas with more trees.

Carbon sequestration and the Sustainable Development Goals (SDGs)

By reducing atmospheric CO2, carbon sequestration helps mitigate climate change, contributing to SDG 13 (Climate Action). Additionally, it supports sustainable land use practices, enhancing soil health and biodiversity, which aligns with SDGs like 15 (Life on Land) and 2 (Zero Hunger).

SDG 13: Climate Action: Reducing greenhouse gas concentrations, including CO2, is central to SDG 13. Carbon sequestration directly removes CO2 from the atmosphere, helping to limit global warming and its associated impacts, such as extreme weather events and sea-level rise.]

SDG 15: Life on Land: Protecting and restoring terrestrial ecosystems, including forests, wetlands, and agricultural lands, is vital for carbon sequestration. Sustainable land management practices, like no-till farming and agroforestry, can enhance soil carbon sequestration, contributing to both climate change mitigation and improved soil health.

SDG 2: Zero Hunger: Healthy soils are crucial for food production. Carbon sequestration practices can improve soil fertility and water retention, contributing to increased agricultural yields and food security.

SDG 8: Decent Work and Economic Growth: Carbon sequestration projects, including those focused on carbon capture and storage (CCS) technologies, can create new jobs in the green economy.

Reference

Singkran, N. (2022). Carbon sink capacity of public parks and carbon sequestration efficiency improvements in a dense urban landscape. *Environmental Monitoring and Assessment, 194*(10), 750.

CIRDAP Knowledge Series: 10

Webinar on the "International Day of Rural Women"

SDG 3 Good health and well being : The situation of Rural Women

17TH OCTOBER, 2022

11:00 AM (BANGLADESH TIME)

Click here for Zoom Link

CIRDAP

Presenter
Dr. Usharani Boruah
Librarian and Gender Coordinator
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Moderator
Ms. Hurain Jannat
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Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

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Women's Good Health and Well-being

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https://www.youtube.com/watch?v=AqKPaVv6tuI&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=34

SUMMARY

Dr. Usharani Boruah explores the intersection of Sustainable Development Goal 3 (Good Health and Well-being) with the lived realities of rural women in the Asia-Pacific region. Coinciding with the International Day of Rural Women, her presentation highlights how gender inequalities, poverty, and climate vulnerability exacerbate health disparities. It addresses critical issues such as maternal mortality, mental health, limited reproductive rights, and the impact of COVID-19 on migrant women. Despite progress in sanitation, disease control, and digital health access, rural women still face systemic barriers to healthcare due to discrimination, lack of resources, and harmful social practices

SDG Linkages: 3

Policy Insight: Stronger administrative measures, community participation, and intersectoral coordination are required to ensure equitable health outcomes and uphold the rights and resilience of rural women.

Background

October 15 is the UN's International day of rural women. The first rural women day was observed on October 15, 2008 after a General assembly resolution on December 18 2007, in recognition of "*the critical role and contribution of rural women in promoting agricultural and rural development, improving food security and eradicating rural poverty*." This year's theme for the day is "rural women and girls building climate resilience" as an outcome of the un climate action summit. The theme is significant given the challenges and impending crisis of climate change, and it reminds us that a sustainable future for the world is not possible without the contributions of rural women and girls.

Gender Inequalities

For the millions of rural women around the world who play essential roles in food systems, the cost-of-living crisis is deepening gender inequalities. Women's contributions to these vital systems range from cultivation and production, to processing, preparation and distribution of food. Despite this contribution, women globally have less food security than men, and the gap has grown. In 2021, more than 126 million more women than men went hungry. Without equal access to land and other productive resources, women are not able to accumulate comparable assets, income and savings, and these gaps are widening also. This is especially acute where social protection is lacking and where rural women and girls face other forms of discrimination, including older and indigenous women, gender-diverse persons and persons with disabilities. The cost-of-living crisis is also reversing progress on access to modern energy as household incomes decline. This has led to a return to use of unhealthy biomass for fuel for cooking and heating, putting rural women and girls at greater risk of death by household air pollution.

Good Health and Well-being

Good health is a state of being vigorous and free from bodily or mental disease. Health is a state of complete physical, mental and social well-being and not merely The absence of

disease or infirmity. Health is wealth: the value of health is vital for every human on earth. Many people have to suffer from diseases to allergies and stuck with a not so good life for their Entire life. If people had control over health, then they would make sure that there are no issues with it.

Wellbeing is fundamental to our health and overall happiness. Having a strong and well-adapted sense of wellbeing can help us overcome difficulties and help us achieve our goals in life. Wellbeing relates to increased physical benefits, such as lower incidences of cardiovascular disease, stroke and sleeping problems, and with increased productivity and creativeness in both employment and personal lives. Enhancing your wellbeing isn't always easy, but it is always worth it. Eating a healthy balanced diet, getting enough sleep and exercise, and creating healthy Habits to look after your physical health are some of the easiest ways to help develop your sense of wellbeing.

SDG-3: Good Health and Well-Being

SDG 3 aims to achieve universal health coverage, that seeks equitable access of healthcare services to all men and women. It proposes to end the preventable death of newborns, infants and children under five (child mortality) and end epidemics.

Women's Health

Women and men have different health-care needs, but an equal right to live healthily. For many rural women and girls, however, gender discrimination systematically undermines their access to health care, for reasons that include fewer financial Resources and constraints on mobility. The unhygienic and unhealthy conditions of household, unsafe drinking water, open defecation, aggravate expansion of several diseases in rural areas and women are the major sufferers of various diseases. Progress has been made on increasing access to clean water and sanitation and on reducing malaria, tuberculosis, polio and the spread of HIV/AIDS. Advances in technologies such as the internet have enabled the digitization of health records and easier access to online medical resources for doctors and health workers, leading to improvements in patient treatment and outcomes.

Maternal Mortality

Maternal death refers to the death of a woman while pregnant or within 42 days of termination of pregnancy. Included are deaths from any cause related to or aggravated by the pregnancy but not from accidental or incidental *"every day, approximately 830 women die from preventable causes related to pregnancy and childbirth*." (WHO). That most of the world's maternal deaths could be prevented maternal mortality is much more common in rural areas in Asia Pacific region. SDG 3 also aims to reduce maternal mortality to less than 70 deaths per 100,000 live births. Though the maternal mortality ratio declined by 37 per cent between 2000 and 2015, there were approximately 303,000 maternal deaths worldwide in 2015, most from preventable causes.

Women's Mental Health

Nearly one billion people live with a mental health condition across the globe. Before COVID, many of adults and youth in the asia experienced depression. These numbers have risen significantly since the start of the pandemic. Mental health challenges can also impact a

person's family and peers. Many people in Asia provide care to an adult with a mental or emotional health issue, spending lot of hours a week providing unpaid care.

Less Reproductive Rights

Women in rural areas who are in the less reproductive rights. In conservative and slow changing rural societies, women must rely on their husbands or relatives to give them permission to go for prenatal care and delivery and to seek family planning services. Rural women and girls are also vulnerable to the perpetuation of harmful practices such as child marriage, bride kidnapping and widow abuse.

COVID-19 Pandemic and Migrant Women

The COVID-19 pandemic has devastated health systems globally and threatens already achieved health outcomes. Most countries, especially poor countries, have insufficient health facilities, medical supplies and health care workers for the surge in demand. Rural women are mostly the sufferers of the pandemic. During COVID lockdown, migrant women, mainly coming from rural areas who can't go home, are giving birth on the streets and relying on cloth & ash. Since the announcement of the lockdown, who are working in middle East came back to their own country. They have lost their jobs and come back home without money with poor health and stress.

Whenever a disaster strikes, affected farming families often lose all their productive assets, leaving them unable to continue providing for themselves and leaving them totally dependent on external assistance for food, shelter and other essentials. Women more vulnerable than men to natural disasters, conflicts, and other crises because they usually have less access to productive assets, as Tropical storms, cyclones and monsoon floods are recurring events in the Asia & Pacific Region.

Conclusion

The rural womens health in Asia-Pacific has been one of the important issues for development but neglected sectors. Reluctant community participation, dearth of men power, and inter sectoral coordination make the condition nastiest. The administrative measures would involve the regulation and enforcement in public health, population stabilization, health education, safe drinking water, proper ssanitation, disease controlling information, etc.

Sustainable Development Goals (SDGs) – Women's Health and Well being

Sustainable Development Goal 3 (**SDG 3**) focuses on ensuring healthy lives and promoting well-being for all at all ages. This includes specific targets related to women's health, such as reducing maternal mortality, ensuring access to sexual and reproductive health care, and addressing the prevention and treatment of communicable and non-communicable diseases. Gender equality (SDG 5) is directly linked to women's health and well-being, as inequalities and discrimination can negatively impact health outcomes.

Maternal Mortality: SDG 3 aims to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030.

Sexual and Reproductive Health: A key target is to ensure universal access to sexual and reproductive health-care services, including family planning, information, and education.

Communicable and Non-Communicable Diseases: SDG 3 also addresses the prevention and treatment of various diseases, including AIDS, tuberculosis, malaria, and non-communicable diseases like heart disease and diabetes.

Mental Health: Promoting mental health and well-being is also a crucial aspect of SDG 3

Universal Health Coverage: SDG 3 aims to achieve universal health coverage, ensuring that everyone has access to essential health services without financial hardship.

CIRDAP Knowledge Series: 11

Climate Smart Water Management in the Context of Pakistan

Dr. Manzoor Ahmad Malik
Director of the Pakistan Council of Research in Water Resources (Retd.)/former Project Manager
Khyber Pakhtunkhwa Irrigated Agriculture Improvement Project (PISC-KPIAIP).
Email: ma.malik379@hotmail.com

CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=NZjvSsKZsBA&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=32

SUMMARY

Dr. Manzoor Ahmad Malik highlights Pakistan's acute water management challenges amid population growth, climate change, and resource strain, with the country ranked among the top 36 water-scarce nations and projected to worsen by 2050 due to erratic rainfall, glacial melt, and rising temperatures. Policies such as the 2018 National Water Policy and tree-planting initiatives (e.g., 10 billion trees) are advocated, alongside future strategies like declaring water an economic good, enhancing storage, IT-based accounting, and crop quotas.

SDGs Linkages: 2, 6, and 13

Policy Insight: robust governance, equitable distribution mechanisms, and capacity building along with adequate technical interventions can only achieve the SDGs on clean water, climate action, and food security.

What is water management?

The FAO forecasts that by 2050 global water requirements for agriculture will increase by 50 per cent to meet the increased food demands of a growing population. Therefore, it's high time to pay proper attention to irrigation for a sustainable and supportable water management system in agriculture. Agricultural water management or water management systems in agriculture are crucial for several reasons. While it helps ensure the reduction of adverse environmental effects, it also accelerates crop productivity. Management options available include, effective best practices for qualitative and quantitative planning, development, distribution and consumption and water conservation or reducing usage through exiting, improved and/or innovative equipment and practices.

Climate Change Implications for Pakistan

The implications of climate change in Pakistan are given hereunder.

- Pakistan is among the top 36 water scarce countries and will become 20th by 2050.
- World average flood events increased from 127 to 171 over 2005-14.
- Heat wave increased by more than 31 days during the last 3 decades.
- Temperature increase is likely to be higher than the global average, resulting in reduced agricultural productivity.
- Temperature rise and shortened growing seasons will adversely affect yields of agriculture and livestock productivity.
- A 1°C increase in average temperature may reduce wheat yield by 7.4 percent.

Indus Basin Irrigation System (IBIS), Land and Water Resources of Pakistan

Pakistan is highly vulnerable to climate change impacts, including changes in rainfall patterns, increased temperatures, and glacial melt, which can disrupt water availability. The Indus Basin Irrigation System (IBIS) in Pakistan is the world's largest contiguous irrigation system, primarily relying on the Indus River and its tributaries for water supply. This system is crucial for Pakistan's agriculture, contributing significantly to GDP, employment, and exports.

IBIS

The Indus River, originating high in the Tibetan Plateau, courses roughly from north to south through the length of Pakistan before culminating in the Arabian Sea. The Indus Basin, stretching over one million square kilometres, encompasses parts of India, China, and Afghanistan. IBIS is the largest unbroken irrigation network worldwide. It began as a series of irrigation canals constructed during British governance from 1857 to 1947 and has continuously developed since. The IBIS infrastructure is given in the table.

Item	**Quantity**
Storage Reservoirs Live capacity (designed)	3 18.6 MAF
Barrages, headworks and syphons	23
Main irrigation canals Command area Length (including distribution system)	45 17 Mha 61,000 km
Farmer Watercourses Length	110,000 1.6 m.km
Tube wells	1.3 million

Land Resources

The country's geographical area is 80 million hectares(mha), excluding the Northern Areas of Pakistan.

	Land Resources	**Area**
1	Total geographical area	80 Mha
2	Cultivable land	32 Mha
3	Irrigated area from all sources	18 Mha
4	Rainfed area	4 Mha
5	Cultivable waste	10 Mha

Water Resources

Pakistan's mean annual rainfall varies from <100 mm in parts of Balochistan and Sindh provinces to>1500 mm in foothills and northern mountains. The water resources particulars of Pakistan are given in the table.

Inflow from Indus River System	138 MAF (Million acre feet)
Per Capita Water Availability (1947)	5600 m^3
Groundwater	55 MAF
Per Capita Water Availability (2021)	<1000 m^3

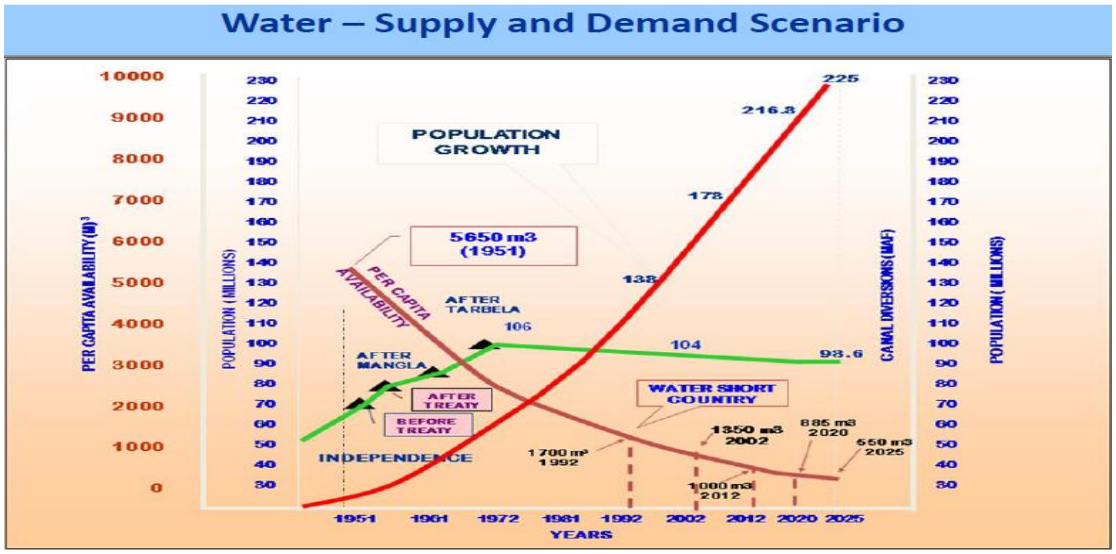
Water management issues in Pakistan

The following are some of the major water management issues facing Pakistan.

- Shortage of water
- Inadequate storage facility
- Sedimentation in storage reservoirs – 0.2 MAF per year
- Low system efficiency (less than 40%)
- Low Productivity per unit of water
- Water productivity of rice (0.45 kg/m3) is 55% below the average in Asia (1.0 kg/m3)

- Water productivity of wheat (0.76 kg/m3) is 24% less than the world (1.0 kg/m3)
- Increased water requirements in all sectors.
- Inequity in water distribution
- Mining of groundwater

The water supply-demand scenario of Pakistan is given in the graph.



Water - Supply and Demand Scenario in Pakistan

National Programme for Improvement of Watercourses in Pakistan (Phase- I and II)

This programme is in progress since last four decades with participatory approach

Being implemented all over the country

Outcome of the Programme

- Increase in Conveyance efficiency: 10%
- Increase in Cropping intensity: 20%
- Increase in Yield per acre: 15%
- Increase in Yield on average: 11-20%

Climate Smart Technologies for Northern Pakistan to overcome Water management issues

- Exploit hydel power potential for coping with economic water scarcity.
- Solar-powered drip for raising apple/vegetables orchards
- Solar powered river water lift up to 100 ft
- Zero energy" water lifting

Climate-smart Technologies for the Plains of Pakistan to overcome Water

High efficiency irrigation system

- Intends to enhance crop and water productivity through efficient irrigation.
- Promote use of solar energy irrigated agriculture and reduction of GHG.
- Shifting the trend to high value crops for poverty alleviation.
- Job opportunities in rural areas through climate smart technologies socioeconomic uplift of farmers and rural community. Target 6000 Ha.

Bed and furrow irrigation

Zero tillage

- Saves 80% energy costs
- 20-25% water saving
- 10-15% better germination
- 30% better fertilizer use efficiency
- 10% better yields

LASER land levelling

- Improves application efficiency (saving 30-40% water)
- Increases the uniformity of water distribution
- Increases fertilizer use efficiency
- Saving irrigation time: 25%-32%
- Increasing irrigated area: 34%-42%
- Improving crop yields: 11%-13%
- Reducing farm cultivable waste land: 2.10%

Irrigation Advisory Services

- Service launched: 8th April, 2016 (trial basis)
- Initially University of Washington servers were used
- Farmers are informed on weekly bases for crop-based irrigation requirements
- Started with initial beneficiaries of 700 and gradually increased to 40,000

Groundwater Management

Demarcation of groundwater quality Zones in the Indus Plain (Thal Doab)

- Explored 6 BCM (Billion Cubic Metres) of fresh groundwater
- It will Irrigate 1.34 Mha of additional land
- Groundwater Quality Mapping in the Upper and Lower Indus Basins

Satellite based groundwater management

- Monthly Monitoring of Groundwater Storage with gravity satellite "GRACE" data of NASA for effective groundwater resource management
- Pakistan has developed capacity to independently operationalize GRACE based groundwater monitoring

Monitoring Transboundary Water Footprints

- GRACE data has indicated that a ground water mining crater has developed along the internation border of India and Pakistan.
- Developed a network of piezometer to monitor the crater for avoiding its adverse implications.

Rainwater harvesting and groundwater recharge

- Constructed 100 rainwater harvesting and groundwater recharge system

Leaky Dam – A new Concept of Groundwater Recharge in Baluchistan

'Leaky dams' are a technique used for groundwater recharge, particularly effective in regions like Baluchistan, which experience flash floods and have porous riverbeds. These dams, built across seasonal riverbeds, slow down floodwaters, allowing sediment to settle and releasing

cleaner water downstream to infiltrate and replenish aquifers. This method helps conserve water, reduce evaporation, and mitigate the impacts of flash floods.

Ecological Measures for Climate Change Implication

- Annual tree-planting campaigns (100 million tree saplings) during spring and monsoon seasons.
- World record by planting 541,176 saplings in a day on July 15, 2009,
- National level project of 10 billion trees has also been launched in 2019

Water and Environment Oriented Policies in Pakistan

The following are the water and environment-oriented policies in Pakistan.

- National Environmental Policy 2005- Ministry of Environment
- National Sanitation Policy 2006 – Ministry of Environment
- Drinking Water Policy 2009 – Ministry of Environment
- Climate Change Policy 2012 – Ministry of Climate Change
- National Water Policy 2018 – Ministry of Water Resources

Way Forward

- Declare water as economic good for all users.
- Small and large dams for enhancing storage capacity
- Managing flood water by surface storage, aquifer recharge, domestic RWH.
- Fine-tuned irrigation scheduling.
- IT and space technology-based water accounting and management.
- Rainwater harvesting at farm and household level.
- Groundwater regulation and extensive groundwater recharge.
- Promoting phytoremediation of wastewater treatment
- Redefining crop phenology reckoning impact of changing climate.
- Cropping quota for water intensive crops for reducing virtual water export.
- Capacity building at all levels.
-

Sustainable Water Management and SDGs

Climate-smart water management is crucial for achieving **Sustainable Development Goal (SDG) 6, which focuses on ensuring access to clean water and sanitation for all**, and also plays a significant role in achieving other SDGs, particularly SDG 13 (Climate Action). By managing water resources sustainably, we can mitigate the impacts of climate change, enhance resilience to its effects, and protect vital ecosystems.

How Climate-Smart Water Management Supports SDGs:

SDG 6 (Clean Water and Sanitation):

Climate-smart water management directly supports SDG 6 by promoting efficient water use, reducing pollution, and ensuring sustainable water resource management, which are all essential for achieving universal access to clean water and sanitation.

SDG 13 (Climate Action):

By reducing greenhouse gas emissions from water and wastewater management, improving water use efficiency, and building resilience to climate change impacts, climate-smart water management contributes significantly to SDG 13.

SDG 2 (Zero Hunger):

Sustainable water management is vital for agriculture and food security. Efficient irrigation techniques, rainwater harvesting, and improved soil moisture management, all part of climate-smart practices, help reduce water scarcity and improve agricultural productivity.

CIRDAP Knowledge Series: 12

Webinar on the Celebration of the "World Soil Day"

The use of vetiver grass for protection of soil erosion in Bangladesh

5 DECEMBER 2022

11:00 AM (BANGLADESH TIME)

Click here for Zoom Link

CIRDAP

Presenter

Dr. Mohammad Shariful Islam

Professor
Department of Civil Engineering
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Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

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The Use of Vetiver Grass for Protection of Soil Erosion in Bangladesh

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CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=Q1xXYpAAi9M&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=31

SUMMARY

Dr. **Mohammad Shariful Islam** discusses in detail the growing challenges and key issues in soil management, on the occasion of World Soil Day -2022. He emphasizes vetiver grass as a cost-effective, sustainable, and climate-resilient bioengineering solution for soil erosion and land degradation in Bangladesh, with strong policy relevance for integrating nature-based approaches into national land and water management strategies. Unlike hard engineering structures, vetiver offers long-term slope stabilization, carbon sequestration, phytoremediation of contaminated soils, and even pest control in rice cultivation, making it a multi-functional tool for environmental governance.

SDG Linkages: 2, 6, 13, 15

Policy Insight: Vetiver is a promising low-cost solution to environmental degradation with prospects of enhancing agricultural productivity and climate resilience

World Soil Day – 2022

World Soil Day 2022 and its campaign "Soils: Where food begins" aims to raise awareness of the importance of maintaining healthy ecosystems and human well-being by addressing the growing challenges in soil management, increasing soil awareness and encouraging societies to improve soil health.

Focus of World Soil Day 2022

Soil Management: Application of operations, practice and treatments that are aimed to protect soil and enhance its quality and performance.

Soil Awareness: The awareness that soil is a very important resource for all living beings including humans.

Soil Health: The capacity of soil to function as a vital living system, within ecosystem and land-use boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health.

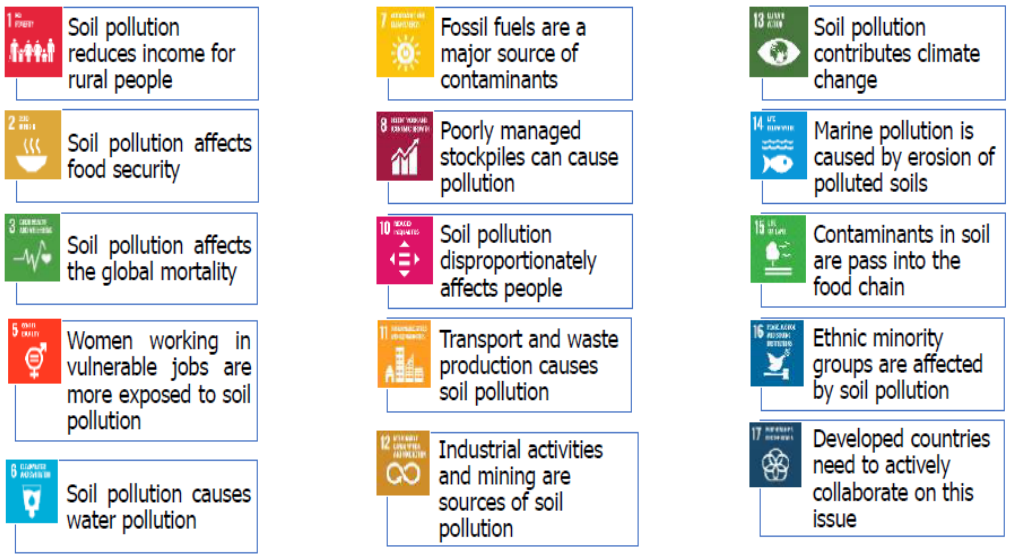
Soils and SDGs

Soils are crucial for achieving many of the United Nations' Sustainable Development Goals (SDGs), particularly those related to food security, climate action, and sustainable land management. Healthy soils support food production, help mitigate climate change through carbon sequestration, and contribute to overall environmental sustainability.

How Soil Pollution hinders SDGs

Soil pollution significantly hinders the achievement of several Sustainable Development Goals (SDGs), particularly those related to food security, health, and environmental sustainability. It impacts SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), SDG

15 (Life on Land), and others, by reducing agricultural productivity, contaminating food and water sources, and damaging ecosystems. The illustration below depicts this effect.



Soil Pollution and SDGs

Soil Erosion

Soil erosion is the displacement of upper layer of soil which is caused by the dynamic activity of erosive agents, i.e., water, ice (glaciers), snow, air (wind), plants, animals and humans. The factors affecting soil erosion are, **climate**, soil structure and composition, **vegetation cover**, topography, human activity and overgrazing of livestock.

Soil erosion management is based on the following tenets:

- highly erodible or susceptible soils must be protected to prevent accelerated erosion,
- potentially productive soils must be conserved properly to sustain their fertility and
- eroded soils must be rehabilitated while averting their further degradation.

Environmental Impacts:

- Eroded soil contains different nutrients and when carried into water bodies, these trigger algal blooms and reduce the water quality
- Destroys streamside vegetation
- Deposition in streams destroys fish spawning areas
- Turbidity from Sediment reduces in-stream photosynthesis
- Erosion removes the smaller particles from topsoil which hampers the re-establishment of vegetation

Economic Impacts:

- Sedimentation reduces reservoir capacity
- Reduces the growth of plant and crops

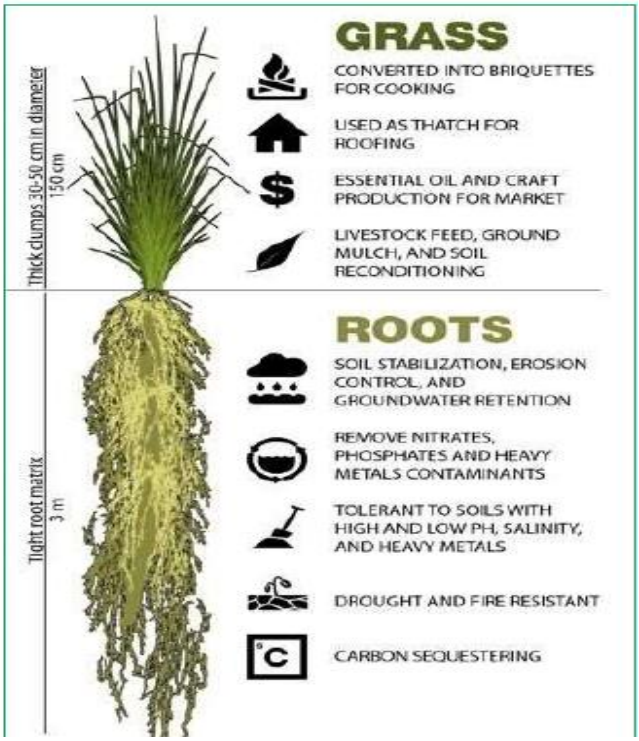
Establishment of vegetation as a soft bioengineering technique to combat Soil erosion

Failure of embankment and riverbank erosion are common problems in Bangladesh. Devastating flood, excessive rainfall and tidal surge accelerates the failure process. The hard engineering structures to combat riverbank erosion makes the scenic environment engineering

unpleasant and helps only to transfer the problem from one place to another place, to the opposite site, or downstream. Establishment of vegetation as a soft bioengineering technique to rigid or hard structures accepted all over the world due to its low cost, longevity and environment friendliness.

Slope Protection: Why Vetiver?

- Vetiver's root system goes up to 14 feet deep in 6-8 months' time.
- Vetiver grass is an "ecological-climax" species. It outlasts its neighbours and seems to survive for decades showing no aggressiveness or colonization ability. It withstands drought and high levels of flooding.
- It is tolerant to high levels of pesticides and herbicides and also to a wide range of toxic and heavy metals. Temperature variation from -14º C to 55 º C, Soil pH from 3.0 to 10.5, High level of tolerance to soil salinity, sodicity and acid sulphate.
- When vetiver roots interact with the soil in which it is grown, a new composite material tensile strength is formed.
- Vetiver roots reinforce a soil by transfer of shear stress in the soil matrix to tensile inclusions. The roots of the grass have an average tensile strength of MPa 75 and improve the shear strength of soil by between 30% and 40%. Engineers liken them to a ″Living Soil Nail″.
- Vetiver grass is an economic attractive solution. In most countries in South-East Asia Vetiver grass can be planted h is 60-70% less relative to hard engineering practice.
- All these attributes show that Vetiver grass will be very suitable for slope protection in Bangladesh context.



Vetiver grass

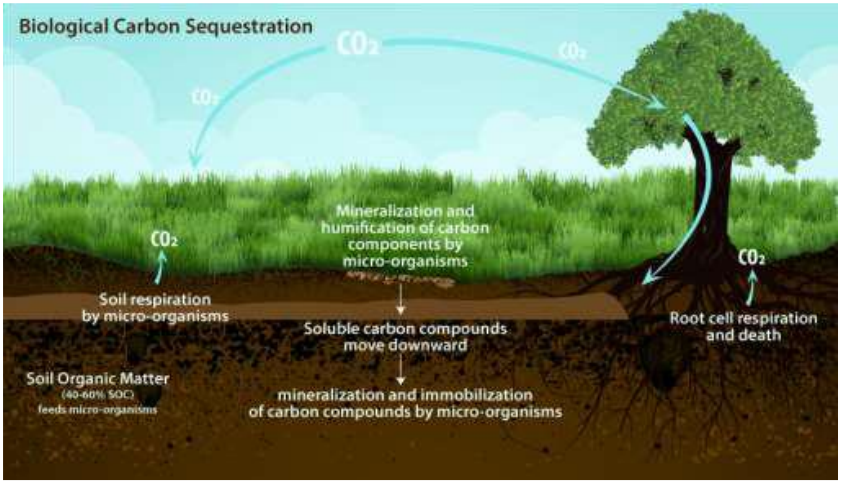
Vettiver in Canal bank

Bridge approach

Road slopes

Effect of Vetiver in Carbon sequestration

Vetiver grass significantly enhances carbon sequestration in soil due to its deep, fibrous root system and high biomass production. This process involves the capture of atmospheric carbon dioxide through photosynthesis and its subsequent storage in plant biomass and soil. Studies show vetiver can increase soil organic carbon, reduce atmospheric CO2, and mitigate climate change.



Biological carbon sequestration

Vetiver's use in phytoremediation

Phytoremediation basically refers to the use of plants and associated soil microbes to reduce the concentrations or toxic effects of contaminants in the environment. Phytoremediation can be divided into five subgroups. Researchers have used either one or combinations of the following subgroups:

Phytoextraction: Plants remove heavy metals from soil and accumulate them in their foliage.
Phytodegradation: Plants degrade organic pollutants.
Rhizofiltration: Plant root system absorbs metals from waste system.
Phytostabilization: Plants minimize movement of contaminants in soil environment.
Phytovolatilization: Plants volatilize pollutants into the atmosphere through biological activity.

Of these, the phytoextraction capacity of vetiver grass has been studied. Vetiver grass can be used to remove heavy metals from contaminated soil. Its uptake efficiency can be increased by using chelating agents such as citric acid. Arsenic is a dangerous heavy metal that causes severe diseases. In a study in Munshiganj, Bangladesh, Vetiver had shown promising results in arsenic removal from contaminated soil. Vetiver has also been proven to be fruitful in removing contaminants from polluted water. However, more research is required in this field.

Vetiver for Stem Borer Control in Rice

- Vetiver can control some rice stem boresr and it is being used by Chinese Farmers to control Stripped and Pink Stem Borer.
- Bangladeshi rice is affected by these two insects but it is most impacted by Yellow Stem Borers.
- Yellow Stem borer prefers Vetiver to rice and will lay eggs on it. When the eggs hatch into larva, they start eating vetiver which then destroy an important digestive enzyme of the larva-killing it.
- In a world grappling with climate change, Vetiver's deep-rooted resilience offers Bangladesh a nature-based remedy to restore balance, enhancing groundwater reserves and preventing soil erosion in flood-prone regions.

Way Forward

- At first the cause of land degradation and its extent need to be studied and then appropriate technologies need to be adopted to maintain sustainable agricultural practices for ensuring food security.
- Vetiver, being readily available near different waterbodies in Bangladesh, can be used as a cost-effective, sustainable and environment-friendly solution for soil erosion and pollution control and moisture retainer.
- Limited research has been done to assess its effectiveness in the removal of heavy metals. However, more research is required in this direction.
- Research should focus on climate, landscape, soil criteria, thematic map, long-term climatic and surface and groundwater databases etc. for minimising land degradation. Further research is also needed for better adaptation of bioengineered techniques for reducing soil erosion. Phytoremediation of contaminated soil using vetiver needs to be piloted.

How Vetiver Supports SDGs

Vetiver grass is a valuable tool for achieving several Sustainable Development Goals (SDGs) by promoting soil and water conservation, and protecting against erosion. Its deep, strong roots stabilize slopes and prevent landslides, while its dense foliage helps slow down and spread-out water runoff, reducing erosion and improving soil health. This aligns with SDG 2 (Zero Hunger), SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 6 (Clean Water and Sanitation).

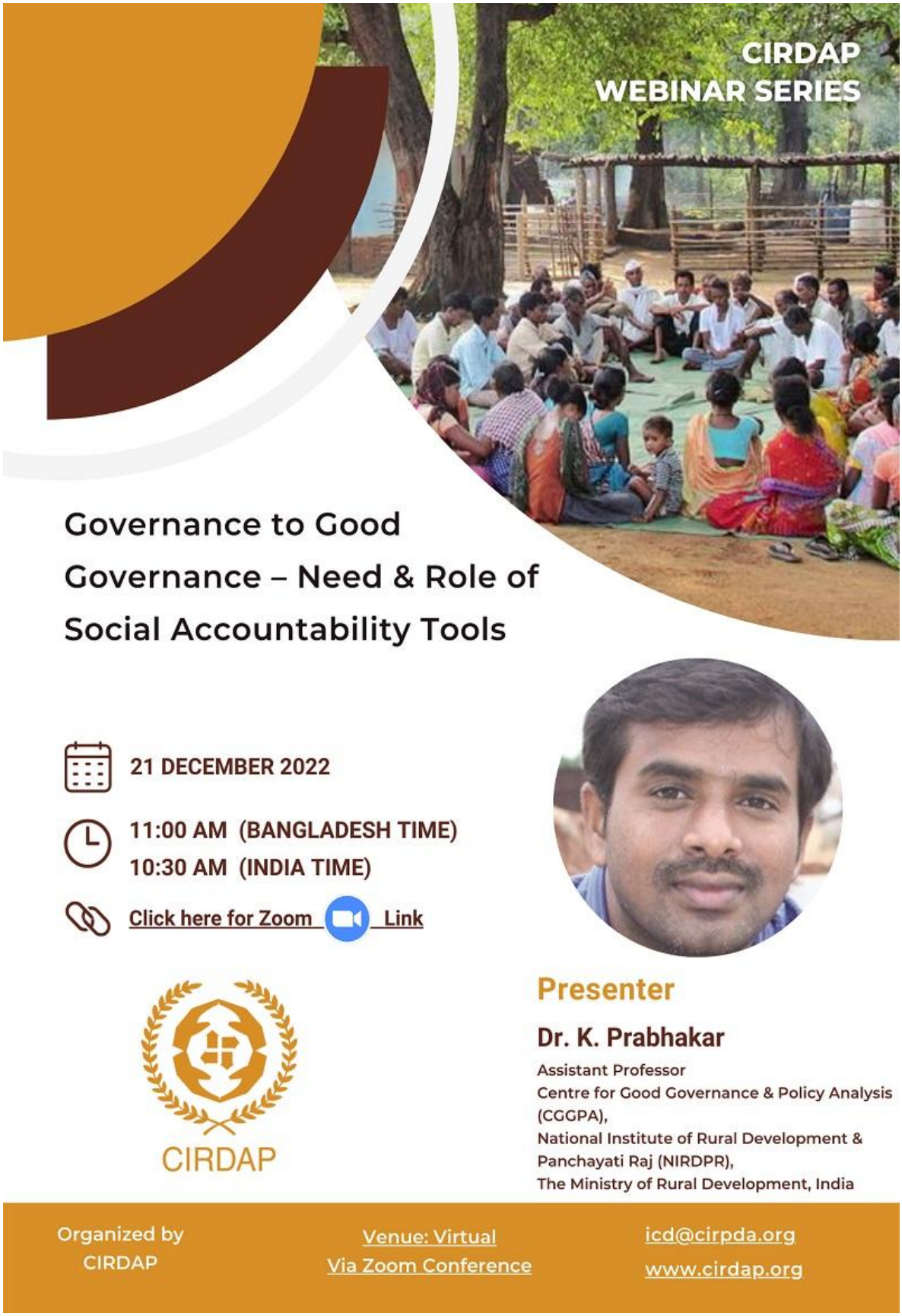
SDG 2: Zero Hunger: By improving soil fertility, reducing erosion, and enhancing water retention, vetiver grass helps farmers increase crop yields and achieve food security, especially in regions with degraded land.

SDG 6: Clean Water and Sanitation: Vetiver grass plays a crucial role in watershed protection by reducing sediment runoff into water bodies, improving water quality, and preventing the spread of waterborne diseases.

SDG 13: Climate Action: Vetiver grass helps mitigate climate change by sequestering carbon in the soil, reducing the impacts of extreme weather events like floods and droughts, and promoting sustainable land management practices.

SDG 15: Life on Land: By stabilizing slopes, preventing erosion, and improving soil health, vetiver grass contributes to the protection and restoration of terrestrial ecosystems, promoting biodiversity and sustainable land use.

CIRDAP Knowledge Series: 13



Governance to Good Governance: Need & Role of Social Accountability Tools

Dr. K.Prabhakar

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CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=Ho9DPfN5Jc8&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=30

SUMMARY
Good Governance Day is observed in India annually on the twenty-fifth day of December, the birth anniversary of former- Indian Prime Minister Atal Bihari Vajpayee. In this presentation, **Dr. K Prabhakar** discusses in detail the concepts of governance, the components of good governance, and social accountability tools, on the occasion of 'Good governance day'. He highlighted participatory monitoring, social audits, and community scorecards as instruments of **transparent rural governance**. Digital grievance redressal and open-data platforms improve efficiency and trust between citizens and institutions.
SDG Linkages: 1, 2, 6, 11, and 16
Policy Insight: Institutionalize social-accountability mechanisms in local development plans.

Governance and Good Governance

Governance is the exercise of Political, Economic and Administrative authority to manage a nation's affairs. It is the complex mechanisms, processes, relationships and institutions through which citizens and groups articulate their interests, exercise their rights and obligations and mediate their differences. Governance encompasses every institution and organization in the society, from the family to the state and embraces all methods - good and bad - that societies use to distribute power and manage public resources and problems.

As per **World Bank**: *Good governance entails*

- sound public sector management (efficiency, effectiveness, and economy),
- accountability,
- exchange and free flow of information (transparency), and
- a legal framework for development (justice, respect for human rights and liberties).

As per **DFID (Department for International Development, UK)**

Good Governance is defined focusing on

- legitimacy (government should have the consent of the governed),
- accountability (ensuring transparency, being answerable for actions and media freedom),
- competence (effective policy making, implementation and service delivery), and
- respect for law and human rights.

Governance Indicators

The World Bank had identified six governance indicators as follows:

- Voice & Accountability
- Political Stability and Lack of Violence
- Government Effectiveness
- Regulatory Quality

- Rule of Law
- Control of Corruption

The UN has listed out eight characteristics of good governance as given hereunder.

1. Accountability:
    - Applicable to government, civil society and private sector
    - Types: Political, legal, administrative and social accountability
    - Components: Answerability, sanction, redress, and system improvement
2. Transparency
    - Free flow of information
    - Accessibility of information to those affected by decisions taken in governance process
3. Responsiveness
    - Citizen orientation, citizen friendliness
    - Timely delivery of services
    - Redress of citizen grievances
4. Effectiveness and efficiency
    - Optimum use of resources
    - Competency and performance of civil servants
    - Result orientation
5. Rule of law
    - Fair legal framework
    - Impartial enforcement machinery
    - Independent judiciary
6. Participation
    - Cornerstone of Good Governance
    - Opportunities for citizens to participate in decision making, implementation and monitoring of government activities
    - Freedom of expression and association, organized civil society
7. Equity and inclusiveness
    - All groups, particularly the most vulnerable, have opportunities to improve or maintain their well being
    - Equal opportunities for participation in decision making process
8. Consensus Orientation
    - Mediation of different interests in society to reach a broad consensus on what is in the best interest of the whole community, how this can be achieved

- Independent judiciary

Cornerstone of Good Governance

- Opportunities for citizens to participate in decision making, implementation and monitoring of government activities
- Freedom of expression and association, organized civil society

Eight characteristics of Good Governance

Social Accountability

Social accountability can be defined as an approach towards building accountability that relies on civic engagement, i.e., in which it is ordinary citizens and/or civil society organizations who participate directly or indirectly in exacting accountability.

The case against public services in a country:

Public Services are often thought to be characterized by

Monopolistic 'attitude' – Lack of 'exit' options

Inadequate transparency, in

- Budget Formulation – How public resources are allocated
- Budget Review & Analysis – Diagnosing the implications of the budget when formed
- Expenditure Tracking – Seeing where the money goes
- Performance Monitoring – Even after the money is spent, see how the output/service is performing

Accountability/governance Deficit – Weak Monitoring & Regulation; Poor grievance redress / non- responsiveness, corruption and inefficiency /poor policy implementation

Pre-rexquisites for Success of Social Accountability through Civil society and State-driven initiatives

- Citizen commitment, resources and energy
- Intermediate organizations and non-partisan leadership
- Democratic traditions and tolerance of dissent in society
- State's willingness to empower the people

How to Empower Citizens

- Remove information unevenness
- Publicise standards of service, remedies, rights of citizens/users
- Increase transparency, access to information
- Strengthen supervision for compliance

Social Accountability Tools

These tools are range of methods, tools and choices that involve ordinary citizens and civil society in general into the process of allocation, tracking disbursement, and monitoring use of public resources. These mechanisms help ensure greater accountability to citizens for public actions and outcomes and they constitute demand side approaches_to public policy reform.

- Election Monitoring
- Asset verification
- Participatory budgeting
- Public Expenditure Tracking
- Public feedback mechanisms like Social Audits
- Community/citizen monitoring of over-all performance of public agencies, e.g. through Citizen Report Cards and Community Scorecards
- Public disclosure initiatives
- Right to information movements

Enablers of Social Accountability

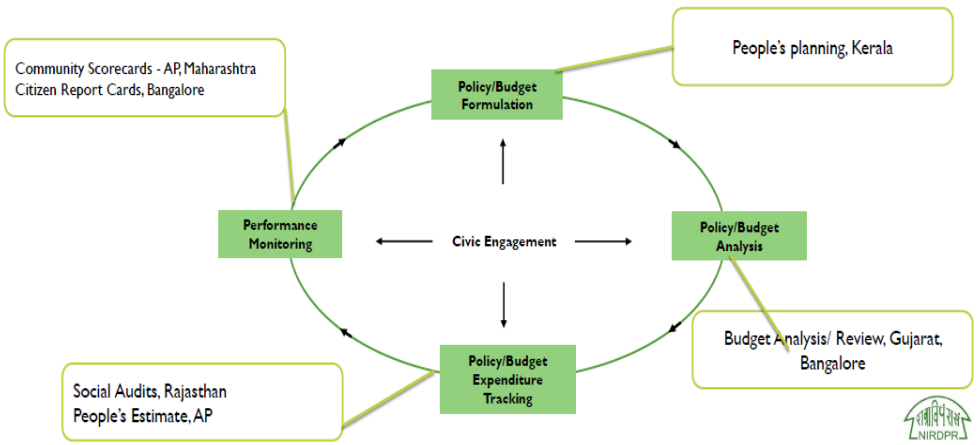
A few cases of enablers of social accountability are:

- RTI – Right to Information Act (Bangladesh, India, Nepal)
- Good Governance Act (Nepal)
- Procurement Act (Bangladesh, Pakistan)
- Right to Public Service Act –RTPS (India)

Common Social Accountability Tools (SAT) used

Some of the common SATs used are -

- Citizen Report Card
- Community Score Card
- Participatory Budgeting
- Budget Analysis
- Public Expenditure Tracking
- Social Audit
- Citizen Charter
- Public Hearing
- Ombudsman
- Citizen Juries
- Community



SATs used by Civil Society Groups in India

Assessing the applicability of SATs

Countries can check if they have applied SATs with the following checklist.

Political Context – Political institutions in your country support or hinder methodologies like SAT?

Decentralization – Do local bodies have reasonably high degree of financial & policymaking power?

Ability to Seek Feedback – Would organizations feel safe conducting public feedback exercises like the SAT?

Freedom of Expression – Do citizens feel free to give honest feedback about government services?

Active Civil Society Organization – Are there active CSOs in the country? Are they independent & non-partisan?

Survey Skills & Advocacy – Are there demonstrated local skills for survey and analysis?

Free Media– Is the media independent? Do they cover issues related to public services? Will they cover SAT findings and present them in an unbiased manner?

Service Provider Responsiveness – Do service providers seek consumer/user feedback? How open would they be to independent assessments on their performance?

Political Involvement– Would higher levels of the government take interest in the findings?

Citizen Report Card (CSC)

Citizen Report Cards (CRCs) are a social accountability tool that uses citizen feedback to assess and improve public service delivery. They involve citizens evaluating the performance of government agencies and service providers, often through surveys, and sharing the results to promote transparency and drive improvements. CRCs are a specific tool used to implement social accountability mechanisms.

Features of CSCs

- Pioneered by Public Affairs Centre, Bangalore, India in 1993
- Generates credible user feedback on public services based on sound research methods
- Provides scientific evidence to enact responsiveness & accountability from service providers
- Creates an environment to facilitate demand mobilization &`Rights-Based' strategies
- Report always in PUBLIC DOMAIN
- Thrusts for Continued benchmarking

How to enhance CSCs?

Through feedback from all stakeholders

- Higher level officials, service delivery implementers, community monitors in addition to users
- Highlights issues faced by both demand and supply side – a more balanced view
- Helps providers to understand the gaps and work towards plugging them

Use of more than one tool in an exercise

- A combination of tools for better effectiveness
- Rural CRCs – CRCs to push for change at the RDPR and district level, CSCs at the GP level to push for joint action

Variety in Impact of CRCs across countries

- Agencies discuss performance with citizens in open forum in Bangalore
- Systematic citizen watch-dog role in local govt. in Ternopil, people's voice project, Ukraine
- Forcing political accountability in Mumbai slums
- Independent approach to monitor pro-poor services in Zanzibar, Ethiopia & Tajikistan
- Lower-level officials cite findings to seek funds & support in Mumbai, india
- Political leadership asks for more direct feedback in Delhi, India
- Regulatory bodies seek independent voices in Kenya
- Benchmark local self-governments in India

Conclusion

Use of SATs, therefore helps in strengthening Public Accountability, stimulating Stakeholder Participation- space for Voice & Contestation – Citizens' Manifesto, increasing Public Awareness – from unreliable to evidential, enhancing Mobilisation & Partnerships – Social Capital and in influencing Reforms – identifying new priorities, leveraging resources at the lower levels, setting standards & norms and institutionalizing public participation.

How Good Governance is related to SDGs

Good governance is crucial for achieving the Sustainable Development Goals (SDGs) as it provides the foundation for effective implementation and sustainable progress. It encompasses principles like transparency, accountability, participation, and the rule of law, which are essential for building robust policy frameworks and ensuring that development efforts reach all segments of society. Social accountability is crucial for achieving the Sustainable Development Goals (SDGs) as it ensures transparency, effectiveness, and inclusivity in the implementation and monitoring of these goals. It involves holding individuals, organizations, and governments responsible for their actions related to the SDGs and their impact on communities

Policy Frameworks and Prioritization:

Good governance involves establishing clear priorities, allocating resources effectively, and developing policies that address the interconnected challenges of the SDGs.

Effective Service Delivery:

Strong governance ensures that public services are delivered efficiently, equitably, and are responsive to the needs of citizens, including the most vulnerable.

Resource Management and Environmental Protection:

Good governance promotes responsible use of resources, minimizes corruption, and fosters environmental consciousness, which are vital for sustainable development.

Promoting Peace, Justice, and Inclusion:

Good governance ensures access to justice, protects human rights, and fosters peaceful and inclusive societies, which are essential for achieving SDG 16 and other related goals.

Stakeholder Engagement:

Good governance encourages participation from various stakeholders, including civil society, the private sector, and citizens, in decision-making processes, leading to more effective and sustainable solutions.

Monitoring and Evaluation:

Robust monitoring and evaluation systems, integral to good governance, help track progress towards the SDGs, identify areas for improvement, and ensure accountability.

CIRDAP Knowledge Series: 14

Identifying the Gender-Nutrition intersections in India: Quantitative and Qualitative Evidence

27TH FEBRUARY 2023

11.00 AM (DHAKA TIME)
10.30 AM (INDIA TIME)

Click here for Zoom Link

CIRDAP

Presenter

Dr. Ruchira Bhattacharya

Assistant Professor & Head in-Charge
NIRD-PR Delhi Branch
New Delhi 110003

Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

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Gender & Nutrition intersections in India: Quantitative and Qualitative evidence

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CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=4pml5hsBq6o&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=29

SAMMARY

Gender inequalities and gender norms restrict women's access to resources and services, such as land, knowledge, and food, leading to nutrition insecurity. In India, many women are actively employed in the agricultural sector while simultaneously facing circumstances that leave them and their children vulnerable to poor nutrition. In her presentation, Dr. **Ruchira Bhattacharya** discusses in detail the gender & nutrition intersections and gendered challenges in India. Quantitative and qualitative analyses demonstrated that gender disparities influence dietary diversity and household nutrition outcomes. Empowering women through education, income, and social capital improves family nutrition and community health.

SDG Linkages: SDG 2, 5, 16.

Policy Insight: Promote women-led nutrition initiatives and gender-sensitive agricultural policies.

Background

India has consistently recorded a higher proportion of malnourishment and hunger in women and children. As per National Family Health Survey, NFHS 5 (2019-21), every second woman in reproductive age and nearly two in three children (6-59 months age group) had anaemia (haemoglobin levels below 11.0 g/dl). From 2015-16 to 2019-21, there is a mild decline in chronic energy deficiency (BMI<18.5) – which is supplemented by a notable increase in obesity in adult women. Further, in the under 5 group, one in three children were suffering from stunting, one in five children reported wasting, and every tenth child in India was suffering from acute malnourishment.

Gendered Nature of Hunger:

Studies show that more women and girls experience hunger than men and boys, highlighting a gendered dimension to food insecurity. This is often due to deeply ingrained social and cultural norms that disadvantage women in access to resources, opportunities, and decision-making power.

Land-holding and Food Security: Land ownership is a crucial factor in food security. Limited or no land ownership for women can significantly restrict their ability to produce food for their families or to generate income for food purchases, leading to increased vulnerability to hunger and malnutrition.

WFP Gender Policy (2015-2020): The WFP's gender policy, adopted in 2015, explicitly addresses the need to integrate gender considerations into all its operations. This involves ensuring that food assistance programs are designed and implemented in a way that promotes gender equality and empowers women and girls.

Chronic Hunger and Gender: Chronic hunger, characterized by prolonged inadequate food intake, is often exacerbated by gender inequalities. Women and girls may be particularly

vulnerable to chronic hunger due to factors like unequal food distribution within households, limited access to nutritious food, and increased vulnerability to climate change impacts.

Intersectionality: It's important to recognize that gender intersects with other social factors like poverty, ethnicity, and disability, further compounding vulnerability to hunger. Addressing these intersecting inequalities is essential for achieving food security for all.

Gender intersected with Food production

Women farmers play an important role in the production and development of rural economy. Agriculture, the single largest production endeavour in India and contributing substantially to the GDP, is increasingly becoming a female activity. Agriculture sector employs 80% of all economically active women; they comprise 33% of the agricultural labour force and 48% of self-employed farmers. Women play a significant and crucial role in agricultural development including, main crop production, livestock production, horticulture, post-harvesting operations, agro/social forestry, fishing etc.

The visible rise in women's responsibilities in agriculture is a result of increasing diversification out of family farming, which is being driven by demographic pressures and land fragmentation. It also reflects the intensification of agricultural production, which affects the demand for female and male labour.

The primary areas of concern from interventions related to gender and agriculture are given hereunder:

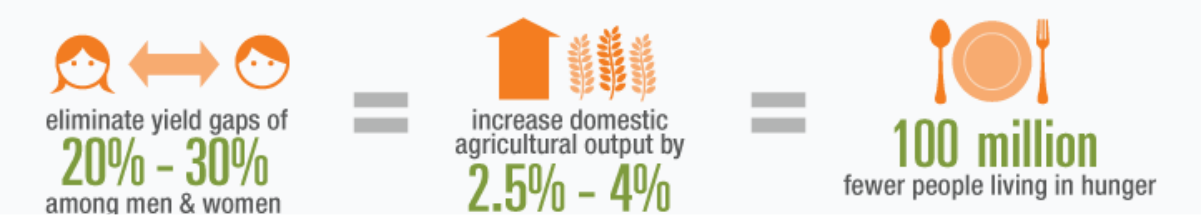
- gender-specific use, control and ownership of assets and their effect on the adoption of agricultural practices; and, conversely,
- the impacts of agricultural interventions on the gender-differentiated use, control and ownership of assets.

Women's Access to Productive Resources, Assets, Services and Infrastructure

Women face gender disparities in access to and control over land, as well as a lack of access to other productive resources and services. Legislation and policies, decentralized administrative and institutional capacities and public awareness campaigns need to assert, protect and enhance rural women's rights to land and property. Constraints to women's access to financial services (credit, savings and loans, insurance, etc.) include policy and legal barriers as well as cultural norms that prevent women from developing and growing enterprises, improving productivity, keeping bank accounts or entering into contracts without their husbands or another man. Women's lack of ownership over assets that can be used as collateral to leverage loans also constrains them more than men.

Improving women food producers' productivity

To improve women food producers' productivity, interventions should focus on reducing their workload, enhancing their access to resources and technology, and strengthening their capacity through training and support. This includes providing access to water sources, transportation, and labour-saving agricultural tools. Additionally, initiatives should address gender-specific challenges related to land ownership, access to finance, and market opportunities.



Improving women food producers' Productivity

Post-Covid Challenges for Rural Women in India

The rural women in India have been experiencing the following challenges in the post-COVID scenario.

- The sources of seasonal work dried up with the lockdown juxtaposing with lean season
- The access to regular employment opportunities, which was already low, further worsened with *Anganwadis* and schools being closed.
- The independent sources of income of women lowered
- Nutrition, health, education witnessed varying degrees of setbacks
- Recorded decline in household food consumption, high PDS demand, and extreme fall in dietary diversity especially for women and girl child in the rural households.

Gendered Challenges

Challenges to Women as Producers

The following are the challenges faced by women as producers

- Can't access welfare net that requires ownership of land as inclusion criteria
- Do not get fair share of produce and earning
- Overworked and burdened with house-work and outdoor work – devalued contributor-invisible to policy.
- Limited bargaining power with state institutions and markets

Challenges to Women as Consumers

The following are the challenges faced by women as consumers.

- Lack of access to sufficient food or dietary diversity
- Circle of poverty and malnourishment
- Low access to land/farm-decisions, lower share of produce/income, lower purchasing power, lower bargaining power

Gender Differences in Access to Nutrition and Food Production in Rural India

In rural India, gender disparities significantly impact access to nutrition and food production, with women often facing disadvantages in both areas. The Women's Empowerment in Agriculture Index (WEAI) and similar tools are being used to assess women's empowerment in agriculture, including their access to resources and decision-making power, which are crucial for understanding and addressing these gender gaps. Recent literature advocates investments in empowerment programmes for better nutrition. Women's empowerment is observed to improve women's direct access to nutritional security, indirect determinants of nutrition such as adequate quality and quantity of diet, disease susceptibility, quality of caring practices, safe water and sanitation, nutritional outcomes of the household and children through better child care, increased health seeking behaviour, access to services and better self- esteem.

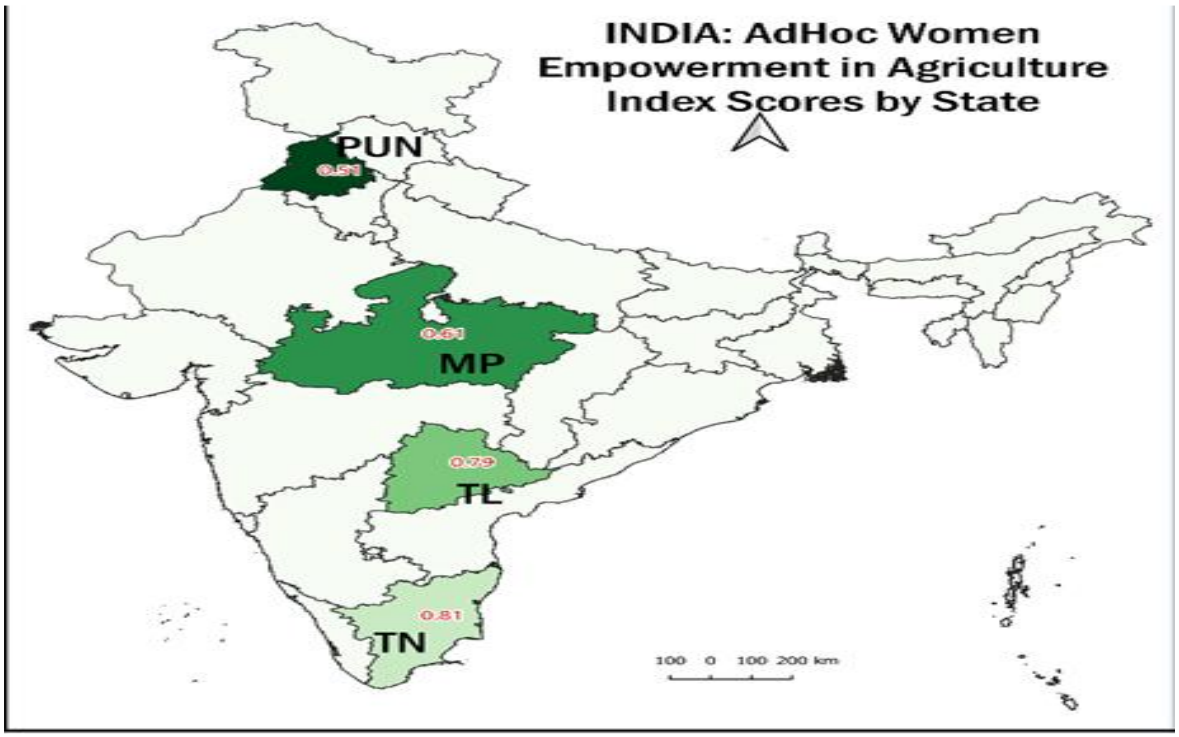
Contextualised WEIA: Measuring Women Empowerment in Agriculture

The following table describes the operations carried out by men and women for measuring women empowerment in agriculture.

OPERATIONS	MEN	WOMEN/CHILDREN
WEEDING	Decision to take up the task	Performs the task
SOWING	Decides on crop (jointly)	Jointly Decides and Performs the task
FERTILIZER/ PESTICIDE	Decides the type of inputs, quantity and time of work, jointly performs	Jointly performs
HARVESTING	Decision and Performing the task	No primary role
POST-HARVEST	No primary role	Decisions on process and performing the task
SELLING	Decision and Performing the task	No primary role

Women Empowerment in Agriculture Index scores of Indian states – Quantitative study

A study on ascertaining the Women Empowerment in Agriculture based on their WEIA scores in the states of Punjab, Madhya Pradesh, Telangana and Tamil Nadu, revealed that the score was lowest in Punjab and highest in Tamil Nadu. In terms of all the districts, Mansa in Punjab showed the worst empowerment score, though Punjab was the richest in terms of asset ownership. The results point to the need for an overhaul of the community development and mobilisation programmes to address women's participation and access to resources in the studied areas.



WEIA scores

The following key points emerge as a result of this quantitative study –

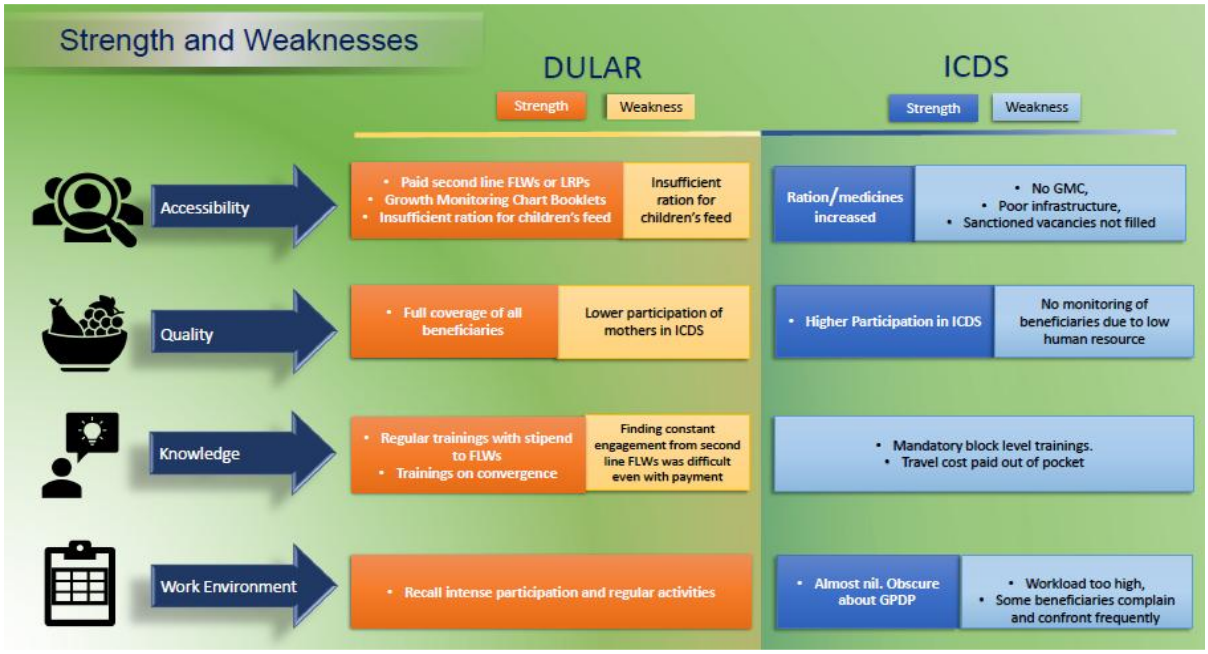
- Women-Empowerment should be a key strategy for nutrition through a long-term commitment to improving gender-equality through all policy and development channels.
- However, there should be rethinking of the high priority of economic or income-generating policies for women's empowerment. Rather than prioritizing income generation as the only policy for empowerment, there should be specific policies for specific inadequacies.
- There is a need to improve women's participation in decision making considering the geographical and wealth-based variations of disempowerment. There needs to be more deliberations on modifying the indicators for WEAI to make it effective in capturing region-specific differences. There is a need to look beyond WEAI for contextualized metrics of empowerment to capture specific inadequacies within their socio-demographic environment.

Service delivery for supplementary nutrition interventions in Dular UNICEF – a qualitative study

Malnutrition outcomes have either remained rigid or regressed despite having some of the largest nutritional interventions, such as Integrated Child Development Services (ICDS). The UNICEF-Dular strategy was launched in 2000 in four districts in Bihar. Muzaffarpur, Vaishali, Nalanda and Gaya (The intervention complemented the government in providing community services through a pool of Local Resource Persons (LRP) or community workers. The strategy aimed at:

- Encouraging the improved child-caring habits among families/communities with the help of networks of the community-based women volunteers.
- Creating a new environment where ICDS and other health system can work together more efficiently.

The strengths and weaknesses of Dular and ICDS, identified by the qualitative inquiry are given hereunder.



How to inform nutrition policy of gender?

Firstly, since poor nutritional intake tends to concentrate among the disempowered, the solutions to increasing or improving nutritional intake is also linked with empowering women.

Secondly, an overhaul of the community-development and mobilization programs is needed to address women's participation and access to resources in the studied areas. There is a need to re-energize the SHG based programmes for an immediate improvement of women's participation in decision making.

Thirdly, the geographical and wealth-based variations of the disempowerments should also be considered. A rethinking for identifying the indicators for WEAI to capture these geography-specific differences in a comparable form?

Lastly, the study shows that malnutrition gap that exists within household men and women can be reduced if gender parity in household decision making around production system can be improved. A long-term commitment to improving gender-equality through all policy and development channels is needed in that direction.

Gender-Nutrition and SDGs

Women's empowerment positively impacts child and maternal health, leading to improved nutrition.

The Sustainable Development Goals (SDGs), particularly SDG 5 (gender equality) and SDG 2 (zero hunger), are deeply intertwined with nutrition. Addressing gender inequalities in access to resources, food, and healthcare is crucial for achieving both gender equality and improved nutrition outcomes, which in turn contribute to broader development goals.

Gender inequality and nutrition:

Women and girls often face unique nutritional challenges due to social norms, limited access to resources, and discriminatory practices.

SDG 5 and nutrition:

SDG 5, focused on gender equality, highlights the need to address these disparities to improve women's nutritional well-being and overall health.

Interdependence of SDGs:

The SDGs are interconnected, meaning that progress in one area, such as gender equality, can positively impact others, like nutrition.

CIRDAP Knowledge Series: 15

Webinar on Best Practices of Integrated Rural Development (IRD) policies

28 FEBRUARY 2023

11.00 AM (DHAKA TIME)
10.00 AM (PAKISTAN TIME)

Click here for Zoom Link

CIRDAP

Presenter

Dr. Muhammad Israr
Secretary and IRD Expert CIRDAP
Agriculture, livestock, fisheries and Cooperative Department, Government of Khyber
Pakhtunkhwa, Pakistan.

Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

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Best Practices of Integrated Rural Development (IRD) Policies

Dr. Muhammad Israr
Secretary Agriculture, livestock, fisheries and Cooperative Department, Government of Khyber Pakhtunkhwa, Pakistan.

CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=8Nnvh4kSsyU&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=29

SUMMARY

Dr. Muhammad Isar in his presentation highlights that integrated rural development (IRD) is a holistic framework to address the multidimensional challenges of rural poverty, agricultural stagnation, and limited access to basic services, with strong policy relevance for national development planning. By combining interventions in agriculture, infrastructure, education, healthcare, and ICT, IRD ensures that rural communities benefit from coordinated resource delivery and participatory governance. The case of Pakistan's Tele-farming initiative illustrates how ICT-based extension services can enhance productivity, resilience, and institutional capacity, offering a scalable model for other developing countries. Policy frameworks that prioritize decentralization, community participation, and digital inclusion can accelerate progress toward several SDGs

SDG Linkages: 1, 2, 6, and 11

Policy Insight: Embedding IRD into national policies is essential for equitable resource distribution, climate adaptation, and balanced rural-urban development.

Background

Integrated rural development (IRD) is an ongoing process involving outside intervention and local aspirations; aiming to attain the betterment of groups of people living in rural areas and to sustain and improve rural values; through the redistribution of central resources, reducing comparative disadvantages for competition and finding new ways to reinforce and utilise rural resources**.** It is the is the process of combining multiple development services into a coherent delivery system with the aim of improving the wellbeing of rural populations.

Characteristics of Integrated Rural Development

Key characteristics of IRD include a focus on the interconnectedness of various sectors, promoting sustainable agriculture, developing rural infrastructure, and fostering community participation. It also emphasizes improving access to education, healthcare, and financial resources, ultimately aiming for a balanced and harmonious growth across all aspects of rural life. Coordination of public goods and services is crucial for successful integrated rural development, ensuring that resources and interventions are delivered effectively and efficiently to meet the needs of the rural population.

Characteristics of IRD

Types of IRD

Target-Oriented:

IRD programs focus on specific goals and objectives, often related to poverty reduction, improved livelihoods, or environmental sustainability. These goals are measurable and provide a clear direction for development efforts.

Comprehensive and Multisectoral:

IRD recognizes that rural development is not solely about one sector (like agriculture). It involves addressing various interconnected aspects like agriculture, health, education, infrastructure, and social development.

Decentralization:

IRD emphasizes the transfer of decision-making power and resources to local levels (local governments, communities) to promote ownership and tailor interventions to local needs.

Community-Centered:

IRD programs prioritize the needs and priorities of the local community, ensuring that development initiatives are relevant and responsive to their specific context.

Participatory:

IRD involves active participation of the local community in the planning, implementation, and monitoring of development projects. This ensures that the community is involved in shaping its own development.

Problems of Rural Development

1. *Lack of Access to Basic Needs:*

Food, Water, and Sanitation

Many rural communities lack access to clean and sufficient food, safe drinking water, and adequate sanitation facilities, impacting health and well-being.

Healthcare

Limited access to healthcare services, including skilled medical professionals and essential medicines, results in high rates of preventable illnesses and mortality.

Housing

Poor quality housing and a lack of shelter from the elements are common issues in rural areas, contributing to vulnerability and health problems.

2. *Primitive Methods of Agriculture*:

Outdated Techniques

Traditional farming methods often lead to low productivity and limited yields, making it difficult for farmers to generate sufficient income and food security.

Lack of Irrigation and Water Management

Reliance on rain-fed agriculture, coupled with inadequate irrigation systems, makes crops vulnerable to droughts and floods.

Limited Access to Inputs

Farmers may lack access to quality seeds, fertilizers, and other essential inputs, further hindering productivity.

3. *Less Employment Opportunities:*

Limited Diversification

Rural economies often depend heavily on agriculture, with limited opportunities for diversification into other sectors like industry or services.

Lack of Skills Development

Inadequate vocational training and skill development programs leave many rural residents with limited employment prospects.

Migration to Urban Areas

The lack of jobs and opportunities in rural areas often leads to migration to cities, contributing to urban overcrowding and further straining rural resources.

4. *Low Literacy and Limited Access to Technology:*

Low Literacy Rates

Low literacy rates hinder access to information, education, and job opportunities, perpetuating a cycle of poverty.

Limited Technology Adoption`

Rural communities often lack access to modern technologies, including information and communication technologies (ICTs), which can improve productivity, access to markets, and access to information.

Digital Divide

The gap between those who have access to technology and those who do not further exacerbates inequalities.

Addressing these challenges requires an integrated approach that focuses on:

Infrastructure Development

Improving roads, electricity, irrigation, and communication networks.

Education and Skill Development

Investing in quality education and vocational training to equip rural populations with the skills they need to participate in a modern economy.

Promoting Sustainable Agriculture

Adopting modern farming practices, improving irrigation, and diversifying crops.

Strengthening Rural Economies

Creating new employment opportunities, promoting entrepreneurship, and diversifying the rural economy.

Bridging the Digital Divide

Ensuring access to technology and digital literacy programs for all rural residents.

Agricultural Challenges in the Developing Countries

The common agricultural challenges faced by the developing countries that could pose problems to integrated rural development are:

1. Investment Challenges

Low On/Off Farm Output, Small Land Holdings, Lack of Market Oriented / Demand Driven Agriculture, Lack of Infrastructure, Limited Financial Services and Accessibility, Private Investment & Crop Insurance etc.

2. Social & Cultural Challenges

Underemployment, Food / Dietary Habits, Population Pressure, Limited Business Opportunities, Low Literacy Level, Gender inclusive actions, Injudicious use and distribution of food resources, Lack of Agri-Business Mindset & Diversification & Less Adoption to Modern Technologies

3. Governance Challenges

Weak Linkages & Coordination, Pressure on Natural Resources, Expropriation of Agricultural Lands, Trained HR, Regulatory Issues and Trade Problems

4. *Research & Extension Challenges*

Climate Change, Limited Capacity of Public Organizations & Limited use of Modern Technologies

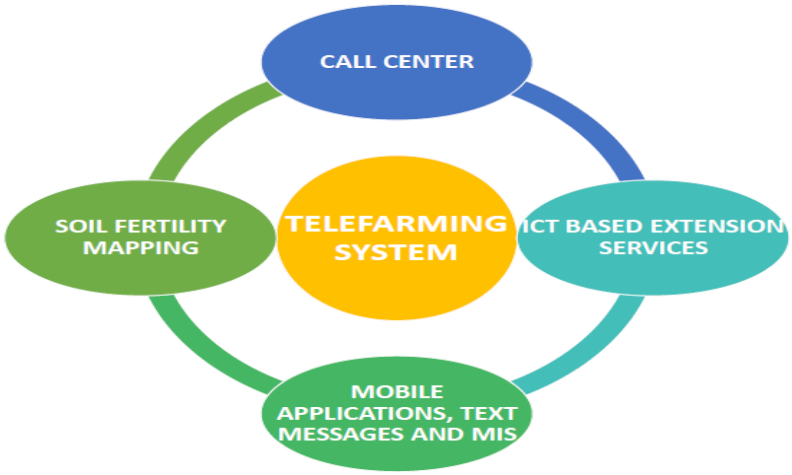
IRD through ICT – the case of Tele-farming System of Agriculture Department Khyber Pakhtunkhwa, Pakistan

The Tele-farming system in Khyber Pakhtunkhwa, Pakistan, is an initiative by the Department of Agriculture to provide farmers with agricultural advice and information through technology. This system utilizes short messages and robocalls to deliver guidance on various farming technologies. The project, supported by organizations like the United States Agency for International Development (USAID), aims to improve agricultural practices and potentially enhance farmers' livelihoods. The objectives of this initiative are:

Enhanced productivity by improving:

- Technology Dissemination
- Trade Promotion

Improved food security
Reduced poverty
Enhanced role of women
ICT based monitoring & tracking system for enhanced services delivery



Tele-farming system in Pakistan

ICT Interventions

The following are the ICT interventions of the Tele-farming project

1. Farmer Tele Facilitation Center (Call Center)
2. Web Portal (www. zarat.kp.gov.pk)
3. Mobile Application (Agriculture Extension KP)
4. Management Information System (MIS)
5. Agri. Info (SMS Service)

Current status of the initiative

The Tele-Farming system was established at Bureau of Agriculture Information under the Project "Piloting Innovative Ideas, Establishment of e-Agriculture & Tele-Farming System"

- 0.65 Million: Farmers Registered with the System, so far
- 120,000 plus : Number of Farmers Issues Received and Resolved
- 10,000 plus: Downloads of Agriculture Extension Android Application

- Millions of Text Messages/Robo Calls to Farmer on Technical Issues, Weather Advisory Market Information etc.

Outcome and Impact

The outcome and impact of the project are given below.

Outcome

- Improved Technical Knowledge
- Improved Coordination
- Improved Crop Yields
- Farmers Organizations
- Improved Linkages for Farmers Prosperity
- Improved Services in JVs (Public Private
- Partnerships)

Impact

Increased Access to Information

Tele-farming has improved farmers' access to crucial agricultural information, enabling them to make informed decisions about their farming practices.

Enhanced Productivity

By providing timely advice on topics like optimal fertilizer use, pest control, and irrigation techniques, Tele-farming has the potential to boost agricultural productivity.

Improved Resilience

In the context of climate change and other challenges, Tele-farming helps farmers adapt by providing information on climate-smart agriculture practices.

Strengthened Institutional Capacity

The project has also contributed to strengthening the capacity of the Department of Agriculture by providing them with the necessary technology and infrastructure to deliver extension services.

Economic Benefits

Increased productivity and resilience can lead to improved livelihoods and food security for farming households. Hence, for balanced development of backward rural areas - ensuring parallel improvement of various access- and resource-type disadvantages- harmonic co-ooperation between different systems of development would be needed.

Integrated Rural Development and SDGs

Integrated Rural Development (IRD) aligns strongly with several Sustainable Development Goals (SDGs), particularly those focused on poverty reduction, food security, and sustainable communities. IRD aims to holistically improve the lives of rural populations by addressing various interconnected issues, mirroring the integrated approach of the SDGs.

Poverty Reduction (SDG 1): IRD programs often focus on creating economic opportunities, improving access to resources, and enhancing livelihoods, directly contributing to poverty alleviation in rural areas.

Zero Hunger (SDG 2): IRD initiatives that promote sustainable agriculture, improve food production, and enhance access to markets directly address hunger and food security.

Clean Water and Sanitation (SDG 6): IRD projects often include infrastructure development for water supply and sanitation, crucial for improving public health and living standards.

Sustainable Communities (SDG 11): By improving infrastructure, creating jobs, and enhancing social services, IRD contributes to building more sustainable and resilient rural communities.

CIRDAP Knowledge Series: 16

Webinar on International Women's Day

9 MARCH 2023

11.00 AM (DHAKA TIME)
10.45 AM (NEPAL TIME)

Click here for Zoom Link

Presenter

Ms. Anju Dhungana
Senior Women Development Officer
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Ms. Hurain Jannat
Communication Officer
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CIRDAP

Moderator

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Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

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www.cirdap.org

Innovation and Technology for Gender Equality and Violence against Women

Anju Dhungana[5] *and Hurain Jannat*[6]

CIRDAP Official YouTube Link

https://www.youtube.com/watch?v=NcFXkPrO8v8&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=27

SUMMARY

In this session, on the occasion of International Women's Day on 8th March, Ms. Anju Dhungana and Ms. Hurain Jannat discuss on the violence against women and the digital gender divide with emphasis on Bangladesh and Nepal.

International Women's Day underscores the urgent need to bridge the digital gender divide and eliminate violence against women, both of which are deeply intertwined with the Sustainable Development Goals (SDGs). Despite progress in Bangladesh and Nepal, women continue to face systemic barriers in digital access, STEM participation, and safety online and offline, reinforcing inequalities that hinder inclusive development.

SDG Linkage: 5, 8, 16

Policy insights: A multi-pronged approach—combining legal reforms, community mobilization, digital innovation, and targeted capacity-building—can accelerate progress toward a more just, inclusive, and sustainable future.

Background

International Women's Day (8 March) is an occasion marked by women's groups around the world. This date is also commemorated at the United Nations and is designated in many countries as a national holiday. When women on all continents, often divided by national boundaries and by ethnic, linguistic, cultural, economic and political differences, come together to celebrate their Day, they can look back to a tradition that represents at least nine decades of struggle for equality, justice, peace and development. International Women's Day is the story of ordinary women as makers of history; it is rooted in the centuries-old struggle of women to participate in society on an equal footing with men. In ancient Greece, Lysistrata initiated a sexual strike against men in order to end war; during the French Revolution, Parisian women calling for "liberty, equality, fraternity" marched on Versailles to demand women's suffrage. The idea of an International Women's Day first arose at the turn of the century, which in the industrialized world was a period of expansion and turbulence, booming population growth and radical ideologies. The theme for International Women's Day, 8 March 2023 (IWD 2023) is***, "DigitALL: Innovation and technology for gender equality".***

Digital Literacy

The TVETipedia Glossary of UNESCO International Centre for Technical and Vocational Education and Training (UNEVOC) says that Digital literacy is the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competence that are variously referred toas computer literacy, ICT literacy, information literacy and media literacy.

E-skills or electronic skills include those needed to make use of Information and Communication Technologies (ICT) as well as those required to apply and develop them.

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E-inclusion refers to the situation where everyone in society can participate in the information society. This requires affordable access to technologies, the accessibility and usability of ICT tools and services, and the ability and skills of all individuals to use these tools

Digital literacy is crucial for promoting gender equality by empowering women with the skills and knowledge to participate fully in the digital world, potentially leading to increased economic opportunities and social inclusion. However, a significant digital gender gap exists, with women often lagging behind men in access to and use of digital technologies, which can exacerbate existing inequalities. Addressing this gap through targeted digital literacy initiatives is essential for achieving broader goals of gender equality and sustainable development.

Digital Gender Divide

The digital gender divide refers to the disparity between men and women in access to, use of, and participation in digital technologies and the technology sector. It's a systemic issue that reflects and reinforces existing gender inequalities. It has become a major concern for policymakers. Globally, more men (58 per cent) use the internet than women (48 per cent).

Digital Gender Divide in Bangladesh

Although Bangladesh has made remarkable progress in narrowing the gender gap in areas such as education, labourur force participation, wages, and income, the progress is likely to be undermined because of the existing DGD. Rural women, especially, are more deprived of ICT than urban women. In Bangladesh, a significant digital gender divide exists, with women facing barriers to accessing and utilizing digital technologies compared to men. This disparity impacts various aspects, including mobile phone ownership, internet usage, and access to digital services, hindering women's participation in the digital economy and society.

In Bangladesh, in terms of using of mobile phones the gender gap is 29 percent and in terms of the use of mobile internet is 52 percent! BRAC Institute of Governance and Development (BIGD), BRAC University, conducted a nationally representative rural household (HH) survey titled “Digital Literacy and Access to Public Services”. It found that only 37 percent household represented women as most digitally able person in comparison to 63 percent were men. More men (40 percent) of Men have access to Internet, on the other hand 31 percent of women have access. Only 5 percent of women can check the emails and 3 percent can send emails. 14 percent of men can check emails and 11 percent can send emails. 32 percent of men can browse information online are much higher than women (20 percent)

Girls in STEM and Women in ICT Jobs

While there's increasing recognition of the importance of women in STEM (Science, Technology, Engineering, and Mathematics) and ICT (Information and Communications Technology) fields, women are still underrepresented in these areas, particularly in leadership and certain technical roles. The widespread adoption of technology in everyday life has made STEM (Science, Technology, Engineering, and Mathematics) education a prerequisite for achieving sustainable and inclusive growth, and social well-being. Equal access and participation in STEM for women and girls is key to the 2030 Agenda for Sustainable Development. The United Nations has referred to the digital divide as the new face of inequality. Globally, there are fewer girls in STEM -- only 30 per cent of students in Science, Technology, Engineering, and Mathematics (STEM) education are girls and the rest are boys The International Labour Organization (ILO) estimates that women represent only one in three online workers particularly in developing countries. In Google’s AI workforce, only 10 percent are women. In Facebook, the proportion is 15 percent, and in LinkedIn 10 per cent.

This reflects gaps in skills and education as well as the persistence of traditional gender norms and stereotypes. A survey of women journalists from 125 countries found that 73 per cent had suffered online violence in the course of their work. Women make up only 22 per cent of artificial intelligence workers globally. A global analysis of 133 AI systems industries found that 44.2 per cent demonstrate gender bias.

In Bangladesh

At present, around 25 per cent of women are studying in the ICT sector. Out of them 10 to 12per cent have taken up careers. And even less have a role in policymaking. Bangladesh Association of Software and Information Services (BASIS) has carried out several surveys which indicate that women's participation in the ICT sector is 12 to 13 per cent. And in the case of women entrepreneurs, this goes down to 2 or 3 per cent.

Bangladesh Government's Initiative for inclusion of women in Digital Bangladesh

The slogan of "Digital Bangladesh" of the Government of Bangladesh has special significance for national development. The government's ICT division has taken up several projects for women and a separate standing committee regarding women in the ICT sector- A women's forum, where women involved in the sector can become members

The Jatiya Mahila Sangshtha, implementing a district-based project for women's computer training. 'Tothyo Apa' which has created a digital database. The ICT division has created a software called Emporia for person with disability. This will help disabled women participate in job fairs. A few examples of available digital services of Bangladesh are: registration for admission to academic institutions, publication of results of examinations, registration for jobs abroad, registration of pilgrimage, collection of official forms, online submission of tax returns, online tendering, etc. Telemedicine services, videoconferencing for the treatment of diseases, and video conferencing for administrative activities are examples of e-services available to rural Bangladesh.

The United Nations Development Programme (UNDP) has been working with the Bangladesh government. For example, Aspire to Innovate (a2i) initiative is providing training on digital literacy to thousands of female entrepreneurs, and through UNDP's teacher's portal, more than 200,000 female teachers now have access to high- quality online educational materials. The organization has also utilized digital technology to launch a market place Anandamela.

Violence against women

The United Nations defines violence against women as "any act of gender-based violence that results in, or is likely to result in, physical, sexual, or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life.

Online Harassment/Violence against Women in Bangladesh

ActionAid, Bangladesh commissioned a study titled "Online Violence Against Women 2022". The study found that as many as 64 out of every 100 women in Bangladesh faced harassment and violence online, up from 50 the previous year (2021). Women mostly faced violence on Facebook (47.60 percent), followed by Messenger (35.37 percent), Instagram (6.11 percent), IMO (3.06 percent), WhatsApp (1.75 percent) and on YouTube (1.31 percent). Only 14.91 percent of the women submitted formal complaints against online violence and more than 85 percent of the sufferers remained silent. According to the study, 65.07 percent of the respondents reported that the harassment had a severe impact on their lives including psychological trauma, depression and anxiety. Most of the women thought the existing

complaining mechanisms do not work. As a result, they did not show interest in submitting (28.87 percent) their complaint. As much as 64.71 percent of respondents said they did not find any redressal or action against their submitted complaints, while 75.77 percent of the women reported they want to complain anonymously through online platforms as they are afraid of social stigma, victim blaming and losing privacy. The police department has a Cyber Support for Women helpline. There is also an app called Eagle offering assistance in the case of cyber harassment. But most of the women are not aware of this.

Violence against women in Nepal

Violence against women remains a significant issue in Nepal, with high prevalence rates of physical, sexual, and emotional violence. While efforts are being made to combat gender-based violence (GBV), including establishing support centres and strengthening law enforcement, deeply ingrained patriarchal attitudes and social norms continue to hinder progress. In Nepal, violence against women is a significant issue intertwined with the Sustainable Development Goals (SDGs), particularly SDG 5 which aims to achieve gender equality and empower all women and girls. While Nepal has made progress in enacting laws and policies to address gender-based violence (GBV), challenges remain in effectively implementing these measures and addressing the root causes of violence.

Gender – based violence (GVB) Situation of Nepal 2021/22

A few facts:

- 22% of women have ever experienced Psychical Violence since age 15.
- 7% of women have ever experienced Sexual Violence
- 22% of women who have experienced Physical or Sexual abuse have sought help.
- 26 % of married women have experienced spousal violence , whether Physical, Sexual and emotional.
- 93% of Nepali women experienced violence within house and 82% had experienced violence by relatives and known men
- Every one out of three women in Nepal suffer from any kind of violence

Total cases of violence reported in National women commission of Nepal

- Domestic violence :1318
- Women violence: 146
- Mental Violence: 42%
- Economic violence: 31%
- Physical violence: 24%
- Sexual violence: 3%

Efforts taken by the Government of Nepal to reduce violence against Women

The following are the efforts taken up by the Government of Nepal to reduce violence against women:

- Formation of National Women Commission
- Provision of toll-free hotline number for cases reporting (1145)
- Rescue, psychosocial counselling, shelter, treatment, rehabilitation with skills andseed money for victim
- Nepal police toll free hotline number for case reporting (100)
- National Child Right Assembly (1098, 108)
- Dedicated ministry for MoWCSC (Ministry of Women, Children and Senior Citizens):

- Reporting in international convention –Convention on Elimination of all kinds of Discrimination Against Women (CEDAW)
- Legal committee in ovary local government units (753)

Laws and acts: Formulation and implementation of domestic act (2009); Domestic violence Accusation and punishment Act 2066) and its directives; Act on Elimination: Work place relation, sexual violence, 2071; Anti witchcraft Act, 2072; Safe motherhood Act 2075

Conclusion

To effectively reduce violence against women in Nepal, a multi-pronged approach is needed, encompassing legal reforms, community mobilization, and addressing social norms that perpetuate violence. This includes strengthening legal frameworks, enhancing law enforcement's response, promoting women's empowerment, and fostering a culture of respect and accountability. Enacting and effectively implementing comprehensive legislation and policies that address all forms of violence against women, including domestic violence, sexual harassment, and trafficking. ensuring perpetrators are held accountable for their actions through prompt and fair investigations, prosecutions, and convictions and providing survivors with access to justice through accessible and supportive legal services, including legal aid, counselling, and safe shelters would help. Similarly, in order to promote women's participation in the digital world, strategies should focus on increasing access to digital technologies, fostering digital literacy and skills, and creating a safe and inclusive online environment. This includes addressing gender stereotypes, providing tailored training programs, and supporting women entrepreneurs and innovators. By embracing innovation and technology, we can accelerate progress towards gender equality and create a more just and sustainable future for all.

Violence against women and SDGs

International Women's Day, aligns closely with the United Nations' Sustainable Development Goals (SDGs), particularly SDG 5: Achieve gender equality and empower all women and girls**.** Violence against women is addressed within the framework of the Sustainable Development Goals (SDGs), specifically through SDG 5 (Gender Equality) and SDG 16 (Peace, Justice, and Strong Institutions). SDG 5, with target 5.2, explicitly aims to eliminate all forms of violence against women and girls, including trafficking and sexual exploitation. SDG 16 indirectly addresses violence against women by focusing on peace and justice, which includes preventing and eliminating violence and exploitation against children, which often disproportionately affects girls.

SDG 5: Gender Equality and Violence Against Women:

Target 5.2: Focuses on ending violence against women and girls, both in public and private spheres, including trafficking and sexual exploitation.

Indicators: Track the prevalence of violence, including physical, sexual, and psychological violence by intimate partners and others.

Harmful Practices: address harmful practices like child marriage and female genital mutilation.

Interconnectedness: recognize that gender inequality is linked to economic, political, and social aspects, requiring a holistic approach.

SDG 16: Peace, Justice, and Strong Institutions:

Target 16.2: Focuses on ending abuse, exploitation, trafficking, and all forms of violence and torture against children.

CIRDAP Knowledge Series: 17

Forests and Health

Dr. Muhammad Israr

Secretary, Agriculture, livestock, fisheries and Cooperative Department, Government of Khyber Pakhtunkhwa, Pakistan.

CIRDAP Official YouTube Link

https://www.youtube.com/watch?v=NqkWiJuaPPg&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=26

SUMMARY

In this presentation, Dr. **Muhammad Israr** discusses the impact of forests on human health and nutrition. Forests are vital to human health, nutrition, and livelihoods, yet their degradation threatens both ecological balance and community well-being. Strengthening the forest-health-nutrition nexus requires integrated policies that recognize forests as providers of food diversity, medicinal plants, clean air, water regulation, and climate resilience. A **One Health** approach- linking human, animal, and environmental health-should guide cross-sectoral collaboration among forestry, agriculture, health, food security, and environment ministries, ensuring sustainable forest management, secure land tenure, and the protection of indigenous knowledge. Women's roles as custodians of biodiversity and providers of household nutrition must be central to policy design. Urban forestry initiatives, such as Korea's forest healing programs, highlight how forests can also promote public health in cities.

SDG Linkage: 3, 6, 13 and 15

Policy Insights: Safeguarding forests is not only an environmental imperative but also a public health strategy essential for achieving sustainable development.

Background

The International Forest Day is celebrated every year on **March 21**. It was established under a resolution passed by the United Nations General Assembly on November 28, 2012. The purpose of this day is to highlight the importance of forests and trees and to promote their conservation for present and future generations. Various countries observe this day by organizing tree-planting campaigns, awareness programs, and other activities. It encourages governments, organizations, and citizens to make efforts toward forest conservation and sustainable management.

Importance of Forests

Around 820 million people live in tropical forests and savannahs in developing countries (FAO, 2018). Major proportion of these depend on forest goods and services for the provision of food, wood fuel, building materials, medicines, employment and cash income. Millions of small forest owners in developed countries manage and benefit from a vast number of forests. Smallholder farmers practicing agroforestry or depending on the regulatory and provisioning services of forests and trees in the landscape are approximately 2.5 billion. Forests are essential for life on Earth. They cover more than 30% of the land area and are home to over 60,000 tree species. They provide vital resources such as water, food, medicine, and fuel.

Biodiversity Conservation: More than 80% of terrestrial biodiversity resides in forests.
Contribution to Combating Climate Change: Forests help absorb carbon, thereby controlling climate change.
Source of Livelihood: Approximately 1.6 billion people depend on forests.
Environmental Balance: Forests regulate the rainfall cycle and prevent soil erosion.

Continent-wise Forest Area

Despite being the sixth largest continent with an area of 10,180,000 sq km, Europe has the largest forest cover among the continents of the world. The forest cover of Europe is 1,015 million hectares, as of 2015. Thus, the continent has a forest cover of 1.42 hectares per capita. The Russian Federation accounts for 81% of the continent's forest area. The forest area of the continent has exhibited a steady rise of 0.08% annually. Over two-thirds of Europe's Forest cover is, however, semi-natural. Northern and eastern Europe has larger areas of virgin forest cover than the western parts of the continent.

Asia too suffers from heavy loss of forests and despite being the biggest continental landmass, Asia's forest cover is only 593 million hectares. In Asia, Laos, Bhutan, and Brunei have the highest forest cover.

Rank	Continent	Forest cover (in million hectares)
1	Europe	1,015
2	South America	842
3	North And Central America	751
4	Africa	624
5	Asia	593
6	Oceania	174

'Forests and Health'

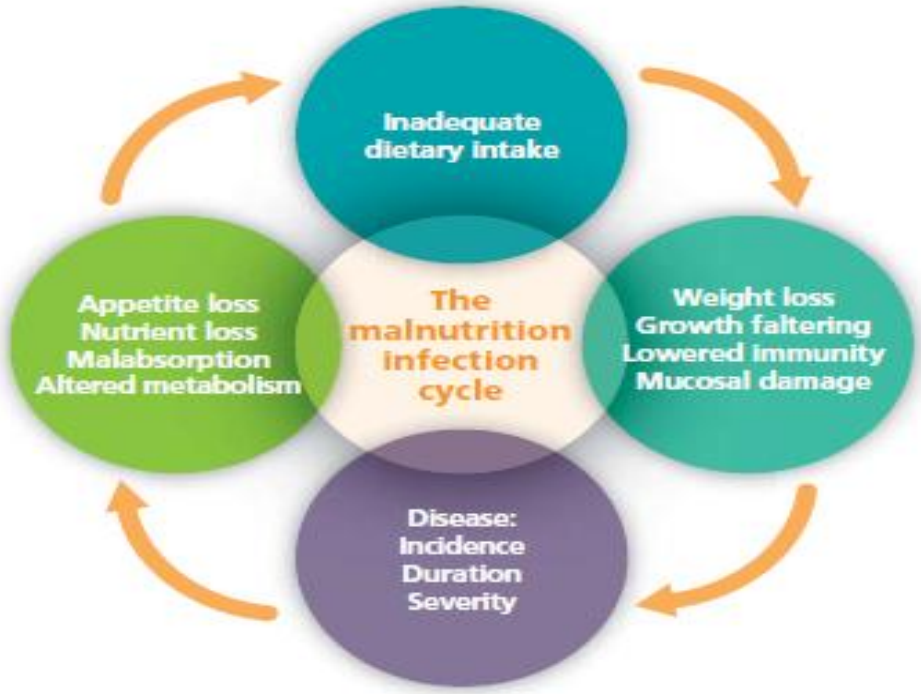
The Theme for 2023 is 'Forests and Health'. Forests give us so much to our health. They purify the water, clean the air, capture carbon to fight climate change, provide food and life-saving medicines, and improve our well-being. It's up to us to safeguard these precious natural resources. This 2023 calls for giving, not just taking, because healthy forests will bring healthy people.

Forests provide, directly or indirectly, important health benefits for all people. Health-enhancing qualities of forests are a result of multiple and mutually reinforcing benefits. For many communities in and near forests, in both developing and developed countries, biodiversity-rich forest ecosystems provide edible products that contribute to a healthy diet, such as fruits, leaves and mushrooms, as well as a vast number of medicinal plants.

Forest, human health and nutrition nexus

Forests provide, directly or indirectly, important health benefits for all people. Health-enhancing qualities of forests are a result of multiple and mutually reinforcing benefits. For many communities in and near forests, in both developing and developed countries, biodiversity-rich forest ecosystems provide edible products that contribute to a healthy diet, such as fruits, leaves and mushrooms, as well as a vast number of medicinal plants.

Malnutrition increases susceptibility to infection, severity of health impacts and mortality, and infection exacerbates malnutrition, in a vicious cycle of repeated infections, reduced immunity and deteriorating nutritional status.



Source: Katona and Katona-Apte, 2008.

Vicious Cycle of Malnutrition and Infection

Positive Impact of Forests on Human Health

- Populations living in or near forests are often distant from centralized health services
- Rural peoples rely on traditional health care systems which are mostly dependent on forest-derived medicines
- Approximately 1 billion people worldwide use herbal and home remedies to treat children's diarrhoea (FAO, 2014)
- Medicinal plants in forests have been used by humans for at least 5000 years
- Approximately 50,000 plant species are used for medicinal purposes
- Urban and Peri-urban forests, woods and green spaces have greater impact on public health
- Direct contact with nature contributes to a healthier composition of the human commensal microbiota
- Micro-organisms living mostly in the human gut, skin and other parts of the body help their human hosts by providing essential nutrients, metabolizing indigestible compounds and defense against pathogens
- Non-material or amenity benefits from forests also include spiritual enrichment and cognitive development benefits
- Promotes healthy physical activity for fighting non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, chronic respiratory diseases and type 2 diabetes, which are linked to chronic stress, poor diet and other lifestyle factors such as insufficient physical activity

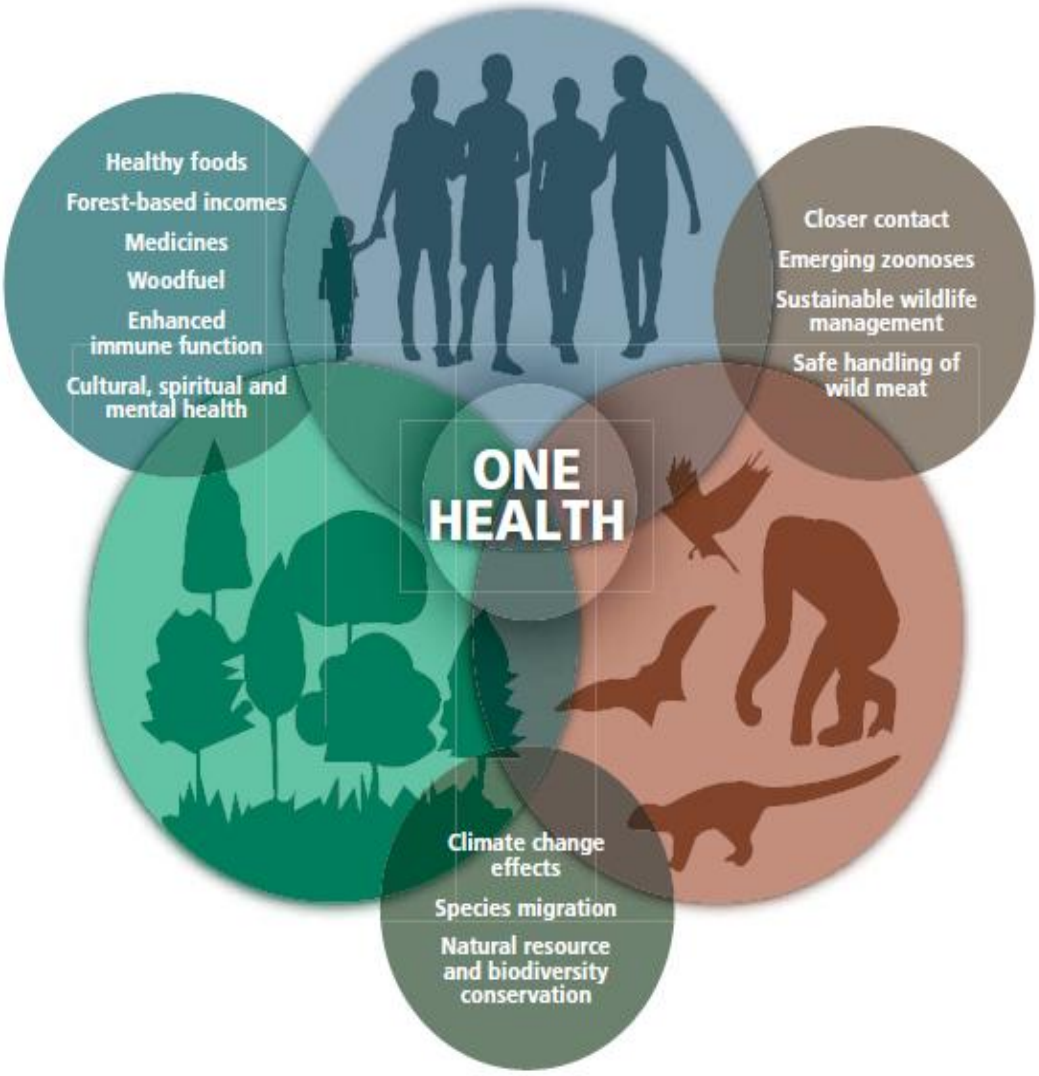
Negative Impact of forests on human health

- Infectious diseases like Lyme disease and encephalitis spreads through forest pest vectors

- Other forest-associated diseases include malaria, Chagas disease, African trypanosomiasis (sleeping sickness), leishmaniasis and lymphatic filariasis
- Land-use change and forest loss and fragmentation effecting the boundaries between forest and inhabited areas which develop new challenges i.e. changing diets and erosion of traditional health-related knowledge. Therefore, a "One Health" approach, integrating policies in all sectors touching on human, animal and environmental health, is the need of the day.

One Health Approach

In view of the inextricable connection of human, animal and environmental health, the best way to promote health and well- being is to prevent and mitigate risk at the interface between humans, animals and their various environments through an integrated "One Health" approach.



Countries should adopt a One Health framework emphasizing collaborative policy-making and partnerships across all relevant sectors, such as forestry, agriculture (the primary driver of deforestation), health, nutrition, food security, water, livestock, environment and tourism.

The COVID-19 pandemic presents a prime opportunity for emphasizing and taking collaborative actions.

How to Promote Good Health of Forest People

Policy and institutions are important in shaping forest contributions to food and health. Above all, the contribution of forests to the health, nutrition and food security of local populations depends on preventing the loss of forests and trees and maintaining their integrity through best practices of sustainable forest management, while ensuring that the harvesting of forest products, including foods and medicines, does not deplete the resources. Sustainable forest management in turn depends on secure land tenure rights, which enable local people's access to forests for their livelihoods and health-giving products, providing a strong incentive to conserve forest resources. In this regard, indigenous knowledge and practices that have allowed forests to be used sustainably over time can provide a sound basis for improving forest management. Forest management approaches that support human health will vary depending on the context, traditions, culture and values of the communities. Some forest communities depend on the non-intensive use of extensive areas of forest, often within protected areas. Restricting their use of the forest can be detrimental to their health because of the loss of the varied physical, socio-economic, cultural and spiritual benefits described above. Therefore, it is essential to harmonize environmental conservation, socio-economic and cultural targets. Women play a key role in use of natural resources for nutrition and health. For e.g.

- Collecting and sterilizing water
- Collecting fuel
- Providing food and medicine for their households
- Custodians of traditional knowledge on local biodiversity, transforming it into edible & medical products and its sustainable management

Direct Consumption of Forest Foods for Good Nutrition and Health

Nutrient deficiency is a critical challenge to human health. Globally, it is estimated that 820 million people are undernourished, and over 2 billion people are micronutrient deficient. While forest foods may have a small role in terms of calories, they form a critical part of diets commonly consumed by rural, food-insecure populations and add variety to predominantly staple diets. A variety of wild products – including herbs, leaves, fruits, nuts, insects, wild meat, and inland and coastal fishery products – supply energy and carbohydrates, fats, proteins, vitamins and minerals to the diets of around 1 billion People.

Forest foods are of particular nutritional and cultural importance to Indigenous communities. A study of 22 countries in Asia and Africa, found that Indigenous communities use an average of 120 wild foods per community. In India, it is estimated that approximately 50 million households supplement their diets with fruits gathered from wildland forests and surrounding bushland. In Nepal, individual households collect as much as 160 kg of wild mushrooms per year for direct consumption. A study in South Africa found that 62 percent of children (in a sample of 850) supplemented their diets with wild food and 30 percent relied on wild food for over 50 percent of their diet. A survey of over 17,000 households in 28 European countries found that 25 percent of households consumed forest foods they had gathered themselves.

Forest products like Cassava, taro, yam and sweet potato are among the major sources of carbohydrates. Resins, saps, gums and honey are rich in protein and minerals. Mushrooms are rich in minerals, vitamins and amino acids. Wild vegetables contribute important vitamins and minerals e.g. In Mekong Delta of Viet Nam, wild vegetables contribute 38 % of vitamin

A, 35 % of vitamin C, 30 % of calcium & 17 percent of iron consumed by women. Specific non-wood forest products (NWFPs) can help address particular nutritional deficiencies.

Small insects, caterpillars and snails are also important sources of animal protein and fat. Forest caterpillars, for example, contain even more protein, fat and energy than meat or fish. Furthermore, 100 g of cooked caterpillars provide more than 100 percent of daily vitamin and mineral requirements. Insects have always been a part of human diets and are currently a cheap and accessible source of nutritious food, supplementing the diets of approximately 2 billion people, mainly in Asia, Africa and Latin America. Worldwide, humans consume more than 1 900 insect species, of which the most common are beetles (Coleoptera) (31 percent), caterpillars (Lepidoptera) (18 percent) and bees, wasps and ants (Hymenoptera) (14 percent).

A few examples of how specific non-wood forest products (NWFPs) can help address particular nutritional deficiencies are given hereunder.

Common nutritional problem	NWFPs useful in solving these problems
Protein–energy malnutrition, causing reduced growth, susceptibility to infection, changes in skin, hair and mental facility	Nuts, seeds (e.g. *Geoffroea decorticans*, *Ricinodendron rautanenil*, *Parkia* spp.), palm oil, baobab (*Adansonia digitata*) leaves, small animals (snails, insects, caterpillars)
Vitamin A deficiency, which can cause blindness and, in extreme cases, death	Green leaves (e.g. *Pterocarpus* spp., *Moringa oleifera*, *Adansonia digitata*), yellow and orange fruit (e.g. bush mango), resins, unrefined palm oil, the gum of *Sterculia* spp., bee larvae and other animal food
Iron deficiency, causing anaemia, weakness and susceptibility to infection, especially in women and children, and increased risk of low-birthweight babies	Bushmeat, green leaves (*Leptadenia hastata*, *Adansonia digitata*), seeds (*Parkia biglobosa*, *Anacardium occidentale*), *Grewia tenax* berries, mushrooms
Niacin (vitamin B3) deficiency, which may cause dementia, diarrhoea and dermatitis; common in zones with a maize-based diet	Baobab (*Adansonia digitata*), *Boscia senegalensis* and *Momordica balsamina* fruit, *Parkia* spp. seeds, bush mango (*Irvingia gabonensis*), acacia (*Acacia albida*)
Riboflavin (vitamin B2) deficiency, which causes skin problems; common in those with a rice-based diet	Green leaves, especially *Anacardium* spp., *Sesbania grandiflora* and *Cassia obtusifolia*; insects
Vitamin C deficiency, which increases susceptibility to disease	Fruit of *Adansonia digitata*, *Sclerocarya caffra* and *Ziziphus mauritiana*; leaves (e.g. *Cassia obtusifolia*); gum of *Sterculia* spp.

Addressing nutritional deficiencies through NWFPs

Dietary diversity

Forest foods also contribute to dietary diversity, and a more diverse diet increases the diversity of the gut microbiome for improved health. A statistically significant positive association has been found between the dietary diversity of children in developing countries and the tree cover in their communities. A study of data from 43 000 households across 27 countries in Africa found that the dietary diversity of children who were exposed to forests was at least 25 percent higher than that of children who were not. In the East Usambara Mountains of the United Republic of Tanzania, children and mothers in households that had more tree cover close to their homes and that ate more foods from forests were found to have more diverse diets, while children living in deforested areas in Malawi were seen to have less diverse diets than children living in areas where forests remained intact.

How to Take Advantage of Forests to Promote Health and Nutrition in Urban Societies

Regional and national forestry and health policies should address the potential role of forests in health and nutrition promotion and ill-health prevention, focusing especially on forests and

woodlands in and around towns and cities. In this process, greater collaboration should be promoted among forestry, conservation, land-use and urban planning experts, as well as public health officials and others responsible for supporting healthy living. In the Republic of Korea, for example – where forests account for 64 percent of the total land area and 81.3 percent of the population visits a forest more than once a year – widespread media coverage has substantially raised awareness of the therapeutic functions of forests.

Building on the country's successful reforestation initiatives of the past decades, the Korea Forest Service (KFS) has formalized the concept of forest for human well-being and launched a forest healing programme using specific therapy centres (Box 6). Next steps could include additional policies to diversify and vitalize private forest-related markets, to support private businesses and to create jobs in relation to forest welfare. This approach requires close collaboration among ministries or government departments that are concerned with public welfare, such as the Ministry of Health and Welfare, the Ministry of Education and the Forest Service.

Way Forward

The following measures are suggested to strengthen the Forest, human health and nutrition nexus in order to achieve the SDGs. Promoting the linkages between forests and human health contribute, directly or indirectly, to achieving all SDGs. Effective, well implemented and well enforced forest policies and management to secure the health and nutrition functions of forests and deliver their benefits to citizens. Countries should adopt a One Health framework emphasizing collaborative policy making and partnerships across all relevant sectors, such as forest & agriculture, health, nutrition, food security, water, livestock, environment and tourism. The COVID 19 pandemic presents a prime opportunity for emphasizing and taking collaborative actions. A network or platform of experts, practitioners and policy makers is indispensable.

Forests and SDGs

Forests are integral to several SDGs, particularly SDG 15 (Life on Land), which focuses on protecting, restoring, and promoting sustainable use of terrestrial ecosystems, including forests. Forests contribute to various other SDGs, including those related to climate action, clean water and sanitation, good health and well-being, and sustainable consumption and production.

SDG 15 (Life on Land):
Forests are central to this goal, which aims to sustainably manage forests, combat desertification, restore degraded land, and halt biodiversity loss.
SDG 13 (Climate Action):
Forests act as carbon sinks, absorbing greenhouse gases and mitigating climate change.
SDG 6 (Clean Water and Sanitation):
Forests play a vital role in maintaining water quality and regulating water cycles.
SDG 3 (Good Health and Well-being):
Forests provide clean air and contribute to mental and physical well-being.

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CIRDAP Knowledge Series: 18

Water- associated diseases –Monitoring aquatic bodies to ensure community health

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CIRDAP Official YouTube Link

https://www.youtube.com/watch?v=AfVg2whFJ3M&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=26

SUMMARY

Waterborne illnesses remain a critical global health challenge, with contaminated water linked to nearly 80% of diseases in developing regions and causing millions of deaths annually. The persistence of pathogenic pollution in rivers across Latin America, Africa, and Asia, alongside India's alarming burden of water-associated diseases, underscores the urgent need for integrated surveillance, pathogen monitoring, and community-level interventions. Strengthening programs like India's Integrated Disease Surveillance Programme (IDSP), investing in wastewater treatment, expanding sanitation infrastructure, and leveraging innovative tools such as bio-optical monitoring and mobile applications like TurbAqua for real-time water quality assessment are effective measures tackling waterborne illnesses.

SDG Linkages: 1,2,3, and 6

Policy Insights: By linking water quality monitoring with public awareness, community engagement, and technological innovation, governments can mitigate disease risks, reduce economic losses, and foster resilient ecosystems essential for sustainable development.

Background

World Health Day, celebrated annually on **April 7th,** highlights critical global health issues, and waterborne illnesses are a significant concern addressed in this context. Water pollution has worsened since the 1990s in almost all rivers in Latin America, Africa and Asia, with severe pathogenic pollution affecting around one third of all river stretches in these regions. Nearly 80 % of the world's diseases, particularly in developing world, can be linked with contaminated water. Globally, at least 2 billion people use a drinking water source that is contaminated with faeces.

Waterborne illnesses

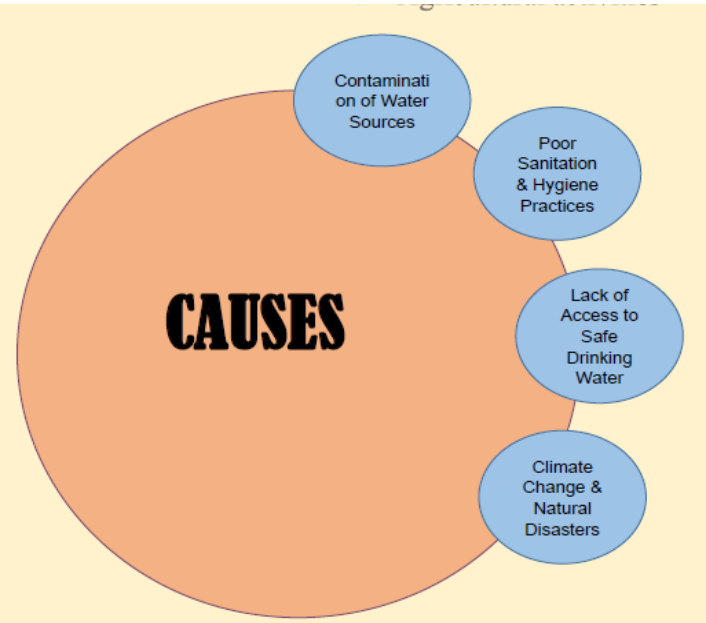
Waterborne illnesses are a significant global health issue, causing millions of deaths and illnesses annually, particularly in developing countries. These diseases are caused by pathogens (bacteria, viruses, protozoa, and helminths) that contaminate water sources and are transmitted through ingestion, airborne exposure, or contact with contaminated water. Many waterborne pathogens can also be acquired by consuming contaminated food or beverages, from contact with animals or their environment, or through person-to-person spread. The pathogenic microorganisms, their toxic exudates, and other contaminants together, cause serious conditions such as cholera, diarrhea, typhoid, amebiasis, hepatitis, gastroenteritis, giardiasis, campylobacteriosis, scabies, and worm infections.

Water borne: Consumption of contaminated water- Cholera, diarrhea, typhoid

Water related: Vectors that breed in contaminated water-Malaria, Dengue, Leptospirosis

Sanitation and hygiene: Poor personal hygiene - Lice, Ring worm, Trachoma.

The causes of waterborne illnesses are given in the figure.



Major causes of waterborne diseases

Global status

More than 3.4 million people die each year due to water associated diseases. According to WHO, diarrhoea alone claims the lives of 1.8 million people a year. About 12 million are infected by typhoid and 780 million people lack access to clean water source. Microbiologically contaminated drinking water can transmit diseases such as diarrhoea, cholera, dysentery, typhoid and polio and is estimated to cause approximately 505 000 diarrhoeal deaths each year. India had recorded 69.14 million cases of water associated diseases (Cholera, Diarrhoea, Typhoid, Hepatitis) during 2012-2017. Over 10,000 lives and 73 million working days are lost per year in the country. Nearly 40 % of Indian population will only have limited access to safe drinking water by 2030.

Surveillance of water borne diseases in India

Infectious disease surveillance and early warning of disease outbreaks remain a complex challenge for the health authorities in India. Ssurveillance for waterborne illnesses is primarily conducted through the Integrated Disease Surveillance Programme (IDSP) in the country which aims to detect and respond to disease outbreaks, including those related to water and sanitation. The program provides states with resources like manpower, training, laboratory strengthening, and IT equipment to manage these outbreaks effectively.

Monitoring Pathogens in Water

Monitoring pathogens in water is crucial for public health, as waterborne pathogens can cause various illnesses. Various methods are employed to detect and quantify these microorganisms, including traditional culture-based techniques and advanced molecular methods. There is no single universal health indicator bacterium, but a number of bacteria, each with certain characteristics, are used as indicators for monitoring pathogens in water. Indicators are elements that can efficiently be monitored to approximate the risk of a contaminated environment while the indicators themselves do not necessarily cause disease to humans

Key Indicator Organisms

Indicator organisms, like faecal coliforms and enterococci, are microorganisms that reliably indicate the potential presence of pathogens, which are disease-causing microorganisms, in

water bodies. These indicators are chosen because they are easier and cheaper to detect than pathogens themselves, and they generally correlate with the presence of pathogens

Coliforms: Gram negative, non-spore forming, oxidase-negative, rod-shaped facultative anaerobic bacteria that ferment lactose (with β-galactosidase) to acid and gas within 48h at 37 °C. Not specific indicator of faecal pollution. Includes four genera that have at least some species of faecal origin

- Citrobacter
- Enterobacter:
- Escherichia:
- Klebsiella:
- Others: *Budvicia*, *Erwinia*, *Leclercia*, *Serratia*–found only in the environment

Escherichia coli: Thermophilic coliform that produce indole from tryptophan. Most appropriate group of coliforms to indicate faecal pollution from warm blooded animals

E. coli is a sub-group of faecal coliform group

Naturally found in the intestines of warm-blooded animals

There are different strains of *E. coli*. very few strains are pathogenic.

More than one strain of *E. coli* may coexist in the intestinal tract; they displace one another 3-4 times a year

Pathogenic strains may cause one of three types of infection: urinary tract, neonatal meningitis, intestinal diseases

Pros and cons of the current indicators and 'indicator concept'

Pros	Cons
○ Simple & inexpensive ○ They occur where pathogens are present ○ Concentration limits can be fixed which help public health management ○ A relation between concentration of indicators and pathogens can be made ○ Can be used for source tracking	○ Media based assays: Require 18-24 hr for detection ○ Current technologies are prone to false positive and false negative ○ Media based techniques do not support finding viable but non-culturable forms ○ Occurrence in the environment do not always confirm the presence of pathogens ○ Some indicators can survive and multiply in the environment

Monitoring of Aquatic Bodies: Bio Optics

Monitoring of aquatic bodies involves assessing water quality parameters, including transparency, using tools like the Secchi disk. Bio-optics, which studies the interaction of light with water and its constituents, is closely linked to water transparency and productivity. Key indicator organisms, like phytoplankton, are often used to assess the health of an aquatic ecosystem, and their abundance and distribution can be inferred from bio-optical measurements. The Secchi disk provides a simple, cost-effective way to measure water transparency, which is related to the amount of light penetrating the water column and is influenced by factors like turbidity and colour. Bio-optics is the term used when the absorption and scattering by particles and dissolved substances are of biological origin. Bio-

optics studies how light interacts with water and its components, such as phytoplankton, suspended sediments, and dissolved organic matter. These interactions affect the way light is absorbed, scattered, and reflected within the water body. Optical remote sensing has become one of the main methods of aquatic environment research, as a tool involving techniques and methods for gathering operative information over large areas and has also been used for monitoring freshwater ecosystems.

Water Quality Monitoring

Secchi Disk:

The Secchi disk is a simple black and white disk used to measure water transparency, also known as water clarity. It is lowered into the water until it disappears from view, and the depth at which it disappears is recorded as the Secchi depth. This depth provides an indication of how far light can penetrate the water column.

The Secchi disc measures transparency of water bodies in a fast, easy and precise way. The Secchi disc is a white disc that is lowered into the water and the depth at which this disc disappears from sight is logged as Secchi depth in the App. Transparency is the depth at which disc reappears, i.e., or how deep the sunlight can penetrate into a lake. The mini-Secchi disc is basically a manually-operated tape measure with a white Secchi 10 cm disk and a brass weight of 100g attached to the tape end. The weight is manufactured using a metal lathe and the disc is made of white polypropylene sheet. The measuring tape is approximately 8m long wrapped around a 3D printed bobbin. For the easy handling of the device a polypropylene finger strap and nylon lanyard are attached to the casing. For prediction of colour of the water body, a vinyl-laminated Forel Ule colour scale sticker (with colour ranging from Indigo blue to Cola brown) is placed on the outside of the casing and the entire device is held together using stainless steel or brass fixings.

Mobile application TurbAqua

TURBAQUA is a mobile application developed **by ICAR-CMFRI** to transmit the data generated during mini-Secchi disc operation in Vembanad Lake of Kerala. Vembanad lake majorly consists of greenish brown to brownish green waters (88%).

Turbaqua app

The app works in conjunction with hand-held, pocket-sized 3D printed Mini Secchi disc designed and fabricated by Plymouth Marine Laboratory, UK. The Secchi disc is used to

measure the clarity of water. It also has a colour scale attached on top of it. This colour scale consists of 21 colours ranging from blue to green to yellow to brown, the colour range of natural waters, and is used by the observer to record the colour of a submerged Secchi disc as viewed by him/her from above. Many Secchi discs are provided with a miniature temperature sensor (i button). After operating the Secchi disc, the operator can submit a photo of the water colour and Secchi depth values onto the app, which will be transmitted to ICAR-CMFRI server with geo-reference co-ordinates of the sampling sites. The application is of immense potential in aquaculture as well as in water quality related studies as it gives almost accurate information based on the colour changes observed in the water body.

Detritus matter

Detritus matter plays a significant role in the Vembanad Lake ecosystem, contributing to its high biological production and supporting various food webs. It acts as a food source, particularly during monsoon months when other food sources are scarce. Detritus also influences the lake's water quality and sediment composition. Detritus matter is the dominant component contributing to the absorption. Dominance of detrital matter in the northern zone of Vembanad lake gives a brownish green to the water. An increase in phytoplankton absorption observed during pre-monsoon gives the water a greenish appearance to the lake in the Central zone.

Conclusion

Monitoring aquatic bodies is crucial for ensuring community health by safeguarding water quality, which directly impacts public health and the environment. This involves assessing physical, chemical, and biological parameters to identify potential health risks and guide management practices. Strategies such as Regular Water Sampling: Collect water samples from various locations in the lake, including areas near potential contamination sources ; Pathogen Detection: Analyze samples for the presence and concentration of various pathogens, including bacteria, viruses, and protozoa; Faecal Indicator Bacteria Monitoring: Monitor levels of faecal indicator bacteria (like E. coli) as an indicator of potential faecal contamination and disease risk; Physical and Chemical Parameters: Measure other relevant parameters like water temperature, pH, turbidity, and nutrient levels, as these can influence pathogen growth and survival; Remote Sensing: Utilize satellite imagery and other remote sensing technologies to monitor water quality parameters like temperature, turbidity, and phytoplankton blooms, which can be indicators of potential health risks; Public Awareness: Educate the public about the risks of waterborne diseases and the importance of safe water practices; Improved Sanitation: Invest in improved sanitation infrastructure to prevent sewage and other pollutants from entering water bodies. ; Wastewater Treatment: Ensure effective wastewater treatment to remove pathogens before discharge into lakes and other water bodies and Community Involvement: Engage local communities in monitoring efforts and promoting safe water practices, could help.

Water-associated diseases and SDGs

Water-associated diseases are also directly linked to Sustainable Development Goal 6, which focuses on ensuring access to clean water and sanitation for all. Many of the SDGs, including those related to health (SDG 3), poverty (SDG 1), and food security (SDG 2), are also heavily reliant on access to clean and safe water. Contaminated water and inadequate sanitation contribute to the spread of diseases like cholera, diarrhoea, and typhoid, impacting public health, particularly among vulnerable populations.

CIRDAP Knowledge Series: 19

World Earth Day: Invest in our Planet

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CIRDAP Official YouTube Link:
https://www.youtube.com/watch?v=DkJ17i_75Sw&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=25

SUMMARY

Earth Day, first celebrated in 1970, has grown into a global movement that raises awareness about environmental challenges such as pollution, deforestation, and climate change. The 2023 theme, *Invest in Our Planet*, emphasizes collective action- through time, resources, and sustainable practices-to protect ecosystems and secure a healthier future. Agriculture plays a central role, as sustainable methods like conservation tillage, crop rotation, residue management, and organic fertilizers improve soil health, enhance soil organic carbon, and mitigate climate impacts. Healthy soils, rich in organic carbon, are vital for food security, biodiversity, and climate resilience. Individual commitments-reducing plastic use, conserving water and energy, recycling, and composting-complement broader systemic changes.

SDGs Linkages: 13, 15

Policy Insight: Earth Day serves as a reminder of our shared responsibility to restore ecosystems, safeguard biodiversity, and build a sustainable, equitable world.

History of World Earth Day

Earth Day, celebrated annually on April 22nd, was founded in 1970 by US Senator Gaylord Nelson to raise environmental awareness. Inspired by the anti-war movement and a major oil spill in Santa Barbara, Nelson organized a nationwide "teach-in" on the environment, which eventually became the first Earth Day. This event saw participation from 20 million Americans and led to the creation of the Environmental Protection Agency (EPA) and several landmark environmental laws. April 22 was chosen as Earth Day because it marks the beginning of spring in the Northern Hemisphere and the end of autumn in the Southern Hemisphere. This day serves as a helpful reminder of a message to review the impact on our environment and also re-commitment to save our planet through global support. Earth Day continues to be celebrated annually, raising awareness about environmental issues like pollution, deforestation, and climate change.

Theme of 2023

The theme for Earth Day 2023 is "Invest in Our Planet," which highlights the importance of investing in our environment for a sustainable future. Investing in our planet means taking concrete actions to reduce our carbon footprint, protect biodiversity, conserve natural resources, and promote sustainable practices. It requires a collective effort from individuals, governments, and businesses to create a more sustainable and equitable world for everyone.

How we can invest in our planet

Investing in a planet does not mean investing only in gold, silver, business, real estate and diamonds. Rather now we have to invest to save our earth. It is not necessary to invest only by putting money, but in its place, we can also invest our precious time, energy, and effort. We must devote far more resources -financial, political, and social - toward a more sustainable way of living if we want to protect the environment. This means transforming how we grow our food, power our lives, transport our goods and ourselves, and much more.

Earth health and Agriculture

Earth's health and agriculture are intrinsically linked, with agricultural practices significantly impacting the environment and human well-being. Sustainable agriculture, which focuses on minimizing environmental damage and promoting resource conservation, is crucial for maintaining a healthy planet and ensuring long-term food security. Agricultural practices can help sequester carbon in soils, decrease greenhouse gas emissions, and feed and fuel the planet.

Climate Change:

Agriculture is a significant contributor to greenhouse gas emissions, primarily through deforestation, livestock production, and fertilizer use. Conversely, sustainable agricultural practices like agroforestry and carbon sequestration can help mitigate climate change.

Soil Health:

Healthy soil is the foundation of agriculture, providing essential nutrients for plant growth. However, unsustainable farming practices like over-tilling and excessive pesticide and fertilizer use can degrade soil health, reduce fertility and increase erosion. About 95% of our food comes from soil. 815 m people are food insecure, 2 billion people are nutritionally insecure, but we can mitigate this through soil. Soil holds 3 times as much C as the atmosphere and can help us meet the challenges of a changing climate. More than 33% of our soils are degraded but we need healthy soils to grow healthy crops. Healthy soil is the foundation for profitable, productive, and environmentally sound agricultural systems.

Role of Organic Carbon

Soil organic carbon (SOC) is the basis of soil fertility and plays a key role in soil health through biological, physical and chemical functions. Soil C helps support a healthy balance of nutrients, minerals and soil microbial ecologies, improving soil fertility. It promotes the sustained production of essential food and fibre as well as the capacity of plants and animals to resist disease, insect infestation and climate stresses. Our soils are low in SOC as they mostly fall under the influence of arid, semiarid and sub-humid climates and this is a major factor contributing to their poor productivity. Greater SOC content can result in higher food grain production.

Management Practices to Improve SOC

The management practices that increase soil C sequestration and mitigate C loss include:

- Less soil disturbance
- More crop residues return to soils
- Adoption of diversified crop rotation
- More use of organic and biofertilizers
- Improved water and nutrient management practices.
- Soil Organic Carbon (Mg/ha) increases with minimum tillage

In the picture, soil on the left easily crumbles upon handling, revealing well-formed macroaggregates and the macropores between the aggregates. Soil on the right is cloddy, with only a few macropores. Soil on the right is from an intensively tilled field, whereas soil on the left is from the grass sod adjacent to the same field

Minimizing or eliminating tillage (ploughing, disking, etc.) reduces soil disturbance, which helps to preserve existing soil carbon and prevent its loss through erosion. These practices involve less soil disturbance than conventional tillage and can still offer benefits for soil carbon while improving other aspects of soil health.

Crop residue management to sustain soil health

Crop residue management is a crucial practice for maintaining and improving soil health by reducing erosion, conserving moisture, and enhancing soil fertility. Leaving crop residues on the soil surface or incorporating them into the soil provides numerous benefits, including improved soil structure, increased organic matter, and enhanced nutrient cycling.

- Residue Retention: Leaving crop residues on the soil surface, either by spreading them evenly or using them as a mulch, helps protect the soil and conserve moisture.
- Residue Incorporation: Incorporating crop residues into the soil through tillage or other methods helps to increase soil organic matter and improve soil fertility.
- Conservation Tillage: Practices like no-till or reduced-till farming minimize soil disturbance and maximize residue retention, contributing to improved soil health.
- Composting: Crop residues can be composted and used as a nutrient-rich soil amendment, reducing the need for synthetic fertilizers.
- Biofertilizer Production: Crop residues can be used to produce biofertilizers, which are a sustainable alternative to chemical fertilizers.

Effect of Residue Return

Soil property	+Residue	-Residue	%increase
SOC (g/kg soil)	6.25	5.63	11.0
Total Nitrogen (g/kg soil)	0.41	0.34	20.3
Mineralizable N (mg/kg in 10 d)	13.6	10.2	35.0
MB-C (ug/g soil) Microbial Biomass-Carbon	477	407	17.2
MB-N (ug/g soil) Microbial Biomass-Nitrogen	56.1	45.4	23.7

Data in the table shows that leaving crop residues on the soil surface or incorporating them into the soil results in increase in various soil parameters such as SOC, Total nitrogen and microbial biomass.

Impact of Crop rotation on soil health

Nutrient Management:

Different crops have different nutrient requirements. Rotating crops allows for a more balanced use of soil nutrients, preventing depletion of specific elements. For example, legumes (like beans and peas) can fix nitrogen in the soil, reducing the need for synthetic nitrogen fertilizers.

Effect of legumes in Crop Rotation

Soil property	Wheat-Fallow	Wheat-mung	%increase
SOC (g/kg soil)	5.24	6.25	19.2
TN (g/kg soil)	0.28	0.49	76
Mineralizable N (mg/kg in10 d)	5.21	20.87	300
MB-C (ug/g soil)	375	533	42.2
MB-N (ug/g soil)	40.4	64.7	16.8

Date in the table shows that wheat crop followed by mung bean cropping had resulted in an increase in various soil parameters.

Response of sugarcane crop to organic fertilizers

Organic fertilizers generally have a positive impact on sugarcane growth and soil health. Specifically, they improve soil structure, nutrient availability, and water retention, leading to increased cane and sugar yields. Using organic fertilizers in conjunction with inorganic fertilizers can further enhance these benefits and improve soil fertility. Organic matter from fertilizers like compost and manure helps bind soil particles together, creating a more porous structure that improves aeration and drainage. Studies have shown that organic fertilizers, can significantly increase sugarcane yields and improve *gur* quality. By improving soil structure and nutrient availability, organic fertilizers can enhance the plant's ability to absorb essential nutrients.

We can make our earth happy by focusing on the following;

- Invest in food and agriculture innovation
- Protect Marine Wildlife and Ecosystems
- Climate change
- Save Water—and Energy Along with It
- Reduce Plastic Pollution
- Invest in peace.

Possible individual goals for World Earth Day: On Earth Day, individuals can set goals focused on reducing their environmental impact and promoting sustainability by:

- *Reducing single-use plastic consumption*
- *Recycling properly- use a recycled bottle*
- *Using of reusable Grocery bags*
- *Composting food scraps*
- *Conserving water*
- *Reducing energy consumption*

World Earth Day and SDGs

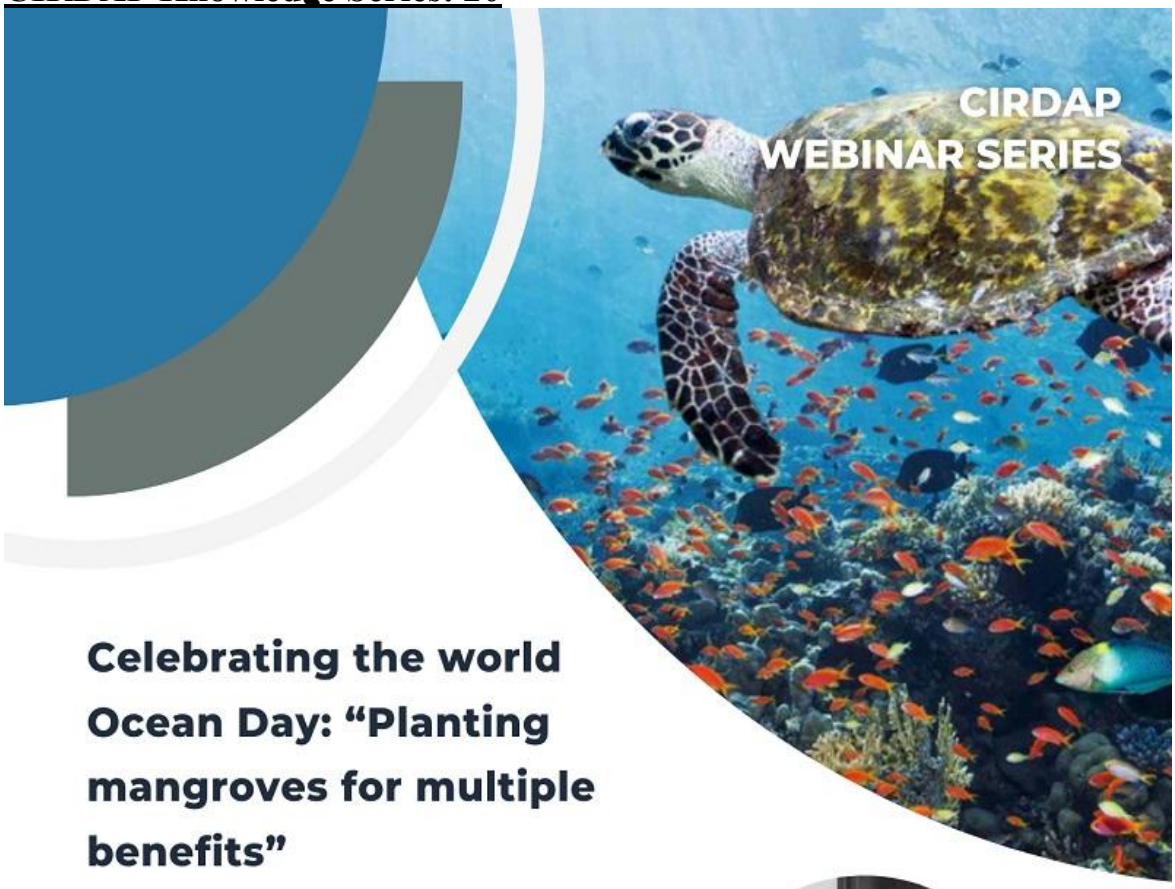
World Earth Day, celebrated annually on April 22nd , is closely linked to the UN Sustainable Development Goals (SDGs). Many of the environmental themes promoted during Earth Day align with specific SDGs, particularly SDG 13 (Climate Action) and SDG 15 (Life on Land). Earth Day events often focus on raising awareness about climate change, pollution, deforestation, and biodiversity loss, all of which are addressed by the SDGs.

Sustainable Development Goals (SDGs): The United Nations established 17 SDGs to be achieved by 2030, covering a broad range of global challenges, including environmental sustainability.

SDG 13 (Climate Action): This goal focuses on urgent action to combat climate change and its impacts. Earth Day's focus on reducing carbon emissions, promoting renewable energy, and adapting to climate change directly supports this SDG.

SDG 15 (Life on Land): This goal aims to protect, restore, and promote sustainable use of terrestrial ecosystems, manage forests sustainably, combat desertification, halt and reverse land degradation, and halt biodiversity loss. Earth Day's emphasis on reforestation, conservation, and combating deforestation directly contributes to this goal.

CIRDAP Knowledge Series: 20



Celebrating the world Ocean Day: "Planting mangroves for multiple benefits"

8 JUNE 2023

11:00 AM (BANGLADESH TIME)
01:00 PM (SINGAPORE TIME)

Click here for Zoom Link

CIRDAP

Presenter

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Venue: Virtual
Via Zoom Conference

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World Ocean Day: Planting Mangroves for Multiple Benefits

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CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=2OeS2AFOSIQ&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=23

SUMMARY

In this presentation, on the occasion of World Ocean Day-2023, **Prof Wong** discusses the global distribution of mangroves, the benefits of planting mangroves and the threats to them. He highlights the critical role of oceans and mangroves in sustaining biodiversity, livelihoods, and climate resilience. Mangroves, thriving in intertidal zones, provide multiple ecological and socio-economic benefits: they sequester carbon at high rates, protect coastlines from erosion and storm surges, support fisheries, purify water, and offer medicinal and nutritional resources. Yet, they face severe threats from deforestation, pollution, unsustainable harvesting, and climate change, with up to 56% at risk by 2100.

SDG Linkages: 1, 2, 14, 15 14.

Policy insights: emphasize the need for integrated coastal management, community-led restoration, secure land tenure, and modular planting innovations to ensure long-term sustainability. Investment in mangroves is a "no regrets" strategy-simultaneously addressing climate adaptation, disaster risk reduction, and sustainable development.

The World Ocean Day

The ocean covers over 70% of the planet. It is our life source, supporting humanity's sustenance and that of every other organism on earth. The ocean produces at least 50% of the planet's oxygen, it is home to most of earth's biodiversity, and is the main source of protein for more than a billion people around the world. Not to mention, the ocean is key to our economy with an estimated 40 million people being employed by ocean-based industries by 2030.

World Ocean Day (WOD) is an international day that takes place annually on June 8. The concept was originally proposed in 1992 by Canada's International Centre for Ocean Development (ICOD) and the Ocean Institute of Canada (OIC) at the Earth Summit – UN Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil. Since launching global coordination in 2002, World Ocean Day has grown from an idea to thousands of events and millions of people reached each year. The World Ocean Day network includes 2,000+ organizations in 180 countries.

Following a four-year petition drive with our international network, the United Nations officially recognized the Day in 2008. Announcing annual themes for World Ocean Day started in 2009. The theme for 2023 is "*Planet Ocean: Tides are Changing*.

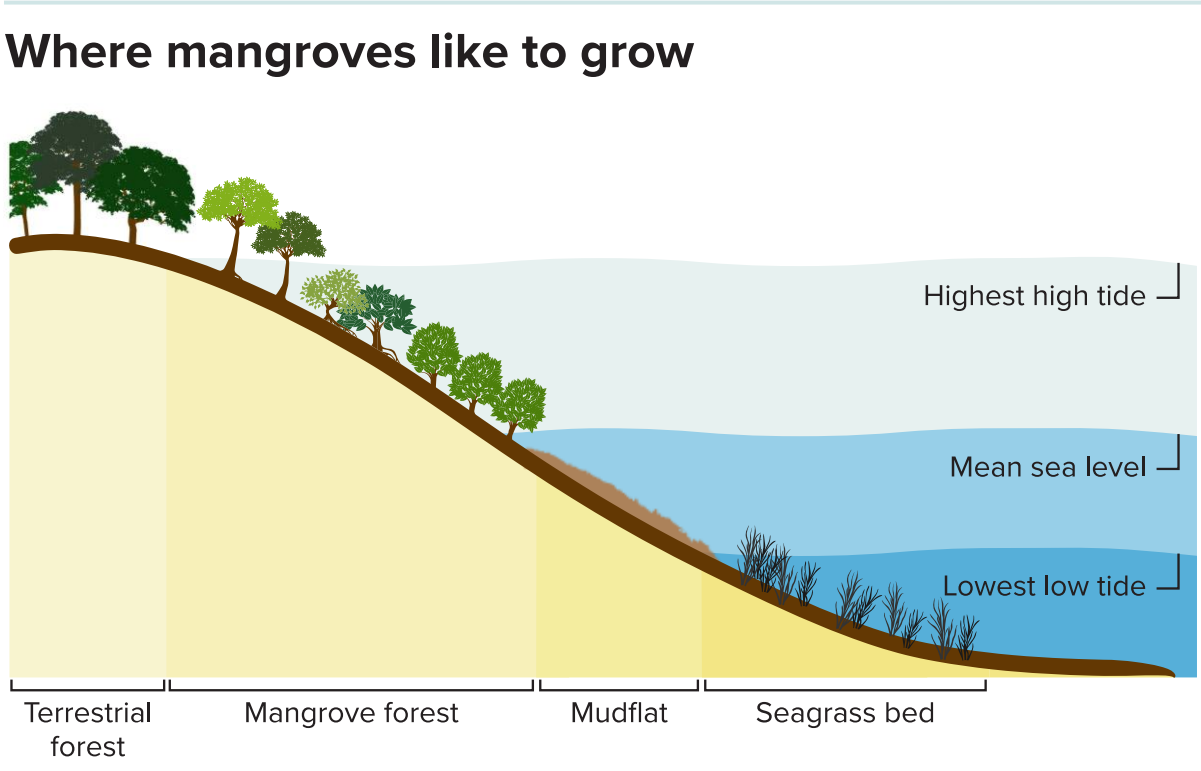
Oceans: some facts

- Oceans cover 70% of earth's surface, contain 97% of earth's water.
- Home to 94% of all life on earth.
- <10% of world's ocean has been mapped.
- Absorb around 30% CO_2 produced by humans, buffering impacts of global warming.

- >3 billion people depend on marine & coastal biodiversity for their livelihoods. (Global
- population is almost 8 billion in 2023).
- Serve as world's largest source of protein, with >2.6 billion people depending on oceans as primary source of protein.
- Unfortunately, as much as 40% of world oceans heavily affected by human activities like pollution, depleted fisheries, & loss of coastal habitats.
- 37 out of 50 critical minerals found in oceans

Mangroves

Mangroves are tropical trees and shrubs adapted to live in the coastal intertidal zone, where land meets the sea. They are unique in their ability to thrive in saltwater and form intertidal forests. These trees play a vital role in coastal ecosystems, acting as a buffer between land and sea, protecting shorelines, and providing habitat for a variety of organisms. Mangroves are vital components of the planet's coastal ecosystems. Mangroves sequester carbon at up to four times the rate of terrestrial forests, making them tremendous allies in our struggle for net-zero carbon emissions by 2050. They stabilize coastlines, protect coastal communities against storm surges, reduce erosion, and serve as vast nurseries and habitats for fish, crustaceans, shellfish and wildlife. They grow in sheltered tropical & subtropical coastal areas across globe, generally between latitudes 25°N & 25°S.



Location of mangroves

Mangroves: Adaptation

Mangroves possess remarkable adaptations in their roots, seeds, and leaves to thrive in harsh intertidal environments. These adaptations include specialized root structures for oxygen

uptake and support, unique seed germination strategies, and salt tolerance mechanisms in leaves. Mangroves have special root systems and may adapt to changes in sea level by growing upward in place, or by expanding landward or seaward. Mangrove environment is highly dynamic and harsh and mangrove species are variously adapted to cope with these environmental conditions.

Breathing roots: Underground tissue of any plant requires oxygen for respiration and in mangrove environment, oxygen in soil is very limited or nil. This necessitates mangrove root system to take up oxygen from the atmosphere. For this purpose, mangrove species have specialized above ground roots called breathing roots or pneumatophores. In some species, these roots are pencil sized and peg like whereas in some other species they look like a knee. These roots have numerous pores through which oxygen enters into the underground tissues. In some plants buttress roots function as breathing roots and also provide mechanical support to the tree.

Silt roots: In some mangrove species, roots diverge from stems and branches and penetrate the soil some distance away from the main stem as in the case of banyan trees. Because of their appearance and because they provide the main physical support to these they are called as stilt roots. These roots also have many pores through which atmospheric oxygen enters into the roots.

Vivipary: Saline water, unconsolidated saline soil with little or no oxygen is not a conducive environment for seeds to germinate and establish. To overcome this, mangrove species have unique way of reproduction, which is generally known as vivipary. In this method of reproduction, seeds germinate and develop into seedlings while the seeds are still attached to the parent tree. These seedlings are normally called as propagules and they photosynthesize while still attached to the mother tree. The parent tree supplies water and necessary nutrients. They are buoyant and float in the water for some time before rooting themselves on suitable soil

Zonation

On the basis of salinity, five zones of mangrove distribution are considered. These are the euhaline, polyhaline, mesohaline, oligohaline and limnatic zones. All mangroves grow along the shoreline; however, each species is limited to different areas within the tidal zone. The zonation is determined by tidal changes, elevation of the land and salinity of the soil and water. Tidal fluctuations play important roles in maintaining mangrove communities.

International Day for the Conservation of the Mangrove Ecosystem (July 26th): Mangroves are unique and vital coastal ecosystems that provide numerous benefits. They act as nurseries for fish, protect coastlines from erosion and storms, and store significant amounts of carbon. This day, established by UNESCO, aims to raise awareness about the rapid decline of mangrove forests and the urgent need for their conservation and restoration.

Benefits

- Mangrove forests stabilize the coastline by reducing erosion caused by storm surges, currents, waves and tides.
- Mangroves protect water quality by removing nutrients and pollutants from stormwater runoff before they reach seagrass habitats and coral reefs.
- Mangrove peat absorbs water during heavy rains and storm surge, reducing the chances of coastal flooding.
- Mangroves provide nursery habitat for many commercial fish and shellfish, and thus, contribute to the local abundance of seafood.

- Mangrove systems provide shelter to a range of wildlife species including
- birds, deer and honey bees.
- Mangroves serve as nesting areas for coastal birds such as little blue herons, great egrets and brown pelicans. Many birds depend on mangroves for part of their seasonal migrations. Even dead mangroves play an important role, providing roosting areas for bird species
- Mangroves play a vital role in coastal ecology and in sustaining and securing coastal communities. They reduce the harmful effects of coastal erosion, storms and flooding and are one of the most cost-effective methods of managing disaster risk along coastlines.
- Mangroves provide a safe nursery – food and protection – for young marine life before they are ready to move further out to sea or populate coral reefs. As well as supporting and protecting marine life, mangroves provide nesting and migratory sites for hundreds of species of birds which flourish among their branches.
- Mangrove fruits, particularly those from the *Avicennia* genus, offer a range of nutritional and potential culinary benefits. They can be processed into various food products like flour, crackers, syrup, and dodol, and are also a source of antioxidants and other bioactive compounds. Avicennia species, notably *A. marina*, are known for their adaptability and are a dominant mangrove species in some regions, with their fruits and other parts having ethnomedicinal uses.
- Mangrove wood is dense and hard, making it suitable for charcoal production and other uses like construction and fuel.
- Mangrove forests offer a natural and effective solution for wastewater purification by acting as a biofilter. They can absorb excess nutrients, trap sediments and pollutants, and even break down some harmful substances, improving water quality in coastal areas.
- Mangroves offer a variety of benefits, both ecological and medicinal. Ecologically, they provide crucial coastal protection, support biodiversity, and contribute to nutrient cycling. Medicinally, various mangrove plant parts are used traditionally to treat a range of ailments, and scientific research increasingly validates their potential as sources of new drugs.

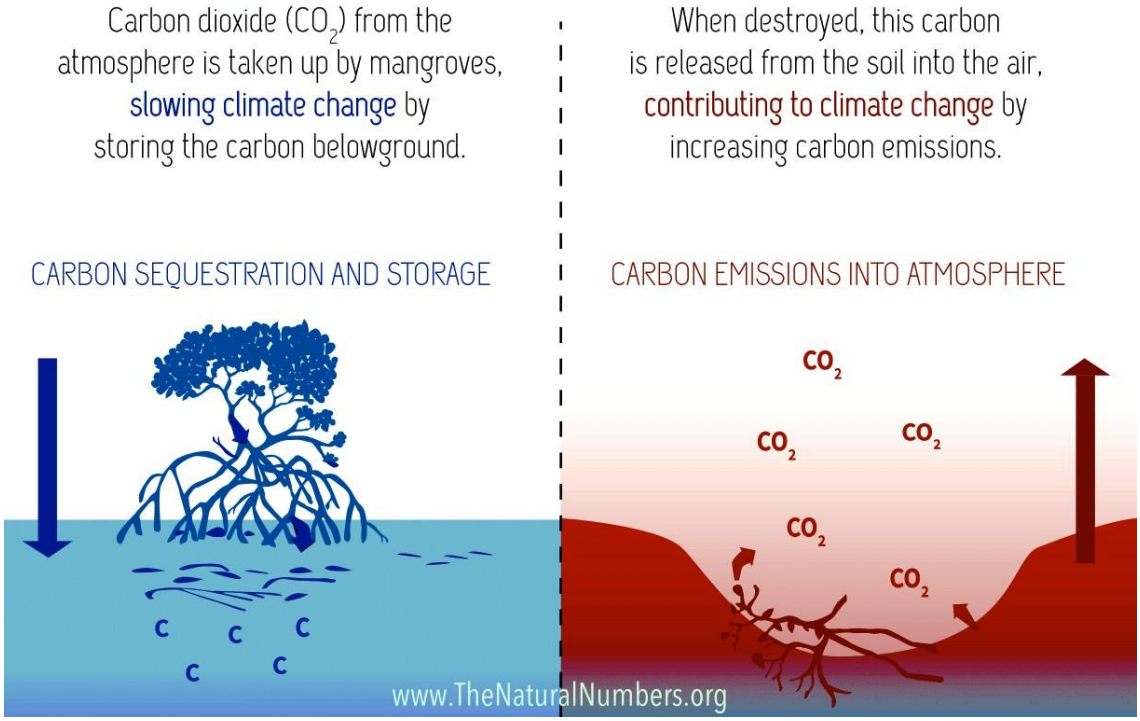
Medicinal uses of Mangroves

Mangrove plant names	Medicinal uses
Acanthus ilicifolius	To treat paralysis, asthma, diuretic, dyspepsia, hepatitis, leprosy, rheumatic gaons. anorexic, anti-inflammatory, leishmanicidal
Aeaiceras corniculatum	Cure for asthma, diabetes, rheumatism, fish ooison
Avicennia marina	Cure for skin diseases
Avicennia offlcinalis	Aphrodisiacs, diuretic, hepatitis and leprosy.
Bruauiera avmnorhiza	Eye diseases
Bruauiera varvi/lora	Antitumor.
Cerioas decandra	Heoatitis and ulcers
Lumnitzera racemosa	Anti-fertility, asthma, diabetes and snake bite

Rhizophora mangle	Angina, boils and fungal infections, antiseptic, diarrhoea, dysentery, elephantiasis, fever, malaria, leprosy, minor bruises, plaster for fractured bones and tuberculosis.
Rhizovhora mucronata	Elephantiasis, febrifuges', haematoma, hepatitis and ulcers.
Salicornia brachiate	Hepatitis
Sesuvium vortulacastrum	Hepatitis
Sueda maritima	Hepatitis
Sueda monoica	Hepatitis

Mangrove ecosystems offer several benefits, and when combined with ecotourism, they can be powerful tools for conservation and sustainable development. Ecotourism in mangrove areas can generate revenue for local communities, incentivize mangrove conservation, and promote environmental awareness

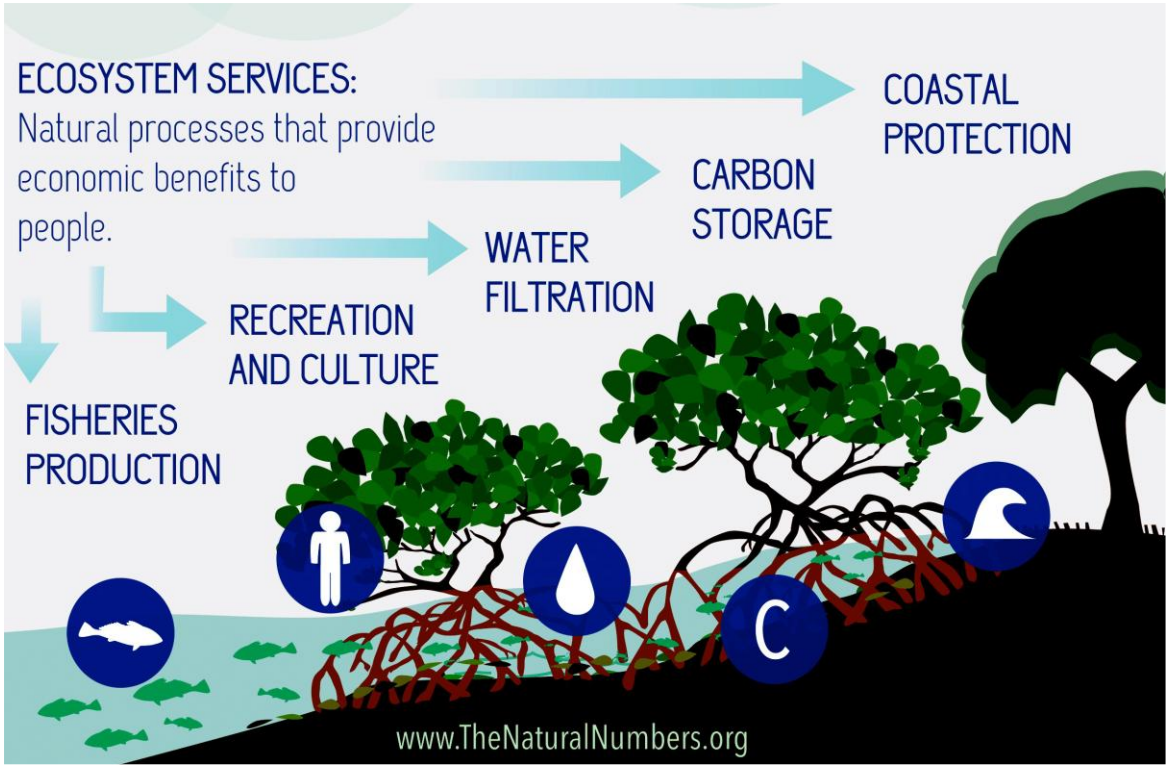
Mangrove forests offer substantial benefits in the fight against climate change, both in terms of mitigation and adaptation. They are highly effective at sequestering carbon, acting as a natural defence against coastal erosion and storms, and supporting biodiversity. Additionally, they play a crucial role in maintaining water quality and supporting livelihoods.



How are mangroves and climate change connected?

Mangrove forests offer significant benefits in mitigating the impacts of sea level rise. They act as natural barriers against waves, storms, and erosion, protecting coastlines and reducing flood risks. Additionally, mangroves help combat climate change by absorbing and storing large amounts of carbon, and their unique root systems trap sediments, helping coastal areas

keep pace with rising sea levels. Intact and healthy mangrove systems can adapt to sea level rise; their growth can accommodate to increases of 3.8 up to 9 millimetres per year depending on local circumstances.

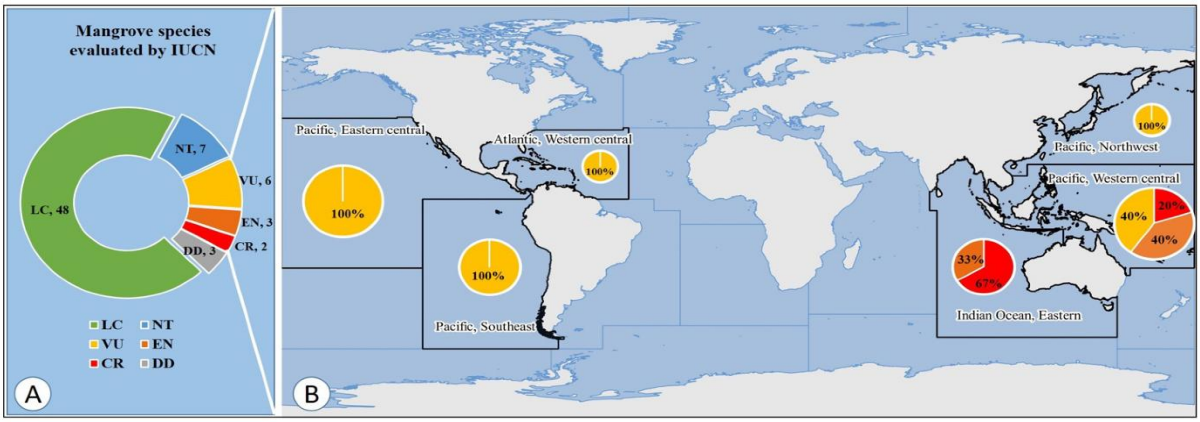


Benefits of mangroves

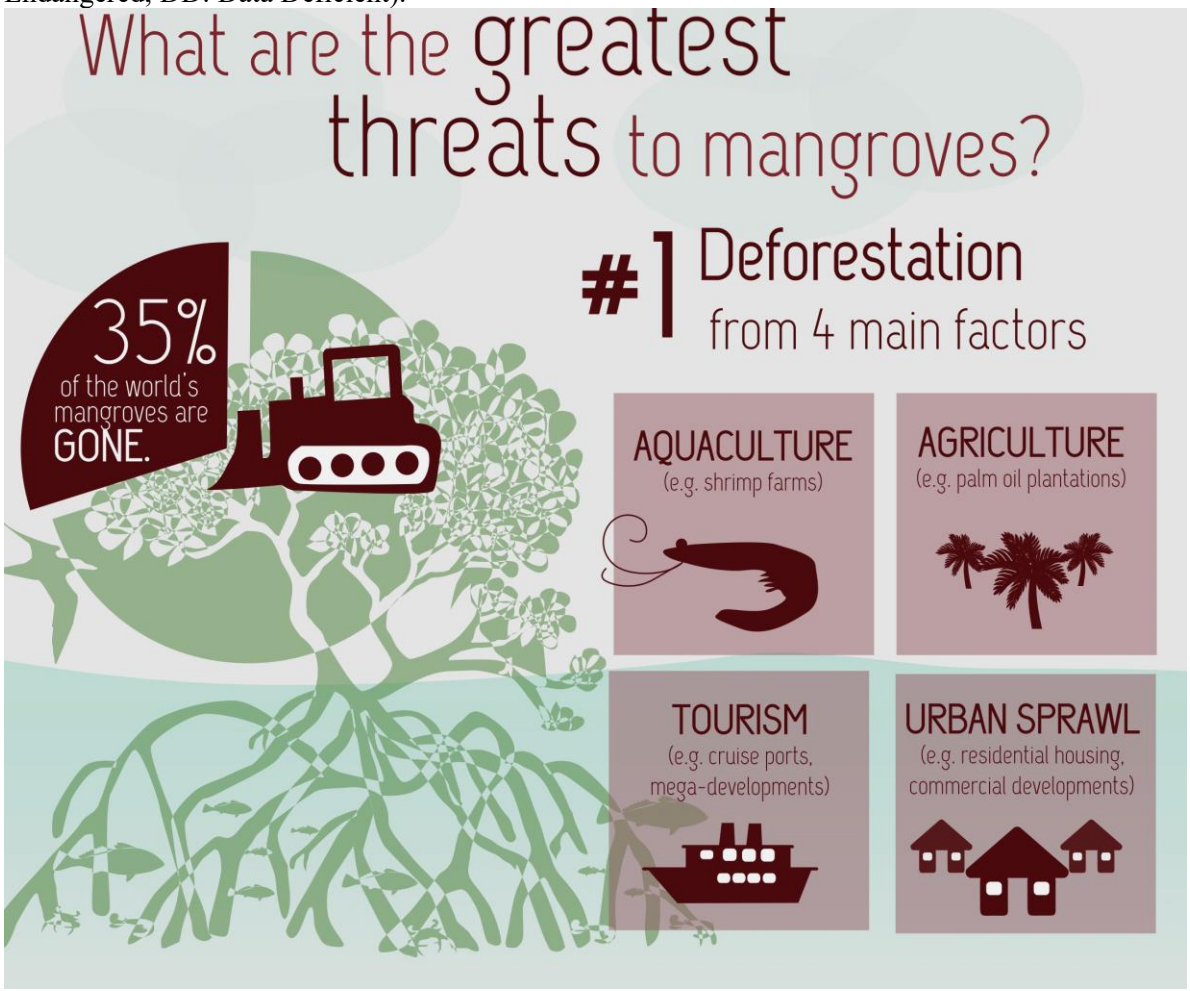
Threats to mangroves

Mangrove ecosystems face numerous threats, primarily from both human activities and natural events. Deforestation, coastal development, pollution, and climate change are major drivers of mangrove loss. These pressures, combined with the impacts of extreme weather events, are significantly impacting mangrove habitats worldwide.

Recent findings reveal that half of the world's mangroves could face severe risks by 2100, threatening coastal protection, carbon storage, and biodiversity. By 2100, up to 56% of global mangroves could face high to severe risk under SSP5-8.5 (Shared Socio -economic pathways). Southeast Asia is especially vulnerable with 52–78% mangroves at risk.



A) Status of the global mangrove species and (B) geographic coverage of the threatened mangrove species (LC: Least Concern; VU: Vulnerable; CR: Critically Endangered; NT: Not Threatened; EN: Endangered; DD: Data Deficient).



Major Threats to Mangroves

Coastal Protection

Mangroves are extremely important to the coastal ecosystems they inhabit. Physically, they serve as a buffer between marine and terrestrial communities and protect shorelines from damaging winds, waves, and floods. Mangroves are the first line of defense for coastal communities. They stabilize shorelines by slowing erosion and provide natural barriers protecting coastal communities from increased storm surge, flooding, and hurricanes.

Mangrove forests play a significant role in coastal protection, particularly against tsunamis, and this was evident during the 2004 Indian Ocean tsunami. Areas with well-established mangrove ecosystems experienced less damage than those without, demonstrating their ability to reduce wave energy and lessen the impact of tsunami surges. While some studies suggest mangroves significantly reduce wave height and flooding, others highlight the limitations of mangroves in protecting against very large tsunamis.

Evidence suggests that mangroves can reduce height of wind & swell waves over relatively short distances: wave height can be reduced by 13 - 66% over 100 m of mangroves.

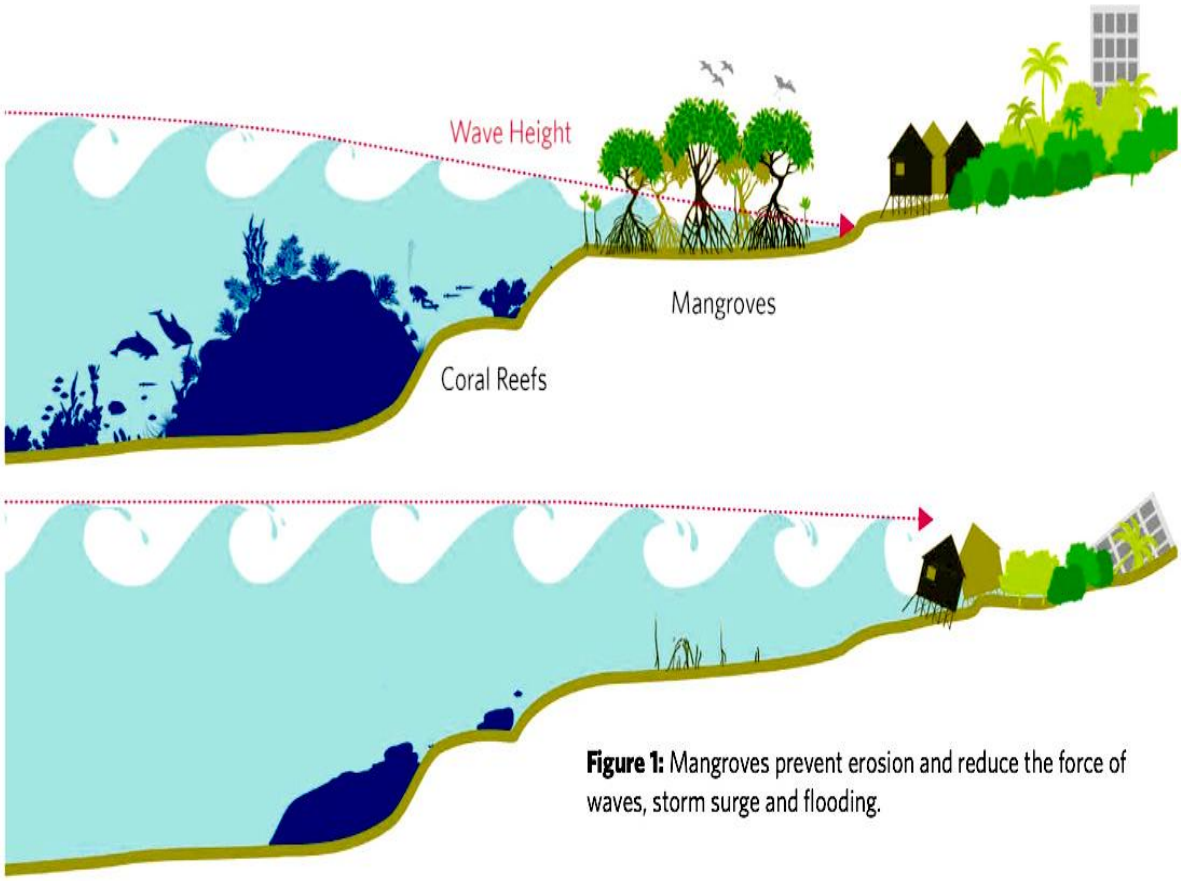


Figure 1: Mangroves prevent erosion and reduce the force of waves, storm surge and flooding.

How mangroves reduce wave height?

Planting and restoration

Mangrove planting and restoration efforts are crucial for rehabilitating degraded mangrove ecosystems and harnessing their valuable services. While planting is a common approach, it's not always the most effective.

Factors Affecting Mangrove Restoration Success:

Ecological Factors:

Hydrology: Restoring natural water flow patterns is essential for mangrove seedling dispersal and establishment.

Soil Conditions: Mangroves need appropriate soil salinity, nutrient levels, and sediment dynamics for healthy growth.

Connectivity: Ensuring the restoration site is connected to other healthy mangrove ecosystems facilitates natural recruitment and biodiversity.

Climate: Warm temperatures, high humidity, and abundant rainfall are optimal for mangrove growth.

Invasive Species: Outcompeting native species can disrupt the natural ecosystem structure and function.

Socioeconomic and Governance Factors:

Community Involvement: Engaging local communities in restoration projects ensures local knowledge and support for long-term sustainability.

*Land Tenure***:** Securing land tenure rights is crucial for implementing restoration projects in suitable areas.

Political Support: Strong policies and governance frameworks are needed to protect mangroves and support restoration efforts.
Funding and Resources: Adequate funding and technical support are necessary for effective restoration projects.

Threats to Mangrove Ecosystems:

Habitat Loss: Clearing mangroves for coastal development, aquaculture, and agriculture destroys habitats and reduces ecosystem services.

*Climate Change***:** Rising sea levels, increased temperatures, and extreme weather events can negatively impact mangroves.

Pollution: Industrial, agricultural, and plastic pollution can harm mangroves and the organisms that rely on them.

Unsustainable Harvesting: Overfishing and unsustainable harvesting of mangrove resources can deplete mangrove ecosystems.

Planting Pitfalls

Wrong site: Popular choice of mudflats because of few competing claims to land. But too saturated with water for roots to source enough oxygen.
Wrong species: Rhizophora with their propagules on exposed coasts & mudflats failed. A. marina & S. alba are better choice.
Unavailable best sites: e.g. former mangrove areas converted to fish & shrimp ponds, are not readily availabl : not easy to identify or owners do not want to give them up.
Lack of monitoring after planting.
Solution: put needs of local communities first; find ways to make conservation pay off for them.

Modular planting

- Initially, modular units can be installed parallel to the shore in coastal areas. Mangrove saplings are then planted inside them.
- Modules can be ideally of space-fitting shapes (triangles, squares, rectangles, hexagons) containing sediments with mangroves grown to various heights or maturity.
- Made of mixture of compressed sediments that become self-destructive & formed part of sediments supporting mangroves. Alternatively of local materials.
- Nutrients & sediments added to growing mangroves in field.
- Large-scale planting using modular system to meet needs of various coastal locations.
- Modular system of planting & deployment is comparable to LEGO® set on a large scale.
- Faster deployment using wooden sledges. Modules anchored by wooden sticks/pegs if necessary.
- Suitable for wide range of coastal types & not confined to muddy tidal flats

Modules

Short-term and long-term benefits of Planting

- Provides employment; utilizes existing skills of coastal communities in mangrove planting.
- Restores degraded coasts caused by shrimp farming & other activities.
- Improves biodiversity; mangroves are nurseries for fish.
- Low-cost protection measure compared to seawalls & dikes.
- Offers coastal protection from erosion, storm surges & buffer to tsunami waves.
- Adaptation to sea-level rise.
- Important carbon sink.
- Supplementary/emergency food supply.
- 'No regrets' measure; beneficial irrespective of future outcome of climate change.

World Ocean Day, Mangroves and SDGs

Planting mangroves contributes significantly to achieving multiple Sustainable Development Goals (SDGs), particularly those focused on environmental protection, poverty reduction, and sustainable livelihoods.

Mangroves support SDG 14 (Life Below Water) by protecting marine ecosystems, providing habitats for marine life, and promoting sustainable fishing. They also contribute to SDG 15 (Life on Land) by conserving terrestrial ecosystems and biodiversity. Furthermore, mangroves play a role in SDG 1 (No Poverty) and SDG 2 (Zero Hunger) by supporting local economies and food security through fishing and other related activities.

CIRDAP Knowledge Series: 21

Celebrating theWorld Environment Day: "Strategic Environmental Assessment and sustainable regional development in Bangladesh"

13 JUNE 2023

11:00 AM (BANGLADESH TIME)

Click here for Zoom Link

CIRDAP

Presenter

Dr. SM Zobaidul Kabir

Deputy Secretary
Government of Bangladesh & Adjunct Research Fellow
The University of Newcastle
Australia

Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

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www.cirdap.org

Strategic Environmental Assessment and Sustainable Regional Development in Bangladesh

Dr. Zobaidul Kabir
Deputy Secretary, GOB & Adjunct Research Fellow,
The University of Newcastle, Australia

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=gmaZXSCcjwQ&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=22

SUMMARY
Strategic Environmental Assessment (SEA) is a vital tool for Bangladesh to embed sustainability into policies, plans, and programs, ensuring development does not undermine ecosystems or social well-being. Unlike project-level EIAs, SEA operates upstream, guiding major initiatives like Delta Plan 2100 and Vision 2041 by addressing cumulative impacts, improving governance, and fostering public trust. Yet, its effectiveness is limited by the absence of a legal mandate, weak institutional capacity, and fragmented coordination.
SDG Linkage: . Properly implemented, SEA supports SDG 11, 13, 15, and SDG 16 making it a cornerstone for balancing economic ambition with ecological responsibility and social justice.
Policy Insight: To mainstream SEA, Bangladesh must legislate its use, develop sector-specific guidelines, strengthen interagency collaboration, and empower local governments to engage communities

Importance of Strategic Environmental Assessment (SEA)

Strategic Environmental Assessment (SEA) is emerging as one of the most crucial instruments in ensuring that development does not come at the cost of environmental and social well-being. Unlike project-level Environmental Impact Assessments (EIA), SEA operates at a more upstream level, evaluating the environmental consequences of policies, plans, and programs (commonly known as PPPs) before specific projects are laid out. Bangladesh is a large country with approximately 170 million people. It is on a roadmap of development where infrastructure and economic expansion are happening at an unprecedented pace; SEA holds the promise of embedding environmental thinking into the very architecture of policy-making. Dr. Zobaidul Kabir stresses in his presentation that SEA is not merely about environmental compliance; rather, it is a framework for making smarter, more just, and more forward-looking decisions.

Benefits of SEA

The speaker dwells upon the points of how SEA is crucial for Bangladesh. He opines that it helps to achieve environmentally sound and sustainable development. Not only does it strengthen policy, planning, and program-making processes, it also helps to identify cumulative effects. It saves time and money and helps improve good governance and public trust/ownership in policy, planning, and decision-making. He highlights the points of how SEA is strategic in shaping policies.

SEA is unique because it may influence the direction and structure of regional and national policies before they become final, irrevocable choices. Dr. Kabir underlined that SEA is a collaborative approach that encourages planners to consider social and ecological trade-offs before investing funds or pouring concrete rather than a report. This is crucial for Bangladesh, which has outlined its goals in programs like Delta Plan 2100 and Vision 2041. Ecosystems are being pushed to their limits by the rate of urbanization and industrial growth as the nation strives to transition from LDC to upper-middle-income status. Approximately 66,000 acres

of agricultural land are being lost annually, and the very development that it is intended to speed up is in danger of being undermined by unplanned growth.

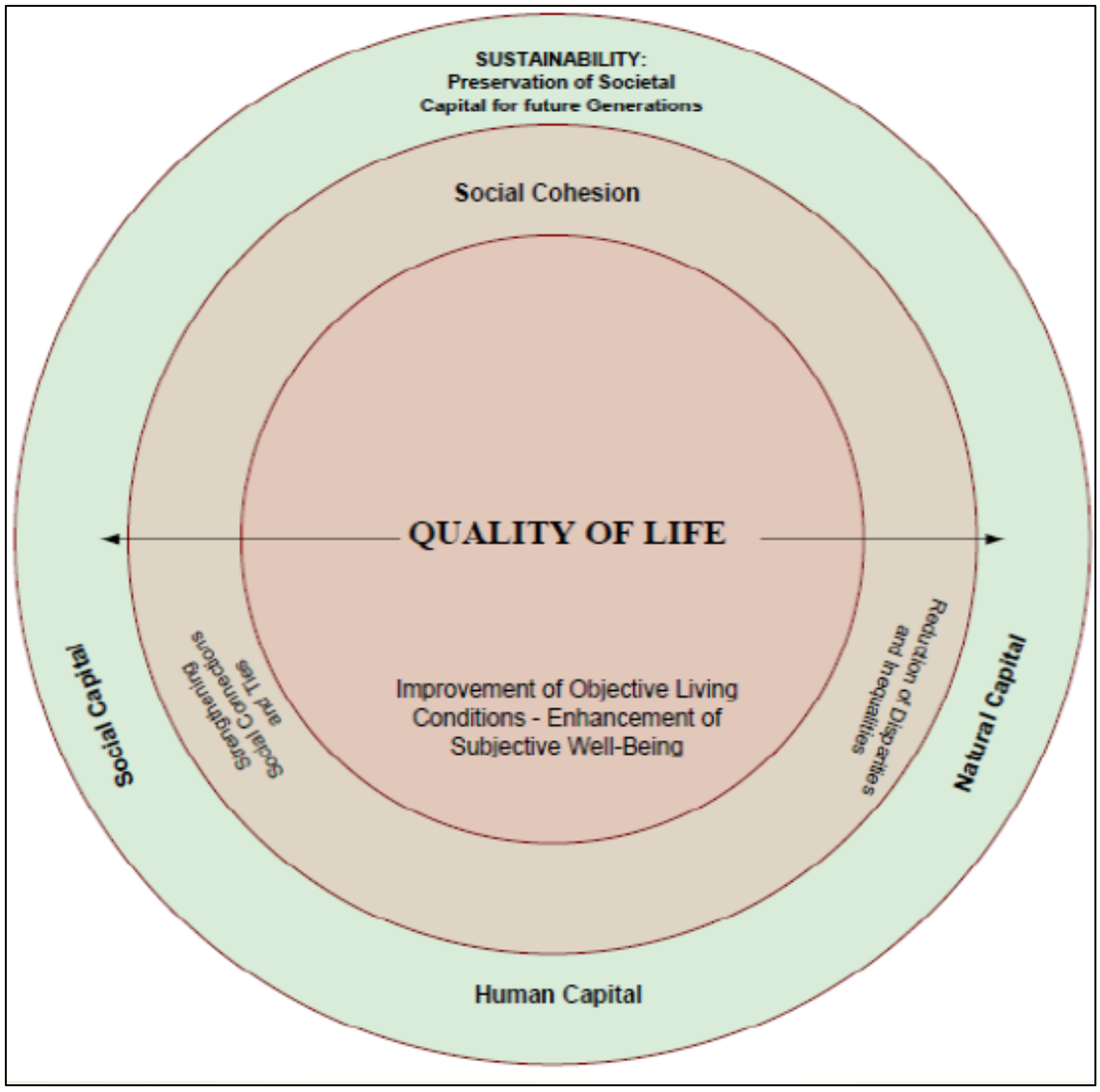

Figure 1: Improved Quality of Life

Legal Vacuum: SEA without Mandate

In Bangladesh, the lack of a legal mandate for SEA is one of the major flaws in environmental governance, as pointed out by Dr. Kabir. Although SEA is mentioned in the National Environmental Policy's 2018 edition, it is not legally binding. The Environmental Conservation Act of 1995 and the Environmental Conservation Rules of 1997 do not incorporate SEA as a legally obligatory requirement. Therefore, SEA is still optional and is frequently only initiated in response to requests from foreign funders. This makes it challenging to guarantee uniformity across sectors and institutionalize SEA. Without legal protections, SEA cannot transition from the periphery to the center of development planning.

Capacity and Coordination: Gaps that Undermine the Process

Laws alone, however, would not solve the problem. Even when SEA is attempted, it suffers from limited institutional capacity and poor inter-agency coordination. Bangladesh currently lacks the human resources and technical expertise required to carry out SEAs that are robust and context-sensitive. Moreover, these evaluations lack precise, industry-specific norms, which causes a great deal of diversity in their breadth and quality. The speaker noted that planners are sometimes left without the resources necessary to carry out insightful assessments because ministries and divisions frequently operate in silos. Without clearer procedures and improved collaboration, SEA cannot be exercised in both letter and spirit.

Referring to the legal arrangements for SEA, he mentions that Bangladesh has not yet endorsed its SEA requirements into the Conservation Act (ECA) of 1995 (revised in 2010) and ECR of 1997 (revised in 2023). The National Environmental Policy of 1992 (revised in 2018) incorporated the requirement of SEA for mega projects and PPPs. He mentions that the Constitution of Bangladesh, through Article 18A, underscores the protection of the environment for current and future generations. He further elaborates on the Institutional arrangement for SEA, wherein he mentions how the Department of Environment (DOE) is responsible for the enforcement of environmental regulations, including the approval of EIA. The Ministry of Environment, Forest and Climate Change is to oversee the activities of DOE, including the approval of SEA and the Parliamentary Committee headed by a Member of Parliament to oversee the activities of MoEFCC.

Furthermore, he examines how SEA is put into practice in Bangladesh. He referred to SEA for Dhaka metropolitan development in 2007 (World Bank Funded), SEA for Detail Area Plan for Dhaka city in 2008 (World Bank Funded), and SESA for River stabilization plan, Bangladesh, 2016 & 2018 by NCEA. He also talks about how the SEA of the NW region is put to protection of Sundarbans (R-SEA)

Governance and Public Participation: The Missing Links

Fundamentally, SEA is about governance as much as it is about science and policy. Ideally, it should be a forum for public engagement, trade-off transparency, and consensus building about development decisions. However, in Bangladesh, community voices are still marginalized due to centralized decision-making and officials' ignorance. The participatory spirit of SEA is too often lost to bureaucratic formality. The speaker makes the case that unless SEA processes become more transparent and inclusive, they will fail to gain legitimacy or generate the kind of civic trust that sustainable development depends on. He points out that the structure of Bangladesh's environmental institutions remains too fragmented to support comprehensive SEA. The Ministry of Environment, Forest and Climate Change (MoEFCC) and the Department of Environment (DoE) have technical jurisdiction but do not have the clout to enforce SEA in other ministries. There is typically little interaction between the planning commission and line ministries as they function autonomously. This, in turn, makes it challenging to include environmental factors in major planning decisions. One of the main reasons SEA has not yet established itself in Bangladesh's policy ecology is because of this institutional fragmentation.

What Needs to Change

What can be done, then? The speaker provides a detailed road map. First and foremost, SEA needs to be formally included in the nation's environmental laws, starting with the Environmental Conservation Act. The creation of comprehensive, industry-specific guidelines is then necessary to ensure that SEA is used consistently and without ambiguity.

Building capacity is also essential for planners, bureaucrats, and local government representatives who are at the forefront of implementation, in addition to environmental specialists. Establishing interagency platforms that promote cooperation over rivalry is equally crucial. Only then can SEA evolve from a static document to a living process.

The Overlooked Role of Local Government

Additionally, Dr. Kabir highlights the important—yet frequently disregarded—role that local governments play in promoting SEA and sustainable regional development. The Bangladesh Constitution's Articles 59 and 16 give local governments the authority to organize and carry out development projects. However, in reality, they hardly ever participate in SEA procedures. If given the necessary authority, funding, and training, these local units, which comprise hundreds of towns and more than 4,500 unions, could play a crucial role in identifying hazards and promoting stakeholder participation. SEA might become more localized and much more sensitive to community demands if their position is strengthened.

SEA has been used with some degree of success in certain projects, such as the Detailed Area Plan (2008), the Dhaka Metropolitan Development Plan (2007), and river stabilization projects funded by the Netherlands Commission for Environmental Assessment (NCEA) in 2016 and 2018. To protect the Sundarbans, the northwest region's SEA was one of the more prominent initiatives. SEA can function in Bangladesh, as demonstrated by these instances. They are the exception, not the rule, though. The country's growth trajectory cannot be changed by these individual triumphs alone without size, integration, and policy commitment.

Aligning SEA with the SDGs

When implemented properly, SEA promotes a number of Sustainable Development Goals (SDGs). By promoting more sustainably developed cities and communities, it advances SDG 11. Climate resilience is included in fundamental planning and supports SDG 13. By protecting biodiversity, it advances SDG 15, and by encouraging responsible and inclusive institutions, it advances SDG 16.

As Dr. Kabir continues, SEA is a framework for striking a balance between social justice, ecological responsibility, and economic ambition. It is not only about protecting the environment. In order for Bangladesh to achieve its 2041 objective sustainably, SEA needs to be ingrained in the legal system, backed by institutions, and accepted by the general public.

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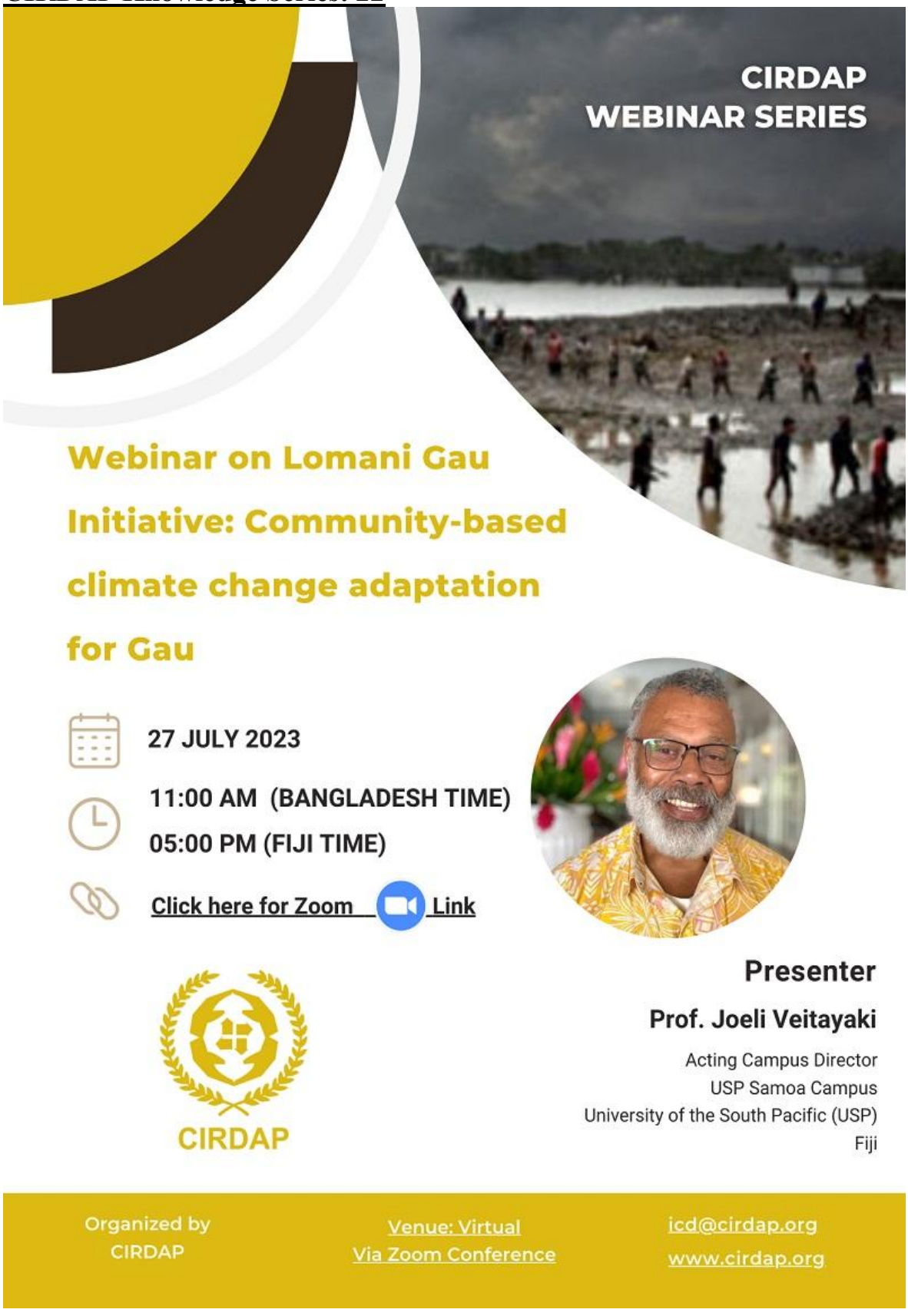


Lomani Gau: Community-Based Climate Change Adaptation for Gau Island, Fiji

Prof. Joeli Veitayaki (Retired)
University of the South Pacific (USP)

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=gENFW2KPvU4&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=21

SUMMARY

This deleberation highlights how rural development in Fiji must be reimagined through community-led, ecosystem-based approaches that respect indigenous knowledge and local governance systems. Faced with climate threats, environmental degradation, and the limits of top-down development, Fijian communities are turning to Community-Based Adaptation (CBA) to protect natural capital, diversify livelihoods, and strengthen water and waste management systems.

SDG Linkage: 6, 13, 15

Policy Insight: Sustainable rural development is most effective when governments and NGOs shift from directing to enabling- providing tools, capacity-building, and supportive frameworks while allowing communities to lead.

Rethinking Rural Development through Local Lenses

Fiji is home to hundreds of islands, many of which are small, remote, and very dependent on the nearby land and ocean, making it more than just a tropical destination. In these places, life moves at a different speed. Human life depends on farming, fishing, and long-standing social networks. However, in recent years, that equilibrium has started to shift. Rising sea levels, unpredictable weather patterns, and shifting coasts are all slowly eroding the long-standing resources of these communities. The threats are already there, as seen by crops damaged by seawater, the depletion of freshwater, and pressured livelihoods, especially for offshore islands.

It is in this setting that rural development takes on a very different meaning. It is not just about putting in a new road or pumping funds into the economy. It is about protecting a way of life. And that means doing things differently. Over time, people have grown wary of top-down development plans that sound promising but rarely fit the local context. What is working better in many parts of Fiji now is an approach called Community-Based Adaptation (CBA). At its heart, it is simple: let the community lead. CBA draws on what people already know, i.e., how to manage land, distribute resources, and make decisions as a group instead of bringing in one-size-fits-all solutions from outside experts. Although it is not flawless and is continually developing, it acknowledges that resilience is something you develop together rather than something you can give.

Natural Capital and Changing Development Models

In Fiji's rural areas, nature is an integral part of everyday life rather than something distinct from it. In addition to food and water, people here depend on the sea, rivers, and forests for stability, identity, and communal rhythm. These ecosystems influence People's lifestyles, diets, and even decision-making. However, that synergetic relationship has begun to deteriorate in recent years. The strain to make a living is forcing people to take more from

nature than it can readily return, invasive species have infiltrated farmlands and forests, and plastic garbage is accumulating in areas without official methods for handling it.

What is frustrating is that a lot of earlier development efforts did not really take this into account. The push to modernize rural areas often meant bringing in outside systems, new farming techniques, infrastructure projects, even imported food, all done with good intentions but not always with an eye on the environmental cost. And in doing so, they occasionally disregarded the extensive expertise that local communities already possessed regarding environmental management. These efforts sometimes even made the damage they were intended to repair worse.

Lately, though, there has been a shift. More people are talking about sustainability, not as a buzzword, but as a way to return to something older and more grounded. Ecosystem-based management, for example, has gained traction in places like Nadi, where communities are starting to take a bigger role in protecting their forests, reefs, and freshwater systems. These plans are not perfect; they still depend on support, resources, and clear policies, but they mark a return to the idea that you cannot separate development from the land it is built on. Still, the challenges are real. Laws and policies do not always reach the outer islands, and even when they do, the funding or staff needed to carry them out might not. Not everyone in the community is on the same page, and without sustained engagement, projects risk fizzling out. But what is clear from Fiji's experience is this: if development is going to last, it has to start by protecting the very systems people depend on to live. Otherwise, everything else—roads, markets, even education—sits on shaky ground.

A Community-led example from Fiji

To address the high rise in increasing environmental stress, the people of a remote island in Fiji came up with their indigenous solutions, which included diversifying their sources of income, addressing waste creation issues, improving water management, and using traditional governance methods. This was a community project influenced by local discussion and traditional knowledge. It was completely participatory and involved elders, councils, and women's organisations. It respected the social fabric and established government structures, and it was successful. It also showed that adaptation is about rethinking development in ways that are more egalitarian, robust, and rooted in place, rather than just surviving climate change.

Institutions, Participation, and Sustainability

The Fijian approach worked because local institutions were strengthened, and the community was motivated and had complete ownership by the people. It is seen that change occurs when villages are given the necessary tools, training, and confidence to take charge, and necessary capacity-building measures are put in place. Systems for water and waste management are enhanced, livelihoods are more stable, and habitats are protected when the people use indigenous knowledge, and that too with pride. Thus, sustainable island development is not a single policy or project but rather a group of interrelated actions, such as protecting ecosystems, promoting native crops, and putting inclusive, participatory governance into place. And yet, many challenges persist—from weak national coordination to the loss of traditional food systems. For CBA to work at scale, governments and Non-Governmental Organisations (NGOs) must move from directing to enabling and supporting rather than steering.

Figure 1: Community discussion and participation

On the roadmap of the Sustainable Development Goals (SDGs)

This case study from Fiji directly reflects the Sustainable Development Goals (SDGs), a global blueprint adopted by all UN member states for achieving environmental sustainability by balancing economic progress with an inclusive approach. Out of the 17 goals, in this particular case, three goals stand out in particular. First, SDG 13: Climate Action, which urges nations to take urgent steps to combat climate change and its impacts. The Fijian community's grassroots adaptation, developed without waiting for external intervention, reflects what this goal truly demands: locally appropriate, community-led responses to environmental change. Secondly, SDG 15: Life on Land, which advocates for the preservation, restoration, and sustainable use of terrestrial ecosystems, is also seen to be closely aligned with the endeavour followed by the people of this island country. By preserving biodiversity and indigenous ecological knowledge, the people's efforts are leading to the saving of native woodlands and encouraging indigenous farming methods. On the same lines, the preservation of watersheds and enhanced local water management make SDG 6: Clean Water and Sanitation visible. This ensures safe and sustainable access to water, which is still a challenge in many smaller islands and rural areas.

It is remarkable to see that the community's priorities, indigenous knowledge systems, and collective governance were the push factors behind these initiatives. They were unknowingly on the path of achieving the SDGs, though. The community has converted impersonal global objectives into practical, everyday activities with its consistent efforts. It is a powerful reminder that the SDGs will only be successful if they are lived at the grassroots level, not as donor projects, but as people's plans for their future. As this island shows, sustainable development is not only about technical fixes or capital investment; it is about giving people the space and support to take stewardship of the ecosystems on which they have long depended.

CIRDAP Knowledge Series: 23

Water-Quality based Risk Assessment Framework for Open-access Aquatic Resources using Citizen Science & Satellite Remote Sensing

22 MARCH 2022

11.00 AM -12.45 AM (DHAKA TIME)

Click here for Zoom Link

CIRDAP

Presenter

Dr. Grinson George

Senior Program Specialist (Fisheries)
SAARC Agriculture Centre (SAC),
BARC Complex, Farmgate, Dhaka,
Bangladesh

Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

icd@cirpda.org
www.cirdap.org

Water-quality based risk assessment framework for open-access aquatic resources using citizen science and satellite remote sensing

Dr. Grinson George,
Senior Program Specialist, SAARC Agriculture Centre, Dhaka.
Email: Sps_fisheries@sac.org.bd

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=rg2IhK4-_dc&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=5

SUMMAARY
In this deliberation Dr. Grinson George highlights citizen science–based water quality monitoring, as demonstrated in Vembanad Lake, offers a low-cost, participatory, and scalable framework for safeguarding open-access aquatic resources. By combining simple tools like Secchi discs and mobile apps with satellite remote sensing, communities can generate reliable, spatially rich data that informs pollution control, ecosystem restoration, and public health interventions.
SDG Linkage: This framework directly advances SDGs 3, 6, and 13
Policy Insights: Embedding citizen science into policy democratizes environmental stewardship while strengthening accountability and sustainability. Institutionalizing such approaches within national water governance-investing in training, integrating citizen-generated data into official monitoring systems, and fostering cross-sector partnerships to ensure evidence-based decision-making.

Introduction and Background

During his talk in the CIRDAP World Water Day webinar, Dr. Grinson George brought attention to something that is changing the way we understand and protect our natural resources—*citizen science*. At its core, it is about everyday people getting involved in scientific work: *collecting data, making observations, and feeding that information back into bigger research efforts.* Whether it is tracking butterflies, recording bird sightings, or checking water quality in a village pond, the idea is simple: science does not always need a lab coat. Sometimes, it just needs a curious eye and a little training.

The speaker pointed out that this is not just a feel-good concept. It is actually a smart and cost-effective way to collect data, especially in places where scientists cannot be present all the time. Places like remote islands, mountain terrains, or scattered farmlands are places where traditional in-situ sampling would cost too much time and money. With citizen science, you can get data from those areas regularly and, over time, build up long-term records that are incredibly valuable. Moreover, what is more, people start to care more about their environment when they are directly involved in observing it. It is one thing to be told that a lake is polluted. It is another way to test the water yourself and see how it changes over the months.

That kind of local involvement can shift mindsets from passive concern to active responsibility. He further noted how, thanks to global networks and technology, it is now possible to feed local observations into international databases. In some ways, it is making science more democratic, where data is not just coming from universities and government labs but from farmers, school kids, and fishermen, too- the common man or stakeholder. When done well, citizen science is not just low in cost; it is also richer in quality, more inclusive, and often more rooted in what is actually happening on the ground.

Example of Vembanad Lake

The speaker takes the example of Vembanad Lake, which is situated in Kerala. It is not just a body of water; and it is a lifeline that runs through the core of the state's ecology, economy, and culture. Stretching along the southwest coast of India, it is the largest lake in the region and one of Kerala's three designated Ramsar Sites. What makes it remarkable is not just its size but the way it connects landscapes and livelihoods. Ten major rivers flow into this lake, draining a staggering 15,770 square kilometers, which is nearly 40% of the state's total area. It is no exaggeration to say that when you talk about water in Kerala, you are almost always talking about Vembanad.

This lake is not just water; it is working land, too. As per the Coastal Regulation Zone (CRZ) Notification of 2011, the lake and its surroundings are classified as a Critically Vulnerable Coastal Area (CVCA), recognizing the pressures it faces and the communities that depend on it. Capture fisheries, freshwater aquaculture, coastal aquaculture, and the distinctive, hardy Pokkali rice farming technique are just a few of the historical and contemporary livelihoods it supports. With houseboats and backwater resorts attracting tourists from all over the world, tourism has also grown significantly in this area.

The lake serves as both a food source and a source of income for many households who live near its shores. However, Vembanad is in danger, much like many other valuable ecosystems. One of the most immediate problems is the volume of untreated domestic waste that flows into it every day. Add to that industrial pollution from heavy metals to pesticides and petroleum-based compounds, and the mix becomes toxic. The lake is also reeling under the effects of nutrient overload, leading to eutrophication, algal blooms, and choking aquatic weeds. It is observed that because of the high levels of fecal contamination, some sections of the lake are a threat to human use as well as aquatic life. Vembanad perseveres, nonetheless. Thousands of people are still fed, housed, and employed there and run their lives and livelihoods along the coast.

However, action is required in addition to admiration if it is to endure for the following generation. The key will be community-led monitoring, regulation, and restoration. The condition of this lake affects not just the environment but also cultural continuity and shared responsibility and ownership.

Contextualising Citizen Science in Vembanad

In this particular section, the speaker goes on to explain the use of Secchi discs to assess the quality of water. Water quality is not just something for labs to worry about; it is something we can all observe and track with the right tools. The speaker shares his experience of taking up this experiment with faculty and students to make monitoring more accessible through a citizen science initiative to measure water clarity using a simple device called the Mini Secchi Disc.

It is a small, white disc attached to a string or measuring tape, and despite its simplicity, it gives us a lot of insight into what is happening beneath the surface of our lakes and rivers. The handheld device is easy to use, and by looking at the codes of shades of the disc, the quality of water can be assessed.

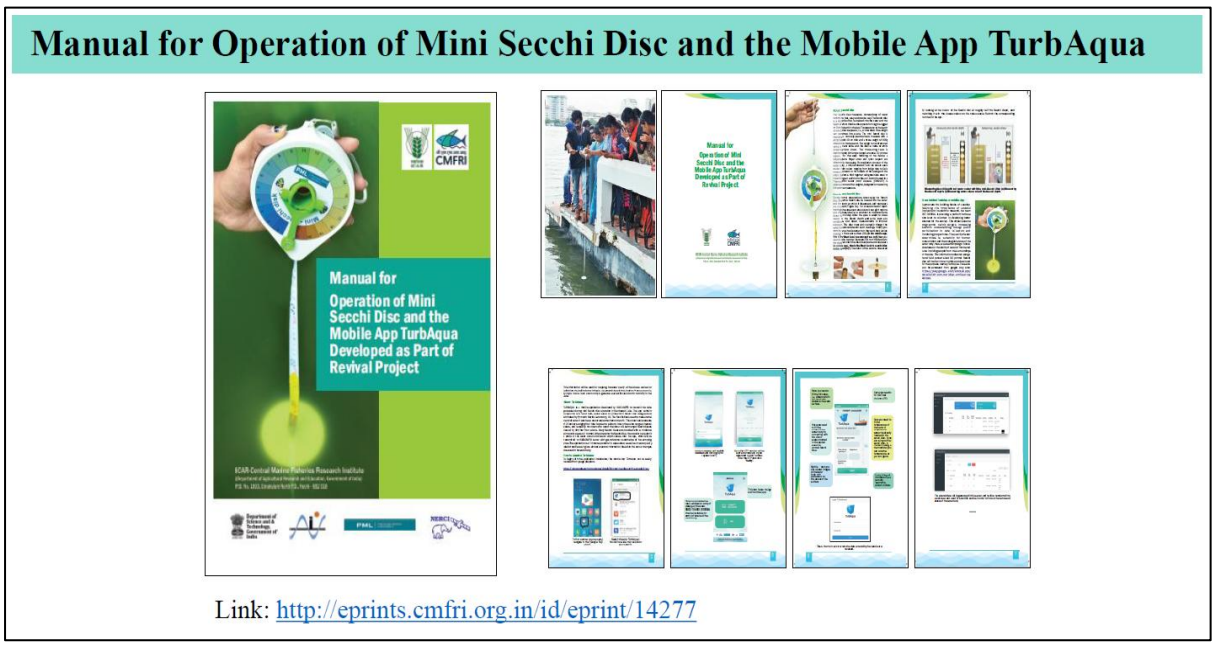


Figure 1: Manual for operating Mini Secchi

The process involves slowly lowering the disc into the water until it disappears, then noting how far it went down. Then, it is pulled back up until one can see it again and note that depth, too. The average of those two readings gives the Secchi depth, which tells how clear or turbid the water is. The clearer the water, the deeper the disc goes before vanishing. In more turbid or polluted water, the disc disappears much sooner.

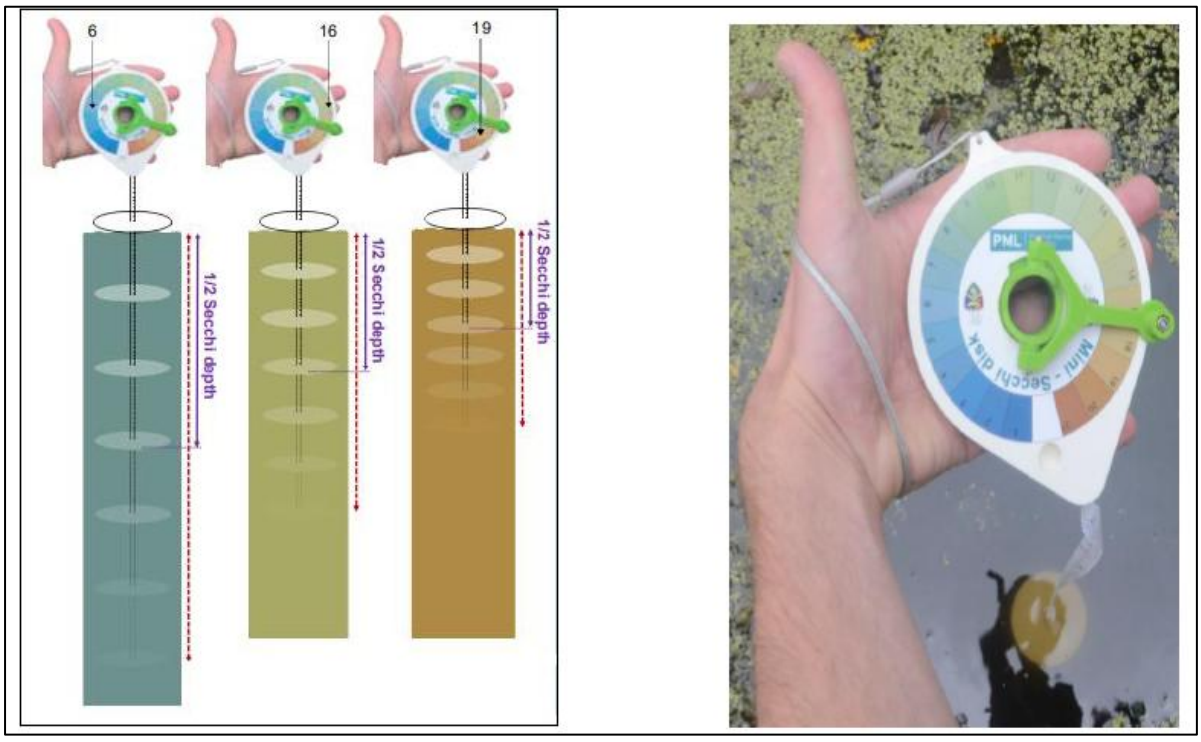


Figure 2: Measuring color and quality of water

To make the data collection even more effective and collaborative, a mobile app called TurbAqua has been launched, which can be downloaded from the Google Play Store. After installing, users simply enter their name and mobile number, get a six-digit OTP (sent

automatically), and are ready to log water clarity observations from wherever they are. The app asks for a few simple details, like the distance from the water surface to the hand holding the device and the point where the disc disappears. It even helps match the color of the water by asking users to compare the disc's appearance at half the Secchi depth with a color scale built into the system. The best part? This method is easy to learn and does not need expensive equipment. Students, teachers, fisherfolk, or anyone curious about their local water bodies can use it. With enough people contributing, one gets a clearer, larger picture of our freshwater systems—what's improving, what's worsening, and where interventions might be needed. It is surely science, yes, but it is also participation, awareness, and a small act of care for the environment anyone can be part of.

In this experiment, the speaker shares that about 250 students from 16 colleges joined in. Hands-on training on mini-Secchi disc & Turb Aquaapp was imparted. People appreciated this initiative as the status of the lake was under threat. Even the houseboat owners came to join the experiment. Support from leaders was also sought to highlight in media the importance of water quality assessment and the conservation of the lake. Through this, a wide spatial location was covered through a citizen scientific approach.

Results from the Vembanad Lake Experiment

The speaker shares that a large number of people, including students, faculty members, houseboat owners, etc., came forward to be a part of this experiment. Hands-on training was imparted to them. They were taught how to read the Secchi disc readings and draw the inference. Using the Secchi disc and the TurbAqua mobile app, a wide range of data was collected, not just about water clarity but about how different parts of Vembanad Lake are being used and impacted. What is powerful here is that they did not just rely on lab studies but also involved people on the ground—across colleges and communities—who recorded observations from the field, helping to build a much more detailed picture of the lake than done in a long time.

One of the things that stood out was the relationship between the reciprocal of Secchi depth (1/D) and the light attenuation coefficient (k). Simply put, when water clarity goes down, the ability of light to penetrate it also drops, and that affects everything from algae growth to aquatic life. The readings we collected confirmed this, adding credibility to the citizen science data. But the learning did not stop with numbers.

They also generated spatial plots, which helped us see how lake usage, like areas dominated by aquaculture, tourism, or domestic discharge, correlates with water quality patterns. In many areas, the data pointed to high levels of detritus matter, especially in zones showing brownish hues in both the Secchi colour scale and remote sensing reflectance (Rrs) data. These are not just pretty visuals; and they reflect a reality where suspended organic matter, silt, and decay are clouding the lake and affecting its health. The detritus is basically broken-down plant and animal matter, which is a dominant factor in light absorption. Brown waters in those plots consistently line up with areas where detritus dominates, showing how simple field methods can align with more sophisticated remote sensing tools. Major light-absorbing components in bio-optics were also studied. The experiment showed that if the water is greenish, it indicates the presence of phytoplankton. If it is highly turbid, it indicates the presence of highly toxic materials in the water.

The bio-optics data explains how various compounds in the water absorb and reflect light, and what that tells us about the health of the lake is one of the many in-depth lessons learned from water quality monitoring surrounding Vembanad Lake. Throughout the experiment, numerous intriguing regional and seasonal trends in the interactions between light and water

in various lake locations were observed. For instance, the water frequently had a brownish-green appearance in the northern zone. Here, light absorption was mostly mediated by detritus matter, which includes decaying organic components such as leaves, plant fragments, and other biological debris. Water with this type of organic excess often seems murkier and darker.

In the central zone, pre-monsoon readings showed a spike in phytoplankton, giving the water a greenish tint, an indicator of higher biological activity. Post-monsoon, inshore waters saw a rise in CDOM, reflected in a yellowish hue. These shifts in water colour reveal what is known as optical classification, where water bodies are grouped based on how they absorb light. It's a simple but powerful way to read water health. When combined with tools like the Secchi disc and citizen science inputs, this approach helps track real-time changes and guides action based on what's really happening beneath the surface.

Bringing the Citizen Science Intervention

The experiment relied heavily on pictures of smartphones collected by people. Combining in situ water sampling with satellite data and citizen-contributed digital images to get a completer and more real-time picture of Vembanad Lake's health. Local students and community members photograph the lake surface, and these images are processed using the WACODI algorithm to extract water colour details. Two simple indicators, the Forel-Ule index and hue angle, helped identify what was in the water, like algae or detritus. This method connects in situ readings with the satellite data, offering both detail and scale. It is low-cost, community-driven, and more responsive than traditional approaches. By tracking changes in water colour, we can map pollution and seasonal shifts across the lake. In the end, it turns basic tools, like a phone and a trained eye—into powerful aids for water monitoring and conservation.

The speaker mentions a flat demolition situation near the lake and how it impacted the water quality. Variances were observed in water quality and colour, even after five weeks of demolition. Another incident mentioned was flooding in the lake in 2018. The speaker shares that the Vembanad Lake could not absorb rainfall runoff and that the lake had been inflated 278 times. He further talks about the situation of the lake during the COVID times. He shares that during this period, water quality improved, especially in southern and central regions. He further stressed that this observation was reliable as it was corroborated by the in-situ data received from stakeholders and the data received from the satellites. In the end, it is not just about the measurements; it is about what we do with them. This project proved that when you bring people into science, you get more data, yes, but also more awareness, more ownership, and better decisions. All of this, thanks to a basic white disc, a mobile app, some open minds, and the shared goal of understanding and protecting a lake, means so much to many.

Roadmap strategy: An integrated approach

A cooperative strategy combines Indian and UK expertise to solve sanitation problems and waterborne illnesses in coastal communities. In order to gather data in real-time and involve communities at an early stage, citizen science, remote sensing, and fieldwork are integrated. While PODCAST expands on REVIVAL to investigate the transmission of cholera, collaborating with partners like ESSO-INCOIS, tools such as the CLEANSE app monitor sanitation and water availability. The WIDGEON evaluates the threats to coastal health by combining disease surveillance and Earth observation. All of these initiatives combine research, technology, and local involvement to more accurately forecast and address health issues associated with water.

Citizen Science, Water Quality, and SDGs

Understanding water quality is not just a technical challenge; rather, it is a public health and sustainability issue that affects millions, especially in coastal and nearshore communities. The talk by Dr. Grinson George highlighted how citizen science can bridge critical gaps in water monitoring by involving local people in collecting data through simple tools like mini-Secchi discs and mobile apps like CLEANSE. Combining satellite data and modelling tools like WIDGEON and PODCAST with community-based initiatives provides a more comprehensive and accurate view of water quality assessments. Assuring access to clean water, monitoring disease risk, and getting ready for climate-related water hazards are all directly addressed by this integrated strategy, which also relates to SDGs 6 (Clean Water and Sanitation), 3 (Good Health and Well-Being), and 13 (Climate Action). The way forward lies in scaling such efforts: investing in training, building cross-institutional partnerships, and ensuring that data collected by citizens feeds into real policy decisions. Clean water is not just a goal-it's a shared responsibility.

CIRDAP Knowledge Series: 24

Webinar on the International Day for Disaster Risk Reduction

October 13, 2023

4 pm (BANGLADESH TIME)
5 pm (THAILAND TIME)

Click here for registration of the webinar

CIRDAP

Speaker

Mr. Tinnakorn Tatong

Inspector General, Department of Mineral Resources, Ministry of Natural Resource and Environment (MoNRE), Thailand.

Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

icd@cirdap.org,
www.cirdap.org

The Landslide Early Warning and Mitigation in Thailand

Tinnakorn Tatong,
Inspector General,
Department of Mineral Resources of Thailand,
Ministry of Natural Resources and Environment

CIRDAP Official Youtube link:
https://www.youtube.com/watch?v=RPPvjACB5xo&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=20

SUMMARY

In this presentation Mr. Tatong highlights about landslide early warning and mitigation system. Thailand's Department of Mineral Resources (DMR) has developed a proactive landslide early warning and mitigation system that combines scientific risk mapping, community-based watch networks, and real-time monitoring through the Geo-hazards Operation Center, DMR shifts disaster management from reactive response to preventive resilience.

SDG Linkage: This integrated approach directly supports SDG 11, 13 and 17.

Policy Insights: With over 18,000 villages mapped and 45,000 volunteers engaged, Thailand's model illustrates how science-policy integration and grassroots empowerment can reduce risks, protect livelihoods, and serve as a replicable framework for other countries confronting geo-hazards in a changing climate.

Role of the Department of Mineral Resources

This webinar is delivered by Mr. Tatong, who states his talk by introducing what his department deals with. He emphasizes that the Department of Mineral Resources (DMR), often referred to as Thailand's Geological Survey, plays a key role in managing the country's geo-hazards, especially landslides, which have become more frequent and severe in recent decades. While its broader mandate includes minerals and geo-conservation, DMR has been at the forefront of studying and mitigating the impact of natural disasters like earthquakes, tsunamis, sinkholes, and particularly landslides.

The speaker goes on to enlist some of the disasters Thailand has faced in the past few years. Thailand has faced several major landslide events over the years, each leaving behind tragic human and economic losses. In Nakhon Si Thammarat (1988), a landslide killed 230 people and destroyed over 1,500 homes. Later, in Phetchabun (2001), 136 lives were lost, while Uttaradit Province (2006) saw over 80 deaths and hundreds of homes destroyed. The 2011 Krabi landslide was particularly devastating, with over 10,000 million Baht in damages. These events have underscored the urgent need for proactive, science-based early warning systems.

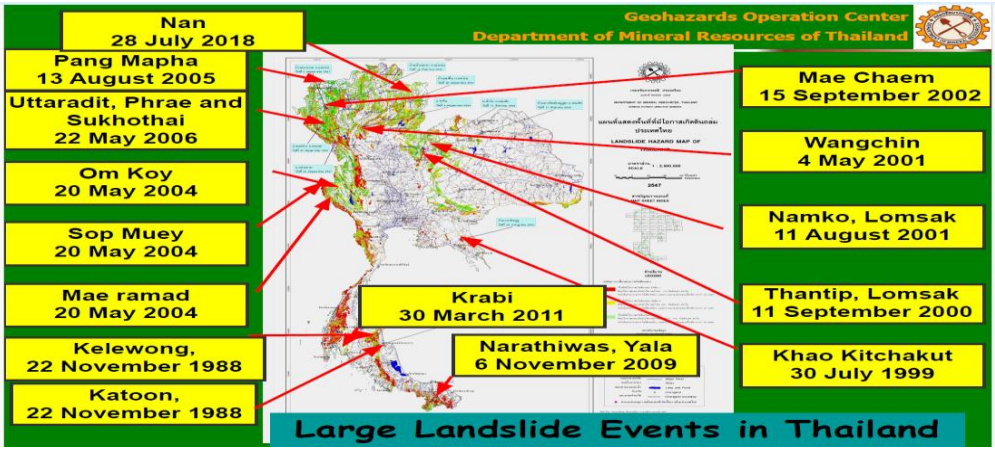


Figure 1: Large Landslide Events in Thailand

DMR's Approach to Disaster Management

DMR's approach to landslide mitigation involves four core strategies. First, they identify high-risk zones using Landslide Susceptibility and Risk Maps. These maps now cover over 18,000 villages across 54 provinces, marking areas where communities are most vulnerable. Second, DMR works to build public awareness by setting up Landslide Watch Networks, groups of trained residents who can spot early warning signs. Third, they install instruments like rain gauges and ground motion detectors in key areas. And finally, they provide timely information and support to these networks, ensuring local people are not left alone during crises.

Pointing Target Areas: By combining scientific mapping, community engagement, and real-time monitoring, DMR's landslide early warning system is helping Thailand shift from reactive disaster response to preventive, people-cantered preparedness. It is a model that shows how science and local knowledge can come together to save lives. He further states that landslide susceptibility maps are drawn for predictive analysis, and the landslide susceptibility model is used to conduct research. The focus is mainly on seven factors, namely elevation, slope, aspect, flow direction, lithology, land use, and structure. He gives the example of the Community Level Landslide Risk Map, drawn at 1:10,000, which shows an area covering the Sub-district or Tambon area, highlighting the areas prone to be affected areas, landslide scars, network locations, and evacuation places. He mentions that the Mathematical model is used in mountainous areas where flood hazard (nonhydraulic) and arc hydro tools are used, while in floodplain areas, HEC–RAS (hydraulic) is used.

Further, he mentions that an easy-to-understand landslide risk map can be used to interact with people. The next step is grouping risky villages and investigating houses that may be at risk. This is followed by meetings with groups of people, where landslide-related risks are discussed in detail. They are told about the signs of the landslide, including heavy rainfall, a rumbling sound in mountainous areas, a rapid change in water level in the stream, and a change in water colour in the stream to that murky. They are also told about the risky areas that may include narrow valleys, buildings that are close to the soot slope of mountains, cracks or landslide scars in upper stream mountains, and flash floods. The people are trained in compiling their early warning and evacuating plans, installing simple rain gauges, searching for appropriate observatory sites and safety places, installing simple benchmarks close to observatory sites, and so on.

Raising Awareness: Next, the process involves raising awareness. This is initiated with talks on DIY-Water Level Gauge and DIY-Inclinometer (one set may cost 285 $). He shared that the networks will only be at the observatory site in the heavy rain night and that at the time of this presentation, 45,000 volunteers were working as networks in 54 provinces.

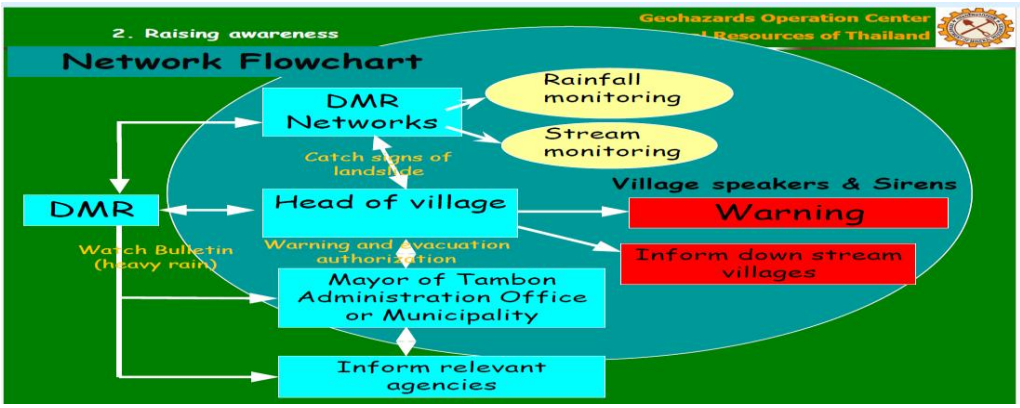


Figure 2: Network Flowchart

Installing Instruments and Tools: Next, the process involves Installing instruments and tools. DMR installation requires automatic rain gauges, inclinometers with automatic rain gauges, and Piezometers,

Role of Geo-hazards Operation Center (GOC)

Lastly, the speaker talks about the Dynamic Susceptibility Map with Kasetsat University. He further mentions supporting information that involves the Geo-hazards Operation Center (GOC) 's support in providing data to the networks to help monitor heavy rain and support landslide information.

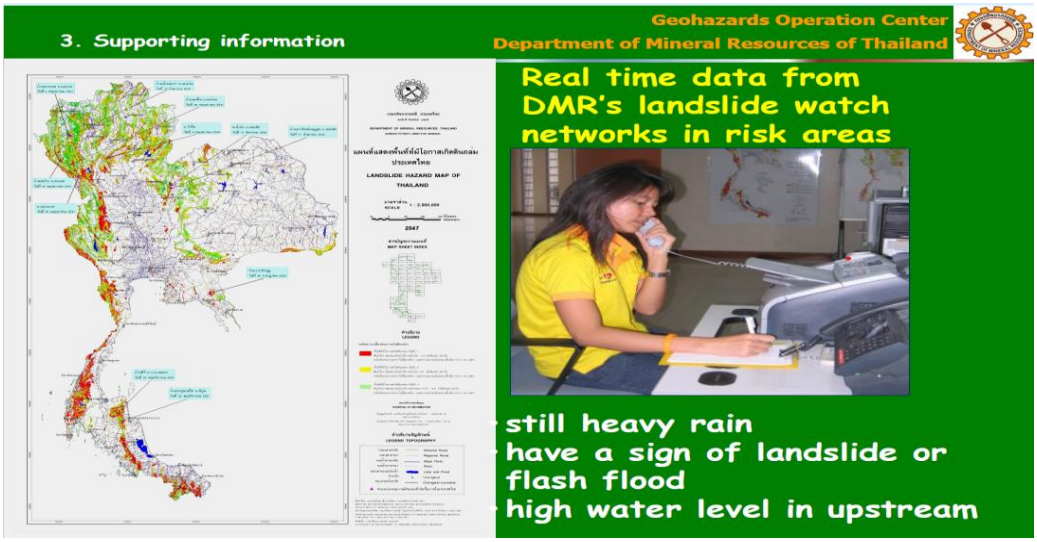
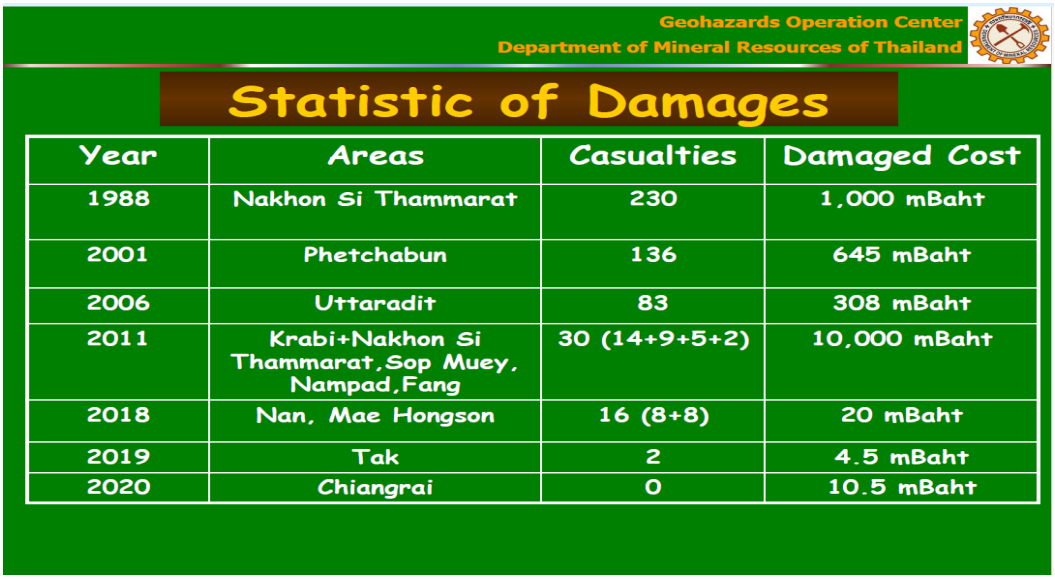


Figure 3: A Glimpse of Geo-Hazard Operations Centre

The speaker elaborates that the GOC will disseminate watch bulletin to relevant agencies, including the Government Response Center, the National Disaster Warning Center, the Office of The National Water Resources, the Disaster Prevention and Mitigation Regional Center, the Chief of Province/District, SMS and telephone to the DMR's networks, T.V. and Radio station. He concludes with the GOC's role in coordinating rescue missions with other bodies for people in risky areas. The system drill includes monitoring, warning, evacuating, search, and rescue.



Year	Areas	Casualties	Damaged Cost
1988	Nakhon Si Thammarat	230	1,000 mBaht
2001	Phetchabun	136	645 mBaht
2006	Uttaradit	83	308 mBaht
2011	Krabi+Nakhon Si Thammarat,Sop Muey, Nampad,Fang	30 (14+9+5+2)	10,000 mBaht
2018	Nan, Mae Hongson	16 (8+8)	20 mBaht
2019	Tak	2	4.5 mBaht
2020	Chiangrai	0	10.5 mBaht

Figure 4: Statistic of Damages

Landslide Preparedness and the SDGs

The landslide early warning efforts shared by Thailand's Department of Mineral Resources clearly tie into the Sustainable Development Goals (SDGs), especially SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action). By mapping risk-prone areas and building local watch networks, the approach prioritizes both safety and resilience at the grassroots level. It also reflects SDG 17 (Partnerships for the Goals) through its collaboration between government, scientists, and communities. Moving forward, the focus must be on expanding coverage to more vulnerable areas, improving real-time data tools, and ensuring local people continue to be trained and equipped. Landslides may be sudden, but their impact does not have to be. With the right mix of local knowledge, technology, and sustained public engagement, countries can reduce risks before disasters strike—protecting both lives and livelihoods. Thailand's model offers a roadmap for others facing similar geo-hazards in a changing climate.

CIRDAP Knowledge Series: 25

Webinar on the International Day of Rural Women

Rural Women's Organization for Development: A Case of BARD Experiment

15 October 2023

11:00 AM (Bangladesh Time)

Click here for Zoom Link

CIRDAP

Presenter

Ms. Saifun Nahar

Deputy Director, Bangladesh Academy for Rural Development (BARD)

Moderator

Dr.Usharani Boruah

Librarian & Gender Coordinator of CIRDAP.

Organized by CIRDAP | Venue: Virtual Via Zoom Conference | icd@cirdap.org www.cirdap.org

Rural Women's Organization for Development: A Case of BARD Experiment

Ms. Saifun Nahar,
Deputy Director & Project Director: RWSEEDE,
Bangladesh Academy for Rural Development (BARD)

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=VeD0nPU0C08&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=19

SUMMARY
In her deliberation Ms Saifun Nahar highlights BARD's initiatives on rural women's organizations with particular focus on how grassroots empowerment can drive systemic change in food security, gender equality, and community resilience. By moving beyond credit-based interventions to integrated programs in education, health, entrepreneurship, and leadership, BARD has enabled women to transition from marginalized roles to active decision-makers and economic contributors.
SDG Linkages: This approach directly advances SDGs 1, 2. 5 and 8.
Policy Insights: Sustainable development requires institutional support for women-led organizations that combine capacity-building, rights awareness, and livelihood opportunities, ensuring that empowerment is not temporary but embedded in rural governance and community structures.

Introduction

The webinar sheds light on the indispensable role rural women play in global food systems. These women are not just caregivers but are deeply involved in every facet of agriculture—from planting and harvesting to processing and marketing. Despite their significant contributions, they often face challenges like limited access to land, credit, education, and healthcare. Since the 1995 Beijing Platform for Action, there has been a concerted effort to empower women through phases like welfare, access, conscientization, participation, and control. This empowerment is crucial for achieving Sustainable Development Goals, particularly SDG 2 (Zero Hunger) and SDG 5 (Gender Equality). By recognizing and supporting the efforts of rural women, we move closer to building inclusive and sustainable food systems that benefit all.

Rural Women Organization in Bangladesh

In Bangladesh, rural women's organizations have played a vital role in encouraging women to step into leadership and decision-making roles, often for the first time in their lives. These groups are built on values like self-help, equality, and solidarity, and they provide a platform for women who were once isolated to come together, build collective strength, and negotiate better outcomes in both economic and social spheres. With the right support, such as training, mentoring, and coaching, many women have emerged as strong community leaders, challenging long-held gender norms in their villages.

However, despite the progress, challenges remain. Due to entrenched cultural expectations about women's roles, their representation in organizational membership and leadership is still far too low. While many NGOs have been working with rural women since the 1970s, the focus has largely remained on credit-based activities, with limited emphasis on broader empowerment. For these organizations to truly uplift women, there needs to be a shift towards encouraging participation in governance, capacity-building, and long-term development planning, not just microfinance.

In 2023, Bangladesh topped the list for gender parity among South Asian countries, according to the World Economic Forum's Global Gender Gap Report, ranking 59th globally, well ahead of its regional neighbors. This standing reflects years of steady progress in areas like girls' education, women's political representation, and grassroots mobilization. While countries like India (127), Pakistan (142), and Afghanistan (146) continue to struggle with deep gender disparities, Bangladesh's relatively higher ranking is a sign that targeted policies and social shifts can make a difference. That said, there's still a long road ahead, especially in terms of economic inclusion and workplace equality.

Role of Bangladesh Academy for Rural Development (BARD)

The Bangladesh Academy for Rural Development (BARD) has long recognized the critical role of rural women in development and began focusing on their empowerment as early as the 1960s. Working from its "laboratory villages," BARD has piloted various projects aimed at improving women's access to education, health, and income-generating opportunities. Some of them were:

- Women Education & Home Development Project (1962-69)
- Women Education Program (1963-1974)
- Village School & Rural Community School Development Program (1986-89)
- Women's Health Development Program (1962-91)
- Women Dai Training & Health Program (1973)
- Village Child and Vulnerable Women Development (1980-85)

They were not just about literacy or skill-building; they were about laying the foundation for women to participate more actively in family and community life. Over the years, BARD's work has evolved to meet the changing needs of rural women. Programs like WEINIP (Women's Education, Income and Nutrition Improvement Project) and GROVE (Gender Rights Operation and Violence Elimination Project) reflect a more holistic approach, addressing not only economic empowerment but also rights, health, and safety. The recent Rural Women Sustainable Education and Entrepreneurship Development for Empowerment project shows that BARD continues to adapt, pushing for long-term, community-driven change. These efforts are not just empowering individual women. They are transforming the fabric of rural society in Bangladesh.

Conceptual Framework

The figure below shows the conceptual framework of the BARD model of Women's Organisations:

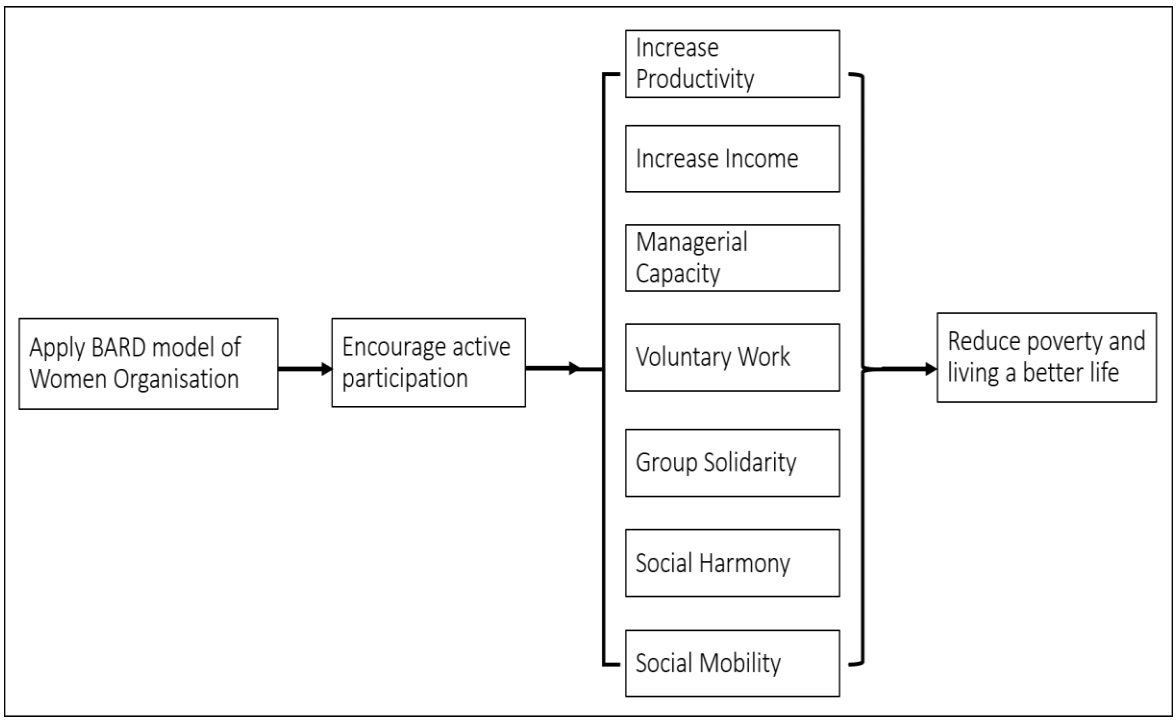


Figure 1: Conceptual framework

The Women's Education, Income, and Nutrition Improvement Project (WEINIP) was launched with a clear and grounded purpose—to uplift rural women, especially those from disadvantaged families, by giving them a voice and a pathway into social and economic development. BARD envisioned WEINIP not just as a temporary program but as a replicable model for rural women's empowerment across Bangladesh. At its core, the Project focuses on building sustainable, village-based women's organizations that act as platforms for continuous learning, income generation, and community participation.

What sets WEINIP apart is its integrated approach. Women's societies formed under the Project aren't just meeting points—they are active spaces where members receive training, engage in horizontal learning, and support each other to improve their quality of life. Through ongoing education, skill-building, and access to livelihood opportunities, these women are not only earning more—they're gaining confidence, decision-making power, and a stronger role in shaping the future of their communities.

Table 1: Summary of achievements of the Project (2022-2023)

S. No.	Factors	Unit	Measure (App)
1.	Investment to Projects	BDT (in million)	1.6
2.	Loan disbursement for business growth	BDT (in million)	2.01
3.	Entrepreneurship development	Person	130
4.	Employment generation	Person	400

To truly improve lives and address deep-rooted social issues like poverty, it is essential to invest in the skills, creativity, and confidence of rural women and youth. One way to do this is by offering training that builds leadership and management capacity, helping them take

charge of their economic futures. Setting up exhibition and marketing centers can also open up new income opportunities for women entrepreneurs, giving their products wider reach and visibility. It is equally important to ensure that these communities have access to the right technologies and support systems, whether through government or NGOs. That information is shared in a way that is accessible and useful. By fostering entrepreneurship, providing low-interest loans, and supporting collective models that share profits fairly, it not only helps individuals grow but also creates resilient, self-reliant communities that can shape their path toward sustainable development. The operational strategy included organizing gatherings, economic activities, human resource development, education, and co-curricular activities.

The Project implements participatory plans for educating individuals, families, and community leaders upholding social values and rights practices towards gender equality and saving motherhood, health, and environmental development. These activities focused on social justice and loving neighbours through services and self-sacrifice. The operational strategy focused on health, nutrition, reproductive rights, rights and laws, and environmental development.

Moreover, BARD came up with activities to practice new models for the formation and sustainable growth of the Asia-Pacific Community that focused on strengthening rural organizations, training people's awareness about education, nutrition, healthcare, awareness about disease prevention, and socio-economic development through providing need and trade based training to rural women to become self-reliant.

One of the key steps toward building a stronger Asia-Pacific community has been the focus on grassroots empowerment, especially through rural organizations. These efforts have gone beyond just forming groups; they have worked to raise awareness around vital issues like education, nutrition, health, and disease prevention at the community level. By offering practical, trade-based training tailored to the needs of rural women, the approach encourages self-reliance and long-term economic stability. It is not just about skills; and it is about giving women the confidence and resources to lead healthier, more informed, and economically secure lives, which in turn strengthens the broader regional community.

Lastly, the speakers share three case studies, which are summarised below:

Case Study I: Sufia Begum

Sufia rose from a marginalized section to a local leader. Her husband lost his business when betrayed by his friends. Sufia then took charge and underwent many training programs in sewing and leadership. It is the leadership training that changed her life. She was elected a public representative in local government institutions twice and still serves at her local level as a member of local government institutions. She now monitors meetings, attends conferences and works with women's welfare.

Case Study II: Saleha

Saleha emerged from a landless person to a social motivator and teacher. A victim of an early marriage that resulted in divorce, Saleha was badly impacted. However, she undertook leadership and entrepreneurial training and has been able to overcome her hardships. She has joined a school and is working on retaining students.

Case Study III: Amena

Amena, too, faced a lot of hardships in her life. She had nothing to survive on. She attended the entrepreneur development training from BARD and emerged as an entrepreneur. She

happened to sell all her woven products, such as *moodha* (woven chairs and stools), at the annual conference and secure a good livelihood.

Empowering Women, Advancing the SDGs

The work of rural women's organizations in Bangladesh, as highlighted in the webinar, speaks directly to the heart of several Sustainable Development Goals (SDGs). Most clearly, it aligns with SDG 5 (Gender Equality) by empowering women to take leadership roles, earn their own incomes, and participate in decision-making processes. However, the impact does not stop there—it supports SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth) by helping women become financially self-reliant through skill development and entrepreneurship. When women gain access to education, health awareness, and markets, it contributes to building more resilient families and communities. These grassroots efforts show that real progress happens when development is community-led, inclusive, and tailored to the realities women face every day.

CIRDAP Knowledge Series: 26

Sustainable Fisheries and Aquaculture: Impact of Climate Change and Mitigation Measures

Dr. Grinson George Padinjakara,
Principal Scientist (Fisheries Resource Management),
Fishery Resources Assessment Economics & Extension Division,
ICAR- Central Marine Fisheries Research Institute, Kochi, Kerala, India.

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=BrxGTXNlfhc&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=18

SUMMARY

Climate change is profoundly reshaping fisheries and aquaculture, threatening food security, livelihoods, and marine ecosystems through rising sea temperatures, acidification, coral bleaching, cyclones, and sea-level rise. Dr. Grinson in this deliberation underscores that aligning fisheries policy with climate adaptation and community resilience is essential for long-term sustainability in vulnerable coastal economies.

SDG Linkage: 1, 2, 12, 13, 14

Policy Insights: Adopting integrated adaptation frameworks-such as controlled fishing access, habitat restoration, vessel monitoring systems, and climate-resilient aquaculture practices- that safeguard both biodiversity and coastal communities.

Introduction

Climate change is no longer a distant concern; rather, it is unfolding right in front of us, affecting the most basic things we depend on: food, water, and shelter. One of the quieter but more alarming signs is the steady warming of the oceans. It has been recorded that sea surface temperatures (SST) have increased by about 0.6°C worldwide during the last 50 years. Methane, a gas that traps heat far more efficiently than carbon dioxide, has been observed to be released from the ocean floor as a result of this warming, among other environmental changes. These changes are lived experiences rather than just scientific facts for the masses, especially those whose livelihoods depend on natural resources.

Frequent and intense floods, droughts, cyclones, and heatwaves are now part of our seasonal vocabulary, and they hit food-producing sectors the hardest. Agriculture, fisheries, and aquaculture, which were once considered stable sources of food and income, are now increasingly vulnerable. This issue is specifically addressed in the webinar "*Sustainable Fisheries and Aquaculture: Impact of Climate Change and Mitigation Measures*." It highlights the ways in which climate change is changing aquatic ecosystems. It forces us to consider how we can help the communities at the forefront of this catastrophe, in addition to developing new policies and technology.

The effects of climate change are especially harsh in India. Of the 36 states and Union Territories, 27 are disaster-prone. The nation has already seen dramatic changes in precipitation and temperature patterns, and research suggests that more frequent and severe extreme weather events are likely in the years ahead. The tragic floods in Kerala after an unusually massive downpour are yet another reminder that the climate chaos is not in the distant future but on us already. Nor are the effects confined to the land.

Even sectors like fisheries and aquaculture, which operate in aquatic environments once considered relatively stable, are now caught in a difficult position. These sectors face mounting losses due to warming waters, changing salinity, ocean acidification, and unpredictable weather cycles. This vulnerability mirrors a broader trend seen in the animal

farming and agricultural industries, where the consequences of climate change are disrupting production systems and threatening livelihoods.

The discussion on sustainable fisheries, as presented in the webinar, helps to put this continued problem at the forefront, reminding us that locally based responses with a global use trajectory are needed. The oceans help drive our planet's climate by functioning as a giant heat reservoir. Through an intricate network called ocean circulation, they sponge up extra heat from the air and spread it around the world. Warm water flows from the equator toward the poles, and dense, cool water descends and returns to the equator, forming a kind of conveyor belt across the globe that moderates temperatures and nourishes marine life. But as the planet heats up, that system is starting to break down.

One notable example of ocean-atmosphere disruption is the El Niño phenomenon, where warming of the central and eastern Pacific Ocean disturbs regular wind and current patterns. El Niño events can lead to extreme weather, droughts in some places, floods in others, and have significant effects on fisheries, coral reefs, and food security. As oceans continue to absorb excess heat, the frequency and intensity of such events are expected to increase, further challenging both marine life and coastal livelihoods.

Unseen Changes Beneath the Surface: Warming and Acidification in the Oceans

The world's oceans are undergoing profound transformations, many of which are invisible to the naked eye but deeply consequential. Global sea surface temperatures (SST) have steadily increased since the pre-industrial era, with an average rise of approximately 0.6°C over the last 40 years**.** This warming, although not uniform across regions or periods, has disrupted ocean circulation patterns, altered fish migration routes, and intensified marine heat waves, posing serious risks to coastal communities and ecosystems alike.

As ocean temperatures rise, thermal expansion causes seawater to expand physically, increasing sea levels even without adding extra water from melting ice. This subtle but steady rise contributes to coastal inundation, where low-lying areas near the sea are gradually submerged or flooded more frequently. Low-lying areas near the coast are slowly covered or inundated more frequently by this slow but steady rise. Thermal expansion is a major but often forgotten driver of climate change because it is one of the silent forces behind the erosion of shores, intrusion of saltwater into sources of freshwater, and displacement of coastal communities.

Just like global warming, ocean acidification has an equally detrimental effect, although it may not be as visible. The rise in carbon dioxide (CO_2) levels within the atmosphere causes an increase in seawater CO_2, too. When this happens, carbonic acid forms and, alongside superheating the oceans, results in acidification. The surface ocean pH has decreased from 8.25 in 1751 to roughly 8.14 by 2021. Even though this looks like a slight change, it holds tremendous ecological consequences. Even though acidification and climate change are different factors, both working in combination to aid an increase in temperature have severely damaging consequences. This results in food webs collapsing, coral reefs losing their structural strength, and a decrease in the resilience of marine ecosystems. Alongside all these factors of stress, unstable and uncomfortable conditions continue to worsen the scenario due to global warming.

Addressing and understanding these reactions is of utmost importance now in order to maintain ecological equilibrium and food security for the future. Although distinct processes, heat and acidification work together in profoundly damaging ways. Collectively, they destroy food chains, threaten coral reefs' skeletal systems, and dampen the overall resilience of marine

ecosystems. Already overburdened, these businesses must navigate a more hostile and volatile ocean landscape as these pressures mount. In relation to balance, security, and sustainability, this is a core issue that needs to be understood and addressed.

Coral Bleaching

The Andaman Islands are now a stark and painful reminder of how serious coral bleaching is, which is one of the most concerning indicators, of our warming oceans. Corals become agitated when water temperatures rise, and they push out the tiny algae that live inside them. These algae are what give corals their stunning hues and vibrancy and provide them with food and nutrition. The corals weaken and lose their colour in the absence of these algae, leaving them vulnerable to disease and succumbing. Once colourful reefs are now becoming delicate and pallid as they fight to live amid shifting waters. These days, the Andaman reefs are severely disrupted due to the loss of marine biodiversity and the ecosystems that support fisheries and tourism. This balance always gets disturbed because of the multitude of changes that ensue.

These range from algal bloom diffusion, which bursts in perturbed systems, further diminishing water quality, and decaying coral ecosystems, alongside a decline in fish populations, which directly impacts food security. This is captured as an addition of silt being washed down and the Andaman gaining erratic, aggressive rainfall during its wet period of the year. This is caused by climate changes where warmer temperatures change the air pressure, storing even more moist air for release as rainfall. This entire infusion together smothers the reefs, putting even more harm on the fragile coral ecosystem's equilibrium. The bottom line is that eroded coral reefs not only transform the ocean landscape into some haunting, beautiful void; they tell a story of climate change-affected distress with extreme impact.

The rising phenomenon of cyclones is becoming a worrying threat to coastal fisheries-dependent livelihoods. The impact of Ockhi on marine fisheries in Kerala is a prime example of how climate events disrupt lives and livelihoods. In 2017, fishing effort units were down 46% from 2016, while Active Fishing Hours (AFH) decreased by more than 57%. Declines in fishing days drastically lowered landings from 22% in 2016 to 13.5% in 2017. This was not just a short-term hurdle to overcome; it amounted to a cumulative loss of 35,465 tonnes of fish on a net basis, over ₹585 crores at the landing site value, and an astounding ₹821 crores at retail value.

The non-isolated losses attributed to Ockhi are alarming. While the overall number of tropical cyclones might not change, the World Meteorological Organization has raised concerns that with warming seas, the intensity of storms will increase. Climate models such as HadRM2 anticipate an uptick in the frequency of high-intensity storms and cyclones with wind speeds of 100-120 km/h or beyond. For coastal economies like Kerala that depend on fishing, this incurs both physical devastation and relentless economic stagnation. Every severe cyclone gradually erodes security, income, and stability.

Rising Sea levels

Sea level rise is no longer a slow-moving concern; rather, it is a fast-paced process. Over the past three decades, the rate has nearly doubled, and one of the biggest contributors is the rapid melting of ice sheets in Greenland. What once seemed like the distant glacial loss is now directly linked to rising tides that are quietly creeping inland. For coastal communities that live in thickly populated areas, this means more frequent flooding, erosion, and the gradual

loss of land they have called home for generations. It is not just a scientific statistic; it is a growing daily reality that is reshaping coastlines and threatening lives and livelihoods.

Marine Ecosystem and its components

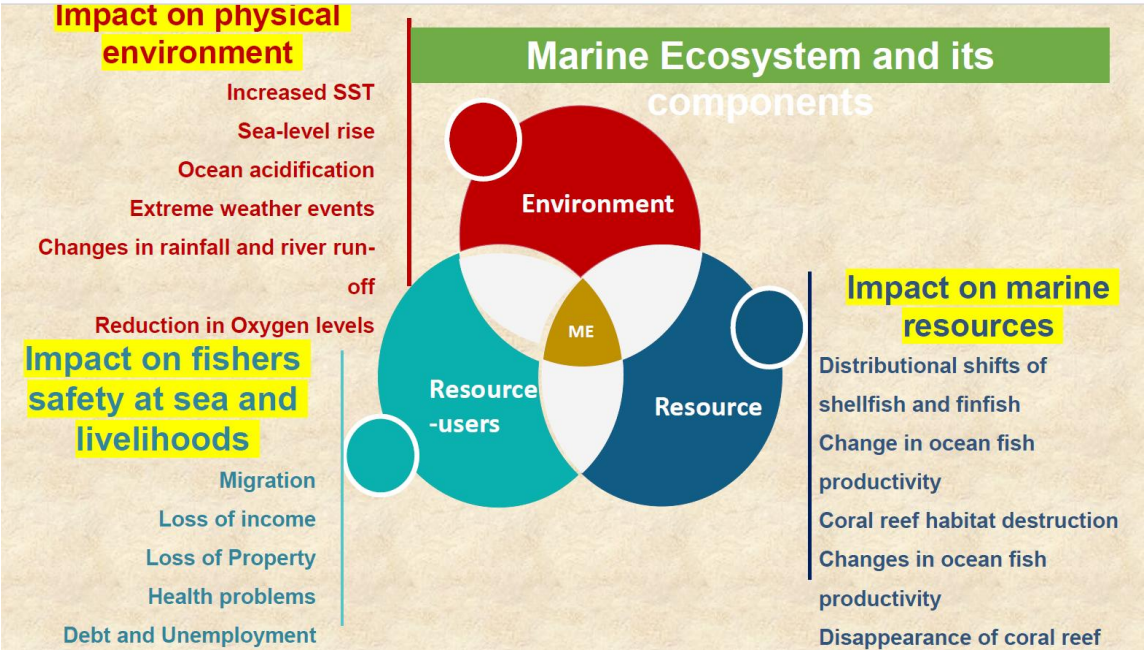


Figure1: Marine Ecosystem and its components

Climate change is reconfiguring the oceans in ways that are at once visible and deeply unsettling. Rising sea surface temperatures, ocean acidification, and sea-level rise are not just environmental concerns; they are directly changing the physical landscape and the ecosystems on which millions depend. We see more extreme weather events, unpredictable rainfall, and disrupted river run-off patterns that affect everything from fish spawning to coastal erosion. At sea, these changes bring severe safety threats to fishers, frequently compelling them to sail further into uncharted waters, raising costs, and subjecting them to higher risk.

For most fishing communities, the impact is dire: *loss of income, damage to property, rising debt*, and *an increase in unemployment and ill health*. Fish populations are also in flux—shells and finfish are migrating to colder waters, and coral reef habitats are vanishing entirely because of bleaching. With productivity going down, marine biodiversity and those who depend on it are left scrambling to adapt. They are not singular issues; they are interlinked, creating a cycle of weakness that calls for immediate response and long-term solutions.

Changing climate impacting aquaculture and fisheries

The warming climate is already making its presence felt in aquaculture and fisheries, and the warnings are becoming increasingly difficult to dismiss. Within a little more than a decade, temperatures are likely to increase by more than 1.5°C above the global mean, accompanied by increased and prolonged marine heatwaves. These brief but intense spikes in temperature have the potential to decimate fish populations and stress aquatic organisms past the point of recovery.

Meanwhile, rainfall is becoming increasingly unpredictable, with heavy downpours and drought occurring together, producing floods and drought that destroy breeding patterns and

aquatic quality. The sea level is gradually increasing, engulfing coastal development and fisheries farms, while cyclones are not only occurring more frequently but also with increased ferocity, endangering lives, vessels, and whole livelihoods. It is not simply a matter of one-off events anymore, but it is how frequently and how forcefully these changes are happening over time that's concerning. Entire aquatic ecosystems and the societies that rely on them are now staring into an uncertain future.

Climate Change Impact –Pathway

Countries are making inventories of GHG emissions. They are discussing targets and deciding on the roadmap for emitting less. Scientists make projections to assess the impact on marine life and their sustenance. The figure below shows the climate change impact pathway.

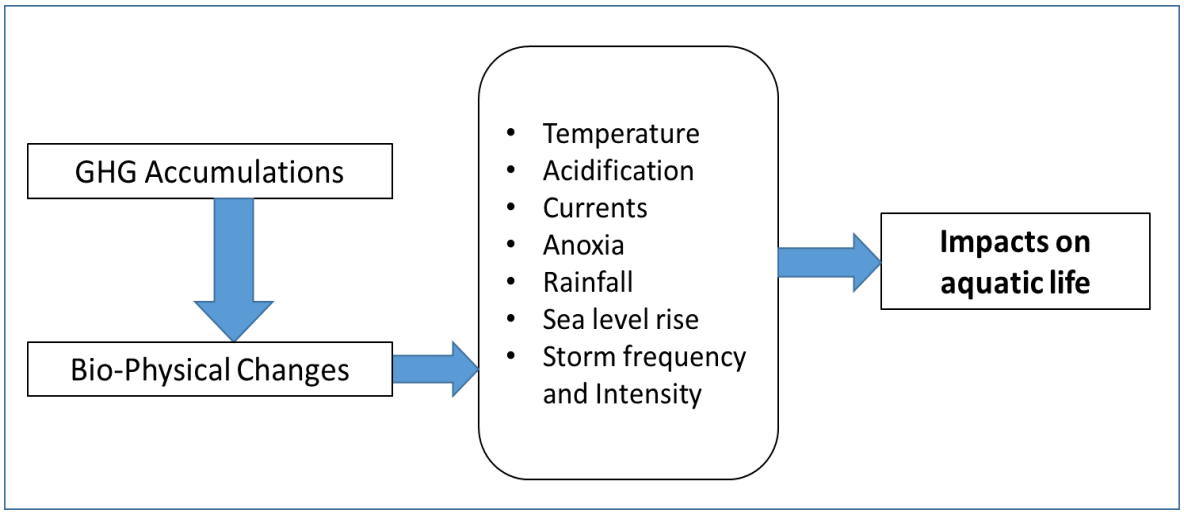


Figure 2: Climate Change Impact Pathway

Impact on the aquaculture farm

Aquaculture farms are under threat from climate change, especially those located in shallow coastal waters. Rising sea temperatures cause the water to warm more quickly due to solar radiation, which affects fish directly as well as indirectly through decreased oxygen levels, poor water quality, and an increase in disease outbreaks. This translates into reduced growth, reduced feeding, and increased losses for farmers. The danger is not from slow change alone either. More intense, more regular cyclones and storm surges now threaten farm infrastructure directly. Sea cages may be damaged or even lost, while stock losses and damage to property can be catastrophic.

There is also a knock-on effect: as wild fish stocks change or decrease, the availability and price of resources such as trash fish used as feed are altering, driving up prices for feed. Harmful algal blooms, formerly an occasional event, are now becoming a serious concern—particularly for open-sea cage farming, where blooms can destroy entire harvests in one night. Aside from this, the dilemma of determining which species are capable of survival in evolving local conditions and fish farming in a hotter world will call for more intelligent, more adaptive practices to endure.

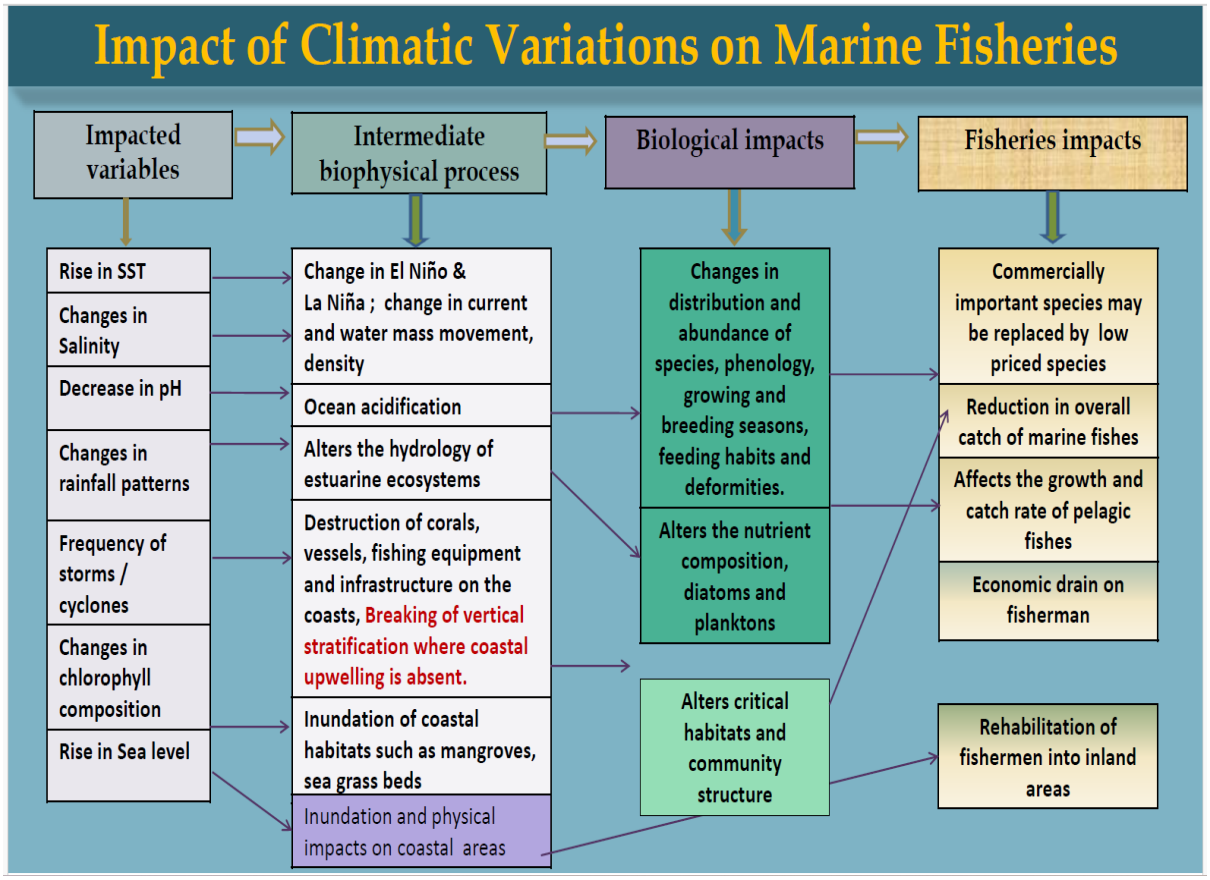


Figure 3: Impacts of climatic variations on marine fisheries

The Table below summarises the adaptation framework for marine fisheries

Adaptation framework for Marine Fisheries

Influencing parameters	Vulnerabilities	Adaptation Strategies
SST, Salinity, Sea Level Rise	Eco system damage- Mangrove, Coral reefs, seagrass beds	• Habitat mapping, monitoring and management • Coastal wetland management and scientific fish farming
SST, Rainfall, Chlorophyll, Wind pattern	Changes in distribution, abundance, phenology and trophodynamics of species	• Vulnerability assessment and monitoring of fisheries resources • Potential Fishing Zone Advisories • Mariculture of climate resilient species • Preventive health management
pH	Ocean Acidification	Seaweed farming and bioproducts development
SST	Reduction in fecundity/size	• Implementation of minimum legal size • Sustainable fisheries resource utilization
GHGs emissions	Increased C footprint in fishing operations	• Algal Biorefineries Integration • Harvesting solar energy from oceans
Wind pattern (Extreme events)	Income loss due to decline in catch and loss of fishing days	• Multivendor E-Commerce solutions for income improvement • Low cost fishing technologies development • Adoption to Integrated farming techniques
Sea Level Rise	Inundation and physical damages on coastal areas	• Enhancing preparedness of coastal population • Climate Resilient Coastal Village development

Table 4: Adaptation Framework

The speaker then addresses methods to protect fish stocks from the growing pressures of overfishing and global warming. Expanding No-Take Zones, i.e., zones where fishing is totally banned, is a key step toward enabling fish stocks to rejuvenate and re-populate naturally. Additionally, efforts are underway to recover important habitats that provide the shelter marine species require to flourish, such as mangroves, seagrass beds, and coral reefs. Control of fishing pressure is also important. The transition from open access to controlled access prevents overexploitation, particularly in vulnerable coastal ecosystems.

A more comprehensive approach to fisheries management has recently gained traction, taking into account harvest limitations in addition to community needs, biodiversity, and environmental well-being. Technology is essential to this strategy for better outcomes. Technologies such as color-coded boats, biometric ID cards, fishing logbooks, and boat movement tokens are promoting accountability and transparency.

These days, High-Frequency (HF) tracking stations and Vessel Monitoring Systems (VMS) handle more sophisticated, real-time tracking of fishing activity, guaranteeing that sustainable practices are observed on the water. When combined, these initiatives provide a way forward for cleaner oceans and more robust fisheries. Furthermore, he asserts that improving value chains via value addition, value creation, and value realization will raise economic returns.

Impact on Fisheries and Fishermen

Climate change is affecting fisheries and fishing communities severely. When ocean conditions change, vulnerable fish species vanish and catch quantities go down, resulting in a direct economic blow to fishermen and their livelihoods. They depend on day-to-day living, which is highly insecure. The cyclones and floods are intensifying and increasing in frequency, as observed lately, resulting in the loss of lives, boats, houses, and equipment. The ripple effects of natural disasters are realized throughout the entire value chain, from fishing to trading and the markets.

To mitigate such risks, we require coastal protection infrastructure, emergency shelters, insurance programs, and improved post-disaster recovery systems. Strengthening sea safety measures, improving early weather warnings, and training communities in disaster risk management are essential steps. However, long-term resilience also depends on building local capacity, increasing awareness, and ensuring proper financing for adaptation and mitigation efforts. Protecting coastal livelihoods in a changing climate is not optional—it is urgent.

Mitigation strategies

In the end, the speaker suggests mitigation strategies. Fisheries can cut emissions by reducing fuel use, adopting energy-efficient engines, and using sail-assisted boats where possible. Protecting mangroves helps curb sea erosion and stores carbon. Using tech to locate fishing zones can cut travel time and fuel use. Stronger cold chains and better seafood preservation reduce waste. The industry may still improve by using effective machinery, reducing post-harvest losses, and optimizing fleets, even if it contributes very little to global emissions. This will help the climate and coastal communities.

A number of climate-resilient innovations have been launched by CMFRI, such as the cultivation of stress-tolerant species in cages and ponds, such as pearl spot and silver pompano. It has promoted low-cost cage farming with all-weather mooring systems and integrated multi-trophic aquaculture combining seaweed, cobia, and mussels. Paddy-finfish cultivation in Pokkali fields and monoline seaweed culture are two methods that farmers use to increase yields and adjust to shifting conditions. Small-scale fishermen now have easier access to fish growing thanks to CMFRI's inexpensive cage culture that uses locally available

materials like fiber barrels and GI pipes. The number of cages has increased from 12 to over 700. About 4 lakh tonnes are anticipated to be produced. Compared to the global average of more than 2 tonnes of CO_2 per tonne of fish, India's marine fisheries release 1.32 tonnes. Although the harvest season accounts for the majority of emissions, India's overall footprint is 16.3% smaller than the world average.

Aligning Fisheries with the SDGs

This webinar on sustainable aquaculture and fisheries showcases how climate-resilient methods, such as low-carbon fishing, restoring habitats, and adaptive agricultural methods—help advance major Sustainable Development Goals. It contributes to SDG 13 (Climate Action) through lowered emissions, SDG 14 (Life below Water) via protection of ecosystems, and SDG 2 (Zero Hunger) through guaranteed long-term food security. Emphasis on community resilience and innovation further reinforces SDG 1 (No Poverty) and SDG 12 (Responsible Consumption and Production).

CIRDAP Knowledge Series: 27

Title of the Webinar:

Times of Crisis, Times of Change: Science for Accelerating Transformations to Sustainable Development

18 December, 2023 (Monday)

6:00 pm Bangladesh time (9:00 am in Darthmouth, NS, Canada time)

Registration link: https://forms.gle/A561U3dywX-LKuiND8

CIRDAP

Speaker:

Dr. Nancy Shackell
Senior Research Scientist
Bedford Institute of Oceanography, Fisheries and Oceans Canada.
Member of the Independent Group of Scientists (N=15)

Organized by CIRDAP | Venue: Virtual Via Zoom Conference | icd@cirdap.org www.cirdap.org

Sustainable Development Goals and Rural Development

Dr. Nancy Shackell, Ph.D.
Senior Research Scientist,
Ocean Ecology Section Ocean and Ecosystem Sciences Division DFO,
Bedford Institute of Oceanography, Dartmouth, Canada

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=6mQ_G5rvvGM&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=17

SUMMARY
The speaker underscores that despite rising awareness and institutional commitments, global crises- COVID-19, climate emergencies, and geopolitical conflicts- have reversed gains in poverty reduction, food security, and gender equality, exposing financing gaps and weak accountability structures. She highlights the **policy relevance of the Global Sustainable Development Report (GSDR 2023)** as a science-policy bridge that guides governments in accelerating progress toward the SDGs. The report calls for **transformational, not incremental, policy shifts**, emphasizing six entry points-human well-being, just economies, sustainable food systems, energy decarbonization, urban development, and global environmental commons- supported by governance, finance, collective action, science, and capacity building.
SDG Linkages: all 17 SDGs
Policy Insights: Achieving the SDGs requires bold national plans, regional cooperation, and financing mechanisms that embed sustainability into core decision-making, ensuring that commitments translate into visible action and long-term resilience.

Introduction and Background

The webinar featuring Dr. Nancy Shackell**,** Senior Research Scientist at Canada's Bedford Institute of Oceanography, offers a timely opportunity to understand the thinking and science behind one of the UN's most important global policy documents: *The Global Sustainable Development Report (GSDR)*,

First mandated in 2016**,** the GSDR plays a key role in reviewing progress on the 2030 Agenda for Sustainable Development. It is not just another report; it is meant to bridge the gap between science and policy, offering a solid, evidence-based foundation for world leaders as they shape strategies for the future. What makes this report stand out is its independence: it's written by a team of 15 global scientists appointed by the UN Secretary-General, ensuring a diverse and balanced perspective. The most recent edition, GSDR 2023, was launched just ahead of the UN SDG Summit in September 2023.

The GSDR process itself reflects its global relevance. Compiled every four years, the report is informed by input from researchers, civil society, and regional consultations across countries like China, Malawi, Peru, Qatar, and the Philippines. The 2023 edition received over 175 submissions from more than 40 countries, showing just how broad the conversation around sustainable development has become. To ensure quality and impartiality, the report went through a rigorous peer review process led by the International Science Council (ISC), involving over 100 reviewers worldwide.

At its core, the GSDR is not just a report; rather, it is a compass for policymakers, rooted in science and grounded in global realities. Dr. Shackell's insights will bring this process to life, offering a behind-the-scenes look at how global sustainability goals are tracked, understood, and translated into action.

To make the GSDR truly reflective of global realities, the Independent Group of Scientists (IGS) held a series of regional consultations with policymakers, researchers, and grassroots voices. These took place across Peru, Senegal, the Philippines, Malawi, and Qatar, bringing in rich local insights from Latin America, Africa, Asia, and Western Asia. Additional virtual consultations were also held in Australia, China, and Japan.

This global outreach helped ensure the report is grounded in real-world experiences—not just global statistics. GSDR contents include Half-way to 2030 – Progress towards the SDGs; Framing the future; Pathways to achieve the SDGs; Accelerating transformations to the SDGs; Transformations through science – and in science and Calls to action for transformations.

Report Findings

Next, the speaker deliberates on the findings of the report. She mentions that our global progress toward the Sustainable Development Goals is currently facing a tough reality check. Since 2019, a mix of crises due to COVID-19, the climate emergency, and geopolitical conflicts like the war in Ukraine, etc., have slowed or even reversed progress in critical areas such as poverty reduction, food security, and gender equality. In some cases, the ground we had gained is slipping away.

Long-term issues like biodiversity loss, rising inequality, and the urgency of climate action continue to deepen, raising concerns that without stronger, coordinated action, we are setting ourselves up for even more serious setbacks in the future. That said, there are still some reasons to stay hopeful. Awareness of the SDGs is growing, more institutions are aligning with them, and countries and communities are setting clear goals. We are also seeing promising local initiatives that are making a real difference on the ground. The path ahead is challenging but not impossible if we act decisively and soon.

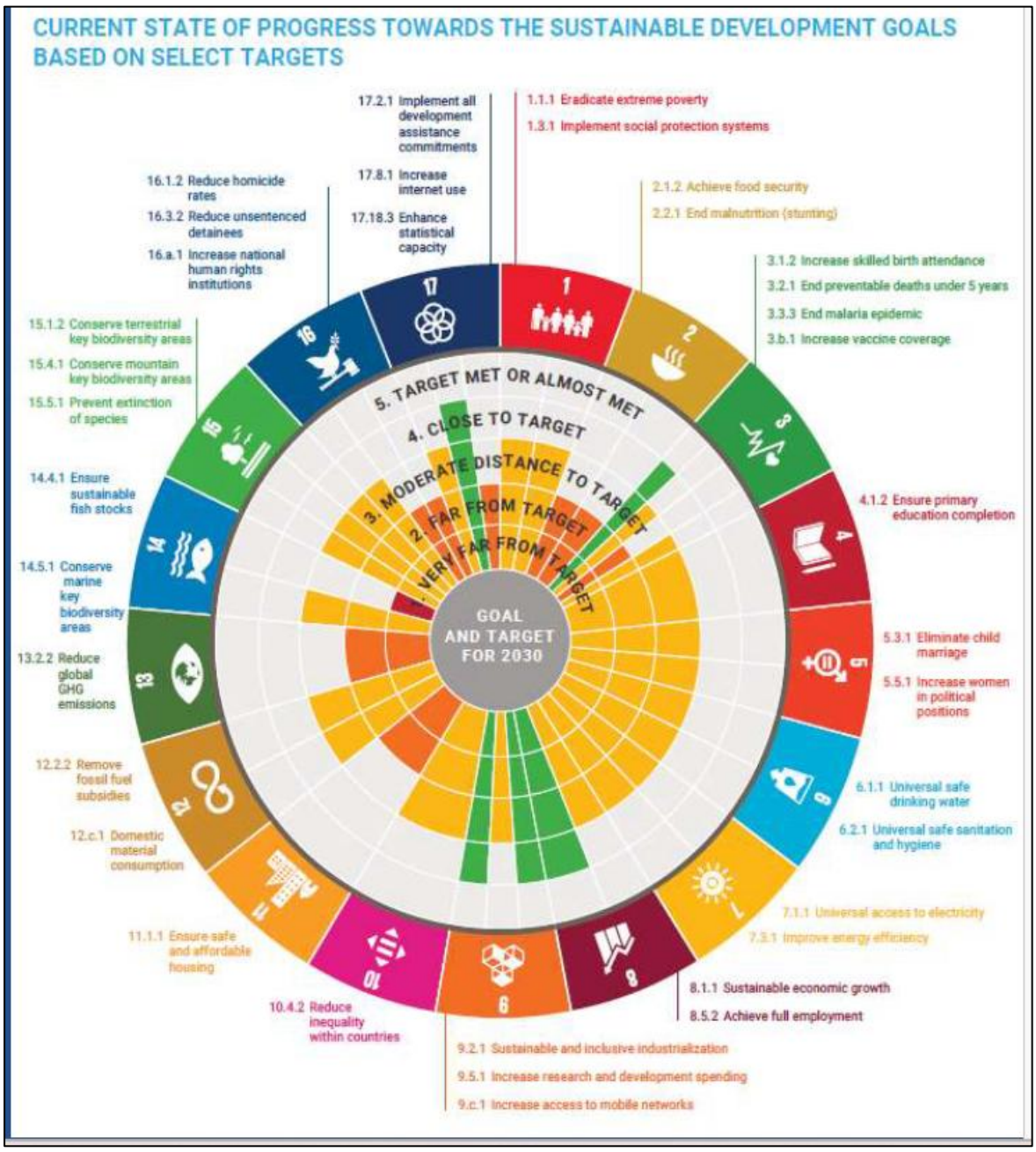


Figure 1: Current status of progress of SDGs

Discussing the integration of SDGs into key policy processes and comparing G20 and other countries, she mentions that SDG awareness is on the rise. SDG awareness, commitments, partnerships, and institutional mechanisms are increasing, but without a visible impact on performance. The challenges that hinder the success are attributed to financing – The SDG financing gap in developing countries increased by at least 56 percent in 2020. Moreover, declining international cooperation - Global solidarity is instrumental to human security is one of the challenges. Lastly, the accountability factor, wherein Inclusive and trusted institutions and decision-making processes are needed, is also at the threshold.

Inferences drawn from the findings

The findings make one thing clear: if we truly want to meet the SDGs, we need to aim higher and act bolder. Under a high-ambition scenario where countries adopt strong measures like

pricing carbon, phasing out coal, supporting electric vehicles, and encouraging sustainable diets, most of the goals could see real progress by 2030, and many could be fully achieved by 2050. But even with that, challenges like air pollution and food waste management may still lag behind. What does not work is doing more of the same. 'Business as usual' or slow, step-by-step changes would not get us there, not by 2030, and not even by 2050. What is needed now are bold shifts and transformational actions that shake up systems, reset priorities, and bring lasting change. It is a reminder that meeting the SDGs is not about tweaks, it is about taking big, coordinated leaps forward.

Accelerating progress: Using SDG interlinkages

The speaker says that policymakers stand to benefit by leveraging synergies and managing trade-offs between SDGs, including accounting for spillovers across national borders. The latest science finds that SDG interlinkages are context and group-specific:

- High-income countries face more trade-offs than low- and middle-income countries, where actions have a relatively high share of synergies.
- Synergies are higher for female, younger, and rural populations for whom trade-offs are more negligible - i.e., progress on a given SDG indicator for these groups will generally foster progress for the group on other SDG indicators.

She further explains that in terms of working through entry points for transformation, we need to understand that business-as-usual strategies will not deliver the SDGs by 2030 or even 2050, but working through six key entry points to leverage interlinkages could unleash rapid progress. She identifies six entry points, namely, Human well-being and capabilities, Sustainable and just economies, Sustainable Food Systems and healthy nutrition, Energy de-carbonization with Universal access, Urban and peri-urban development, and Global environmental commons. The five levers she identifies are Governance, Economy and Finance, Individual and collective action, Science and Technology, and Capacity Building.

The locally relevant, synergistic, and integrated implementation processes will be needed that break down the silos of public service and policymaking. The levers need to work together cohesively to overcome impediments. Capacity building is a lever added in the 2023 GSDR and is crucial for enabling transformation.

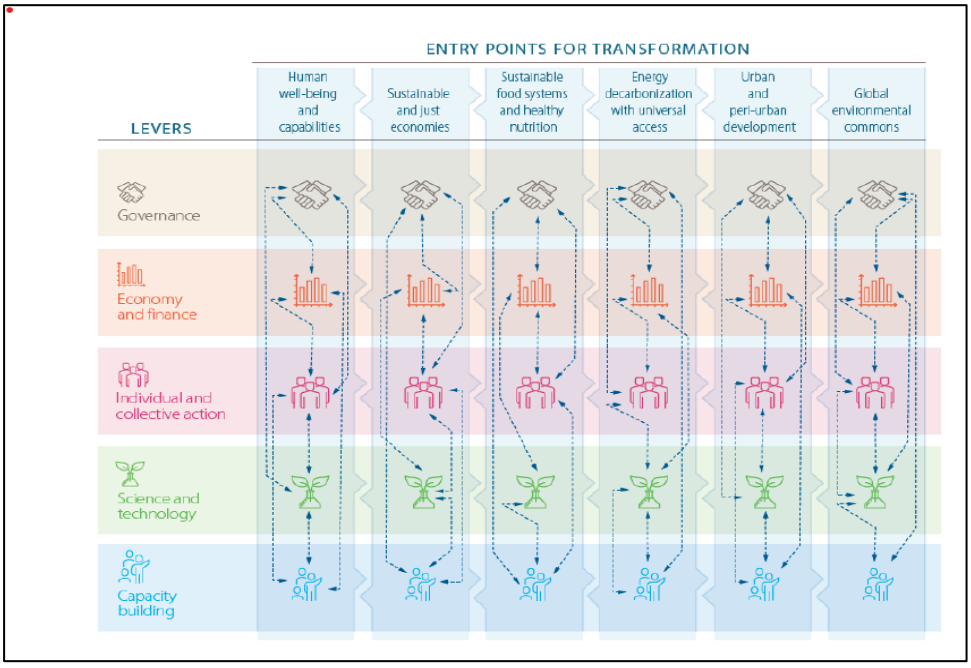


Figure 2: Entry points for transformation

Talking about the transformative shifts in Entry points, the speaker elaborates on each as mentioned below:

Human Well-being and Capabilities:

- Scale up investment in primary health care and ensuring access to life-saving interventions
- Accelerate secondary education enrolment and completion and ensure all girls are enrolled
- Increase investment in water and sanitation infrastructure to deliver universal piped water access and halving of untreated wastewater.

Sustainable and Just Economies:

- Accelerate a just economy with inclusive, pro-poor growth, including redistribution measures, doubling welfare transfers in low-income countries
- Rollout good practice climate policies and global carbon pricing
- Encourage lifestyles that promote 'sufficiency' levels
- Invest in green innovation and circular and sharing economy models.

Food systems and Nutrition patterns:

- Shift to regenerative ecological and multifunctional agricultural systems.
- Improve irrigation and fertilizer efficiency.
- Reduce food waste by 50 percent and scale up proven nutrition interventions.
- Halve consumption of meat in high-consumption regions and adopt plant-based diets.

Energy de-carbonization and Universal access:

- Large-scale deployment of renewables with access to technologies and equipment
- Rapidly scale up energy infrastructure investment, especially in Africa, and support universal electricity access and clean cooking alternatives.
- Transition to energy consumption and demand reduction, including improvement of energy efficiency.
- Urban and Peri-urban development
- Double the recycled and composted share of municipal waste by 2030 and increase the circularity of the waste cycle.
- Greater use of electric vehicles
- Better public transport with cities and infrastructure oriented to people and pedestrians
- Good-practice policies for transport, buildings, and waste

Global Environmental Commons:

- Expand protected areas, abandon intensive agricultural practices in protected areas, reforestation of all degraded forest areas, and shift societal preferences towards conservation land use.
- Reduce water consumption and ensure environmental flow requirements.
- Adopt a 1.5°C land-sector road map that combines ambitious protection, conservation, restoration, and lifestyle changes.

The speaker shares an S-Curve to show driving transformation through its phases. She says that strategies for the SDGs must minimize impediments and support promising solutions specific to different phases of transformation, such as Emergence, Acceleration, and Stabilization. She emphasizes the point that strategic combinations of levers enable SDG solutions to move from emergence to acceleration to stabilization.

Further on, she mentions overcoming impediments for dynamic transformations, saying that acceleration is the key and that nurturing innovation is required. Once the strategic direction is set and goals are set, the impediments can be overcome. She also mentions that the idea of

identifying impediments and encouraging enabling factors can allow synergies to yield action. This would lead to maximizing synergies and minimizing trade-offs.

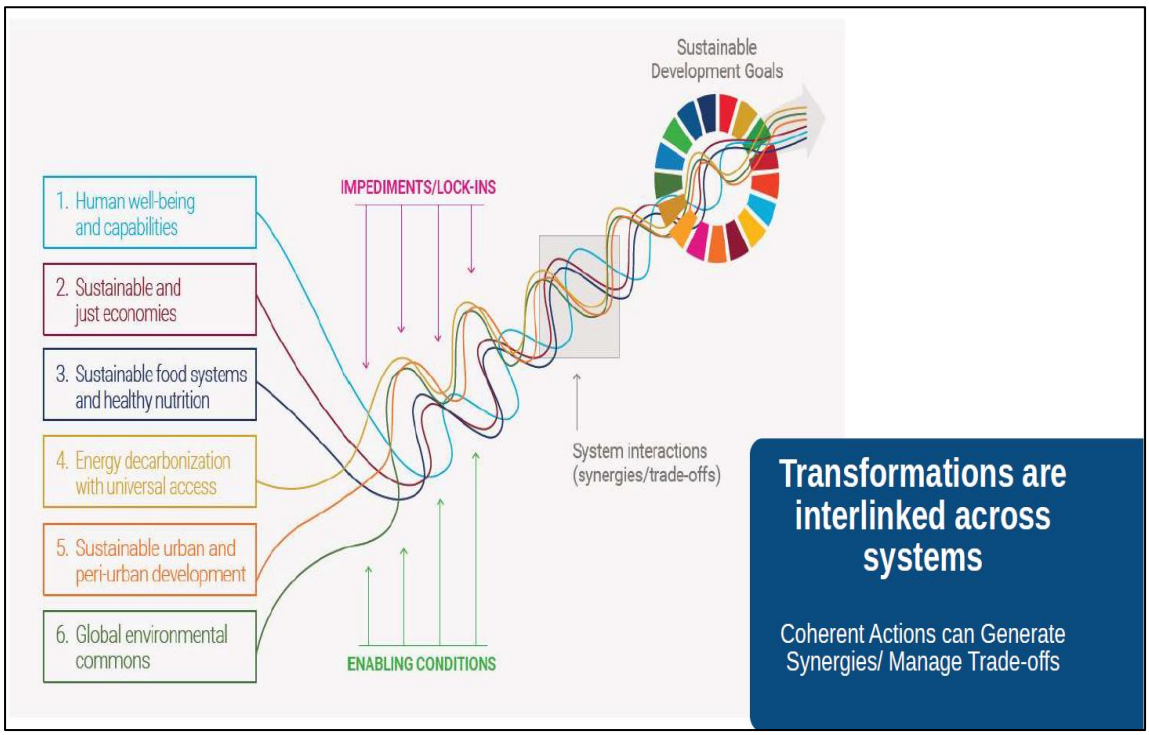


Figure 3: Interlinking of Transformations

Translating rising awareness and commitments to the SDGs into action

The crises that have wiped out years of SDG progress are interrelated, fueling intensities, but connections could be turned into opportunities. The SDGs have taken root across sectors and levels of government, improving prospects for achievement. Still, aspirations and commitments have not yet translated into action and implementation at a scale visible in SDG progress, often due to a lack of financial resources. So, the speaker mentions that goal attainment will depend on all actors integrating the SDGs into core decision-making processes, financing mechanisms prioritizing SDG attainment, and strong mechanisms for accountability.

Calls to Action

Summing up the talk, the speaker suggests that we need to establish an SDG Transformation Framework for Accelerated Action and that the member states should set national plans prioritizing key SDGs and addressing bottlenecks. Next, focus on regional and local goals and provide financial support to achieve them. Capacity building and skill enhancement for better performance are also required. She says that transformations are possible and inevitable. A better future does not rest on one source of security but on all necessary security, including geopolitical, energy, climate, water, food, and social security. Working as a human collective, time and resources must be used as judiciously and effectively as possible. Lastly, she mentions that against the backdrop of shocks and crises, the 2030 Agenda for Sustainable Development remains a strong and valid agenda for a desirable future.

Focus on SDGs

In this particular webinar, the speaker has covered all 17 SDGs and emphasized the action points to achieve them.

CIRDAP Knowledge Series: 28

Enhancing Women's Political Participation through Mahila Sabha

Dr. N.V. Madhuri
Associate Professor, Centre for Gender Studies
National Institute of Rural Development and Panchayati Raj, Hyderabad, India

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=frz_IwhjTUo&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=16

SUMMARY

In her presentation Dr, Madhuri highlights the **significance of Mahila Sabhas and Bal Sabhas** as innovative grassroots mechanisms that strengthen women's and children's voices in local governance, directly advancing the Sustainable Development Goals. By institutionalizing women-only forums, Mahila Sabhas enable rural women to articulate priorities around health, sanitation, safety, and welfare schemes, ensuring their concerns shape the **Gram Panchayat Development Plans (GPDPs)**. Similarly, Bal Sabhas foster early citizenship, gender equality, and child rights awareness, embedding youth perspectives into village development agendas.

SDG Linkages: 3, 4, 5, 10 and 16

Policy Insights: Sustained investment in capacity-building, logistical support, and institutional recognition of these forums can transform local governance into a more inclusive, accountable, and equitable system- bridging the gap between community aspirations and national development priorities.

Women's political representation in South Asia

Despite significant progress in recent decades, women's political representation in South Asia remains well below the global average. On average, women hold just 7% of ministerial positions and about 18% of parliamentary seats across eight South Asian countries, far short of the 25% global average. Countries like Nepal and Afghanistan have seen more substantial participation, with women making up around 33% and 27% of their national parliaments, respectively. In contrast, Sri Lanka and the Maldives lag, with only about 5% representation. In India, though women gained the right to vote at independence, their political presence in Parliament remains limited, currently at just under 15% in the Lok Sabha.

At the local governance level, however, India has seen a more encouraging trend. Following the 73rd and 74th Constitutional Amendments in 1992, one-third of seats in Panchayati Raj Institutions (PRIs) were reserved for women. This has led to a significant rise in women's participation at the grassroots level. Today, nearly 45–50% of panchayat members and chairpersons across many states are women. States like Bihar, Kerala, Madhya Pradesh, and West Bengal have even extended the reservation to 50%, recognizing the value of women's leadership in improving outcomes in areas like health, education, sanitation, and nutrition. Yet, many of these leaders still face social and institutional barriers, including a lack of support, limited resources, and deeply ingrained gender bias.

In India, the journey toward women's political representation has been gradual but significant. While women have had the right to vote since independence, their presence in national and state politics remains limited. However, a major shift has happened at the grassroots level. With reservations in Panchayati Raj Institutions, women are increasingly stepping into leadership roles in villages, bringing local issues, especially those affecting women and families, to the forefront of governance. This grassroots participation is shaping a new kind of politics, one that's more inclusive, responsive, and community-focused.

Role of Mahila Sabha

One powerful initiative to amplify women's voices in rural governance is the Mahila Sabha, a village-level meeting exclusively for women. These platforms provide a space for women to speak openly about issues that often go unheard, such as sanitation, safety, domestic violence, and access to health services. Supported by organizations like NIRD&PR and UNICEF, Mahila Sabhas have been successfully piloted in Telangana, Assam, Sikkim, Karnataka, and Tamil Nadu. Women are mobilized through self-help groups, Anganwadi centers, health workers, and even school activities, creating inclusive and participatory spaces. Topics like menstrual health, breast cancer, skill-building, and festivals are used as entry points to bring women together and build awareness around their rights and entitlements.

However, challenges remain. Many Mahila Sabhas have identified gaps in the implementation of welfare schemes, poor sanitation and water facilities, and domestic violence as persistent issues. Others flagged mental health, mobile addiction, and the need for better market access for rural products. There are also concerns over the maintenance of water systems and a general lack of awareness about waste management, especially regarding plastics.

Addressing these challenges calls for more than policies—it demands sustained efforts in awareness-building, capacity enhancement, and breaking down cultural norms that limit women's roles in public life. While India has taken meaningful steps toward empowering women at the grassroots, there is a clear need to translate this momentum into greater representation at the state and national levels, creating a more inclusive and equitable political landscape.

Understanding the GPDP: A Village's Own Development Roadmap

The Gram Panchayat Development Plan (GPDP) is not just another government document; it's meant to be the community's blueprint for development. It identifies local needs, sets priorities, and creates a roadmap for addressing key issues like healthcare, education, sanitation, infrastructure, employment, and even environmental concerns. What makes the GPDP important is that it is supposed to be participatory, built from the ground up, reflecting the aspirations of villagers themselves.

The plan begins by creating a socio-economic profile of the village, as well as data about its population, income levels, literacy rates, health indicators, and more. Then, based on consultations with villagers, specific development priorities are mapped out. This leads to sector-wise planning, where areas like agriculture, education, and water supply are each given detailed attention. The plan also outlines how funds will be raised or sourced, including government schemes, local taxes, and partnerships with NGOs. Finally, a clear implementation and monitoring framework is put in place so that progress can be tracked.

Mahila Sabhas: Giving Women a Voice in Local Governance

To make the GPDP process more inclusive, Mahila Sabhas, women-only village meetings, were introduced to encourage women to participate freely in identifying development issues. These forums are especially important in places where cultural norms often prevent women from speaking openly in front of men. In Mahila Sabhas, women discuss everything from safety and sanitation to access to ration cards, health services, and clean drinking water. Yet, despite their value, Mahila Sabhas face many obstacles. Many women from poor or marginalized backgrounds are unable to attend due to work commitments or distance. In remote areas like Nartap GP in Assam, even getting women to the meeting spot can be difficult. Often, logistical budgets are limited, making it hard to organize and sustain regular

sessions. Worse, even when issues are raised, some women feel discouraged, believing that their concerns won't lead to real action.

Figure 1: Glimpses of Mahila Sabhas

From Awareness to Action: The Impact of Mahila Sabhas

Where Mahila Sabhas have been supported and conducted well, the change has been tangible. Women are becoming more informed about their rights and eligibility for various government schemes. They are learning to ask questions, demand accountability, and understand the processes that affect their day-to-day lives. In many Gram Panchayats, women's inputs are beginning to shape the actual priorities of the GPDP, ensuring that issues like maternal health, water access, safety, and school facilities are no longer overlooked. In fact, in some instances, issues raised in Mahila Sabhas have been addressed on the spot, with panchayat members taking swift action. This shift from passive listening to active problem-solving is a sign of what real grassroots democracy can look like.

Lessons Learned and the Road Ahead

The most powerful outcome of this initiative has been empowerment. Women and girls, often excluded from governance conversations, are now better aware of laws, schemes, and their entitlements. Elected representatives (ERs) and Panchayat staff are also more aware of women's and children's development needs. There's a visible improvement in coordination among local departments, leading to better planning and execution of schemes, especially for those who have historically been left out. Still, challenges remain. There's a strong need for more capacity-building, continued mobilization at the community level, and greater financial support to make Mahila Sabhas and the GPDP process sustainable and impactful. But the

seeds of change are visible, and they begin with listening to women and valuing their voices in shaping their villages' futures.

Bal Sabha- Children's Forum

A Bal Sabha is a children's forum at the village level, where children are encouraged to express their thoughts, concerns, and ideas in a safe and supportive space. It's a platform that brings children, especially those from rural or marginalized communities, into the heart of local governance. Through interactive activities, peer-led discussions, and creative sessions, Bal Sabhas helps children understand their rights and take part in shaping the future of their village. It's not just about talking—it's about learning democracy, confidence, and citizenship from a young age.

Why do Bal Sabhas matter?

1. Complementing Education beyond the Classroom

Bal Sabhas offer a unique way of learning that goes beyond textbooks. Through storytelling, games, and group discussions, children improve their critical thinking, leadership, and communication skills. They also get opportunities to raise issues that affect them directly, like the quality of school meals, clean toilets, or playground facilities, which helps bridge learning gaps and gives meaning to their everyday experiences.

2. Encouraging Active Citizenship

Children are encouraged to engage in community matters, be it sanitation, school dropouts, or safety at bus stops. This builds their sense of social responsibility, and by participating in real decision-making spaces, they begin to understand the values of democracy and fairness.

3. Promoting Gender Equality

By making sure girls participate actively in Bal Sabhas, these forums help challenge gender stereotypes early. They empower girls to speak up, take initiative, and even question harmful norms. This exposure often leads to increased confidence and leadership among girls, making gender equity a lived value, not just a policy goal.

4. Supporting Mental Well-being and Identity

Bal Sabhas provide a space for creative expression and emotional support where children can play, share, and feel heard. For many, especially those in vulnerable situations, these gatherings become places of friendship, safety, and stress relief. They also offer a platform to celebrate local culture, language, and traditions, helping children feel connected to their identity and roots.

Challenges in organizing Bal Sabhas

Despite their importance, organizing Bal Sabhas regularly and meaningfully comes with several challenges:

- Many children, especially from marginalized communities, aren't aware of their rights or the concept of Bal Sabhas.
- Child labour, poverty, or household responsibilities often prevent children from attending.
- In patriarchal settings, girls may be discouraged from participating.
- The lack of basic infrastructure, such as meeting spaces, facilitators, and learning materials, makes sessions difficult to conduct.

- In some villages, travel distances to the Gram Panchayat office and limited funding make it hard to organize inclusive gatherings.
- Parents and even some teachers don't always understand the value of such forums, leading to low support and turnout.
- Topics like child protection, addiction, and mental health are still difficult to bring into open conversation due to stigma.

Creating Participation

Getting children to attend Bal Sabhas involves strong community engagement. Village organizations, SHGs, Anganwadi workers, mothers' committees, and schools all play a role. Entry-point activities like competitions, storytelling sessions, cultural festivals, and talks on relevant issues (e.g., health, child rights, careers) help spark interest. The idea is to make it fun, accessible, and relevant—so children not only show up but feel excited to participate.

What's Changing: The Impact of Bal Sabhas

Despite the hurdles, Bal Sabhas are beginning to leave a visible mark:

- Children are learning about their rights, local governance, and development goals (like the SDGs).
- Many are now confident in raising their voices—whether it's about better toilets in school, safer roads, or even the need for counseling.
- Their issues are being included in village development plans (GPDPs).
- Panchayat members are becoming more aware of child development needs and are forming dedicated child committees.
- Children are even visiting the Gram Panchayat offices, a space once dominated by adults, and are being recognized as stakeholders in their own right.
- Bal Sabhas are not just meetings. They are powerful spaces that nurture active citizens, build self-esteem, and help create a more inclusive and responsive local governance system. With the right support and awareness, they can truly become a bridge between children's voices and the decisions that shape their world.

Advancing SDGs through Community Leadership

The efforts to strengthen Mahila Sabhas and Bal Sabhas go far beyond community meetings—they are crucial steps toward achieving the Sustainable Development Goals. These platforms directly contribute to SDG 5 (Gender Equality) by giving women and girls a voice in local governance, and SDG 16 (Peace, Justice, and Strong Institutions) by promoting participatory, inclusive decision-making.

Bal Sabhas, in particular, lay the foundation for SDG 4 (Quality Education) and SDG 3 (Good Health and Well-being), as they nurture awareness, confidence, and responsibility from a young age. Most importantly, both initiatives reflect the spirit of SDG 1 (No Poverty) and SDG 10 (Reduced Inequalities) by ensuring that the most marginalized voices are not just heard but included in the planning and development of their communities. While challenges remain, the growing presence of women and children in local governance signals a quiet but powerful shift—toward a more just, equal, and responsive rural India.

CIRDAP Knowledge Series: 29

Webinar on Empirical and Qualitative Study of Nutrition Security in India

4th April, 2024

11:00 am (Bangladesh Time)
10:30 am (India Time)

Click here for registration of the webinar

Speaker

Dr. Ruchira Bhattacharya

Assistant Professor & Head in-Charge, National Institute of Rural Development & Panchayati Raj (NIRD-PR) Delhi Branch, New Delhi 110003, India

CIRDAP

Organized by CIRDAP | Venue: Virtual Via Zoom Conference | icd@cirdap.org www.cirdap.org

Nutrition Security in India: Composition, Sources and Intersections

Dr. Ruchira Bhattacharya,
Asst. Professor, National Institute of Rural Development and Panchayati Raj, New Delhi

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=SewOFmIXTnI&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=15

SUMMARY
In her deliberation Dr Ruchira underscores India's paradox of **nutrition insecurity amid food surplus**, showing that while production and distribution systems like the PDS have expanded, access and utilization remain unequal, especially for women and marginalized groups. Rising food prices, declining reliance on home-grown sources, and diets dominated by subsidized staples have led to hidden hunger and poor nutrient intake. Women, despite being central to farming and caregiving, remain disproportionately undernourished, with high rates of anaemia and chronic energy deficiency.
SDG Linkage: 2.3. 5, and 10.
Policy Insights: Moving beyond supply-side fixes toward **integrated, equity-focused strategies** that link agriculture, health, education, and gender empowerment. Strengthening safety nets, promoting diverse and nutrition-sensitive farming, and addressing social barriers are essential for ensuring that food security translates into true nutrition security for all.

India's Nutrition Dilemma: A Crisis of Plenty and Poverty

India today finds itself in a complex situation when it comes to food and nutrition. On one hand, the country has surplus food production and an expansive public distribution system (PDS). Yet, on the other, it ranks 111 out of 125 countries on the Global Hunger Index, signalling deep-rooted problems in ensuring equitable access to nutrition. One in five adults, both women and men, suffers from chronic energy deficiency, and there's a worrying decline in calorie and protein intake, even as fat consumption rises. This paints a picture of imbalanced diets and hidden hunger rather than a mere lack of food.

Food Availability Has Improved, But Access Remains Unequal

Over the years, India's food availability has improved thanks to higher production and better distribution networks. However, this has not automatically translated to better food access, especially in rural areas. Several factors have contributed to this gap: rising real food prices, lack of financial safety nets like credit or insurance for rural households, and a steady shift away from farming as people move toward non-farm jobs. The COVID-19 pandemic only worsened the situation, exposing the fragility of food access systems for migrant workers and the urban poor, many of whom remained outside formal support programs.

Therefore, the speaker emphasizes that there is a need to address both supply and demand barriers need to be studied. Nutrition policy in India often focuses on supply-side fixes, growing more food, fortifying crops, or making agriculture more nutrition-sensitive. While these are important, experts argue that we must not ignore demand-side issues such as who can actually afford or access this food and how it's distributed within families. Studies highlight the importance of looking at intersectionality, especially the role of women's empowerment, in shaping food security outcomes. However, the impact varies greatly depending on how we measure that empowerment.

Structural Shifts in Rural Diets and Food Sources

Data from the NSSO (1993 to 2011) reveals some important trends in rural India's food habits. There has been a marked decline in calories and protein sourced from home-grown food, like grains or vegetables from personal farms or kitchen gardens. Instead, there's been an

increased reliance on subsidized food from the PDS and a rise in fat consumption. Foods like pulses and legumes, once rich sources of protein, are now more significant as fat sources, while their role in providing protein has diminished. This shift mirrors a broader economic transition as more rural households move away from agriculture to non-farm livelihoods.

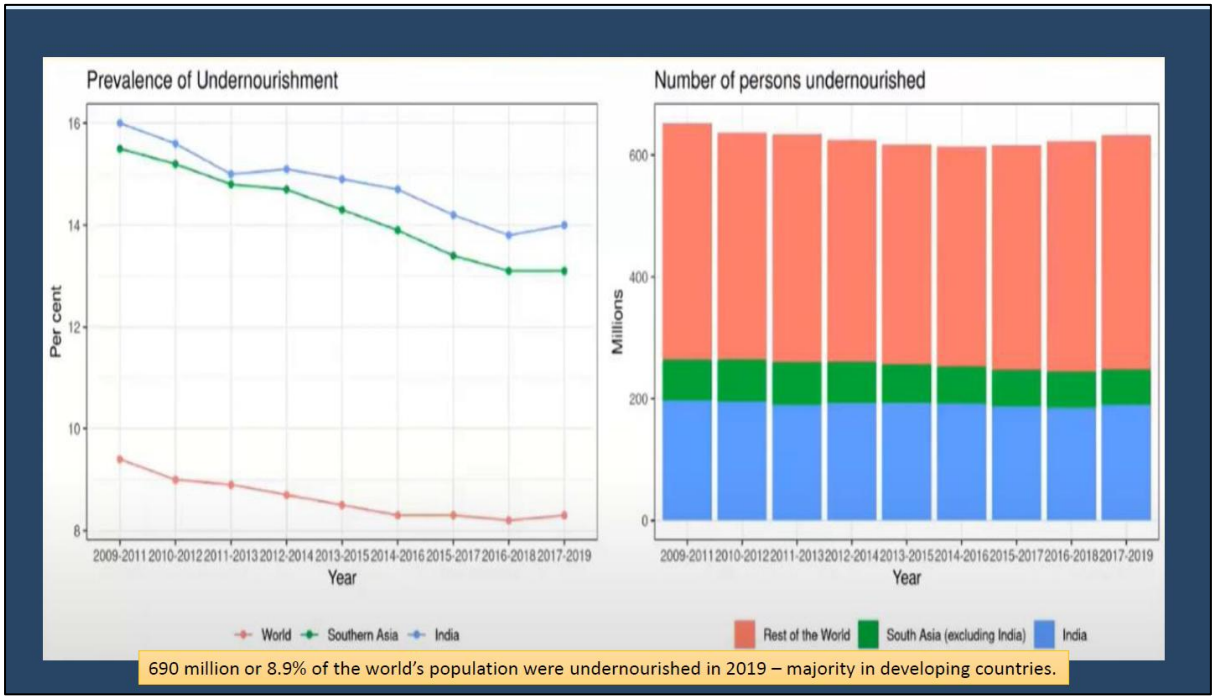


Figure 1: Undernourishment across the countries

However, the speaker argues that over the years, our food stocks have swelled up, and India is one of the countries with a good share of food. Then, the question arises as to why some people are not consuming food grown or why malnourishment exists. She explained that India and South Asia both have a very high share of the Food Insecurity Index. Therefore, juxtaposing with the reality that our food stocks have piled up, there needs to be a question on how policies have been designed to distribute food.

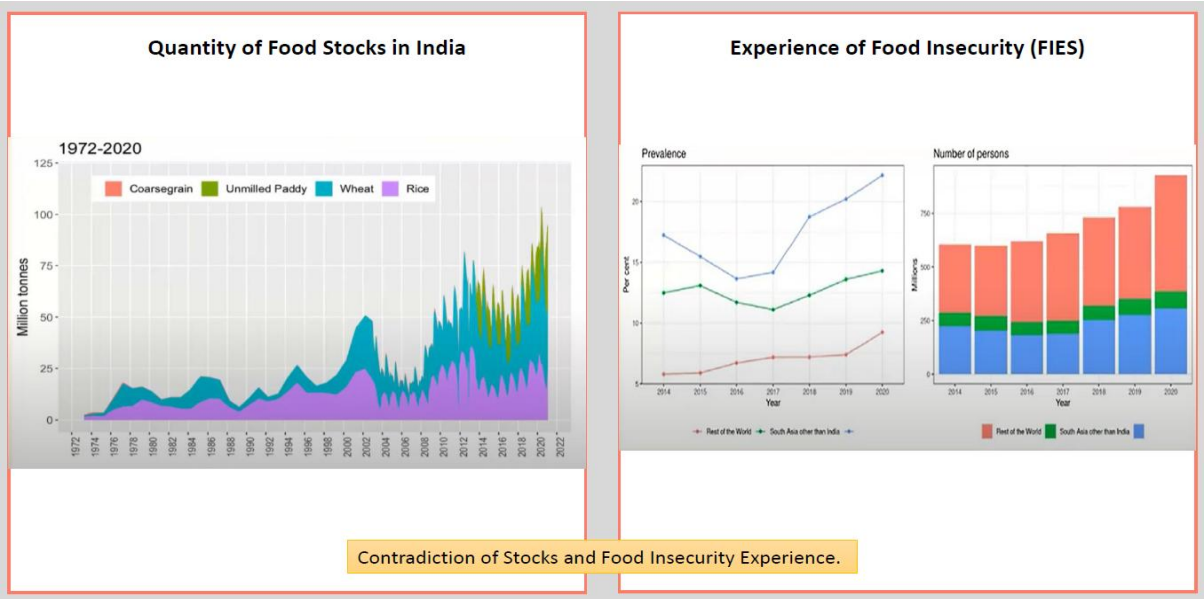


Figure 2: Stocks and Food insecurity over the period of years

Talking about macronutrient obtainment sources of Indian households, the speaker mentions that the share of calorie protein and fat from home-grown sources has gone down in the past few years, say from 35% to 21% in case of fat and from 35% to 23% in case of calorie.

The Impact of Subsidies: Who Gains, Who Loses?

Subsidies through the PDS have played a key role in keeping food affordable. However, not all groups benefit equally. Data shows that agricultural laborers and rain-fed rice producers, often among the poorest, tend to lose out in terms of calorie intake when PDS subsidies are insufficient or not well-targeted. A decrease in the price ratio between PDS and market rates reveals the importance of these subsidies for food security. Without deep subsidies, many vulnerable groups struggle to maintain even basic dietary needs.

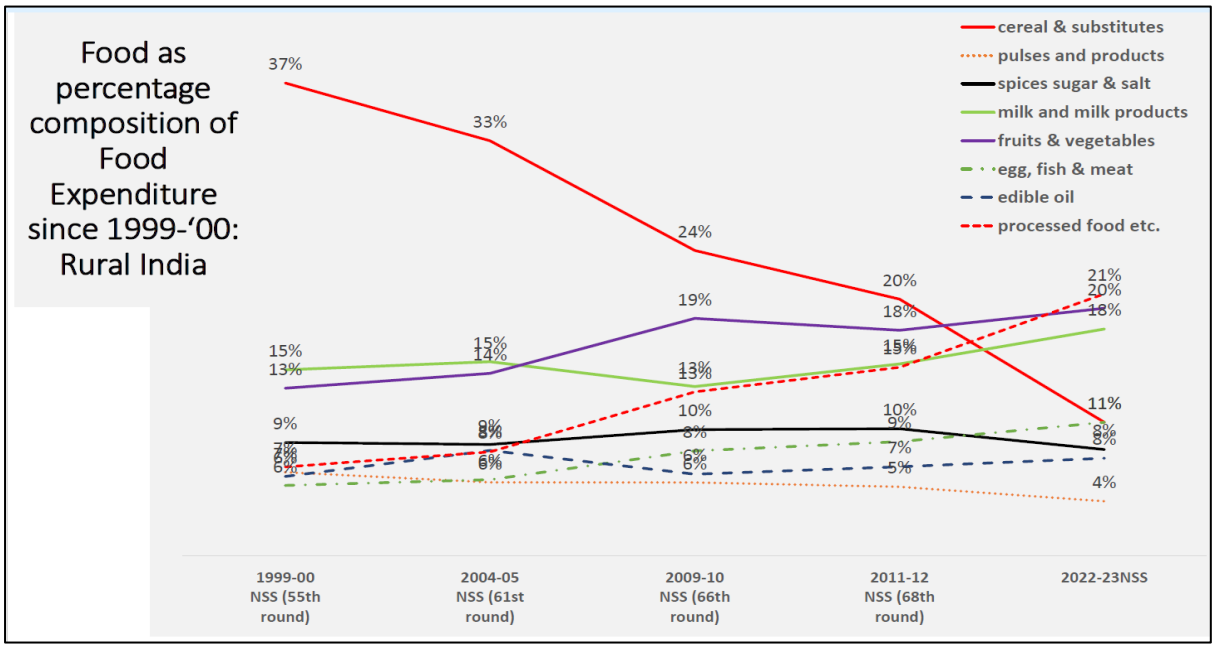


Figure 3: Food Expenditure 1999-2022

A Way Forward: Equity, Empowerment, and Integration

Solving India's nutrition crisis will take more than better food production; and it requires addressing deep social and economic inequalities. Marginalized communities need stronger safety nets, and nutrition policy must be interlinked with healthcare, education, and gender equity. Investing in nutrition services, rather than relying solely on food distribution, may offer better long-term results. Family support, insurance access, and targeted outreach to vulnerable populations like migrant workers or landless farmers must become core priorities. Ultimately, nutrition security is not just about food; it is about justice, opportunity, and dignity. It also requires a comprehensive approach that sees people not as data points but as individuals whose well-being is shaped by the intersections of livelihood, health, and social belonging.

The Gendered Face of Hunger

In India, hunger and malnutrition affect everyone, but women bear a disproportionate share of the burden. Every second woman of reproductive age is anemic, and the nutrition gap between men and women has barely narrowed over the years. Even in the rare and tragic reports of starvation deaths, women and adolescent girls often make up the majority. Cultural practices mean that in many households, women and girls eat last and least, making them

more vulnerable to malnourishment. Factors like the mother's education, income level, and where she lives strongly influence children's nutritional outcomes, showing just how deeply gender and nutrition are connected.

Women as Farmers, Providers—and the Undernourished

It is a harsh irony that women, who are vital to our food system as farmers, consumers, and caregivers, often remain the most undernourished. With 33% of cultivators and 47% of agricultural labourers being women, they are key to food production, but their contributions are undervalued and often focused on low-income or low-nutrition crops. As consumers, they are more likely to face hunger. As caregivers, they shape the diets of their families. But without adequate support—nutritionally and socially, this cycle of deprivation continues. Issues like low maternal BMI, early marriage, closely spaced pregnancies, and lack of awareness of child nutrition continue to impact generations.

Shifts in Food Sources: From Home-Grown to Market Reliance

Over the years, India has witnessed a structural shift in how households access food. There's been a clear decline in consumption from home-grown sources and a rise in dependence on the Public Distribution System (PDS) and market purchases, especially among non-cultivating households. While the PDS has helped improve access for the bottom 40% of households, it still largely provides staples like rice and wheat, which are poor in essential proteins and micronutrients. This increasing reliance on subsidized grains has often crowded out more nutritious food choices, such as pulses, vegetables, and dairy, especially for poorer families.

Can Agriculture Be a Pathway to Nutrition?

Agriculture brought us out of a food deficit era, ensuring staple food security—but that alone is no longer enough. The current food system prioritizes quantity over quality, leaving a gap in nutritional security. To bridge this, there's growing momentum around building resilient farming systems, focusing on crops like millets that are nutrient-dense, environmentally friendly, and accessible. Research has shown that when communities are empowered to grow, understand, and choose nutrition-rich foods, both diets and health outcomes improve. Agriculture can still be our answer—but it needs to be diverse, sustainable, and nutrition-sensitive.

The Utilisation Divide: Who Gains, Who's Left Behind?

Even where food is available, its utilization remains unequal, especially among women and marginalized communities. Data shows that while many individuals moved out of Chronic Energy Deficiency (CED) between 2005 and 2011, Dalit women showed the least improvement and, in some cases, declined further. These gaps are a reminder that nutrition is not just a health issue; it's deeply social. Without tackling caste, gender, and location-based barriers, improvements in food supply may never fully translate into improved nutrition for all.

Conceptual Framework

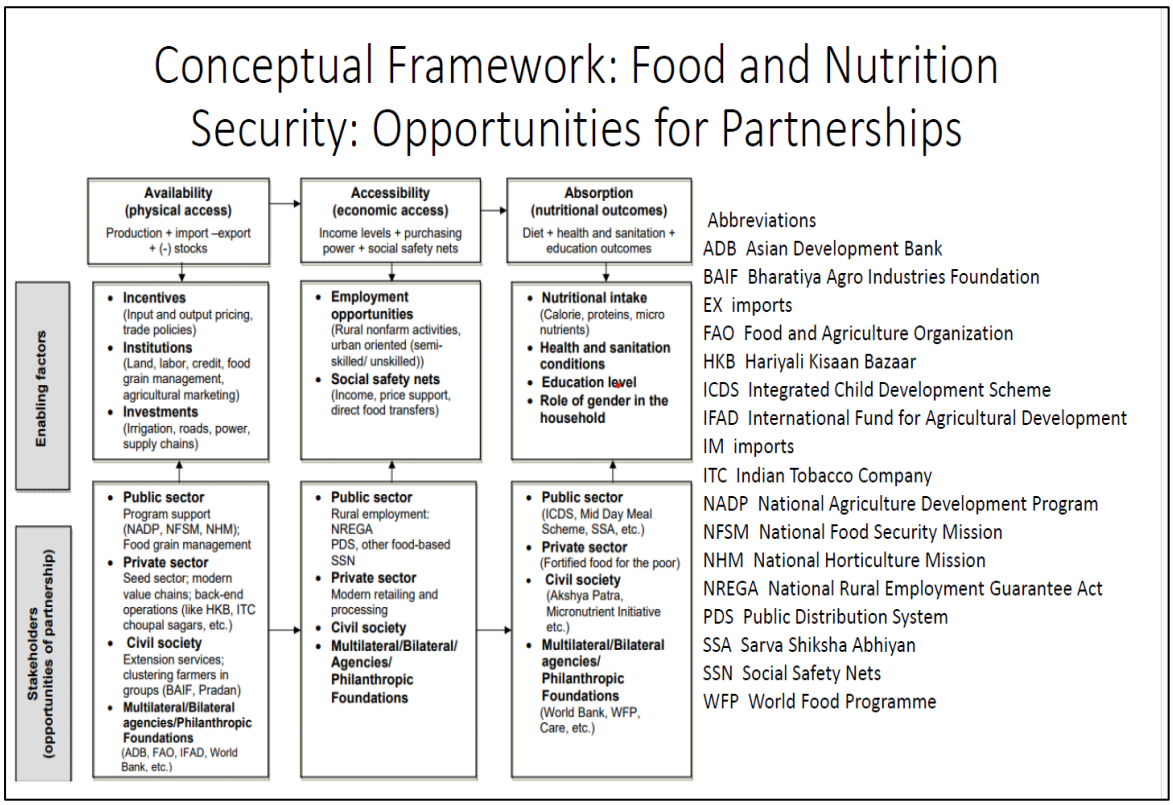


Figure 4: Conceptual Framework on Food and Nutrition

What Needs to Change: A Call for Convergence

Improving nutrition outcomes in India will require more than fragmented programs; it calls for a convergent, long-term vision. Health, agriculture, education, women and child welfare, and social protection departments must work together. Community-level support systems, such as Anganwadi, self-help groups, and local governance bodies, need to be strengthened. Awareness-building, especially around maternal and child health, and investing in rural women's education can create ripple effects across generations.

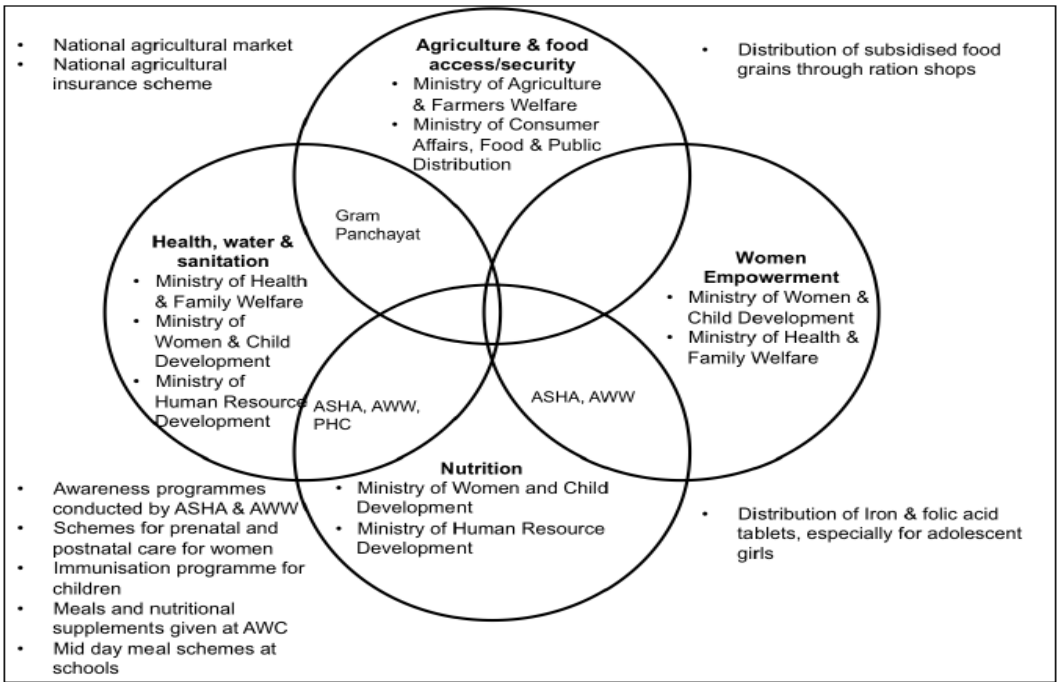


Figure 5: Convergence for Nutrition

Linking with the SDGs: Nourishing a More Equal Future

Tackling nutrition insecurity, especially through a gender lens, directly supports several Sustainable Development Goals. This includes SDG 2 (Zero hunger), SDG 3 (Good Health and Well-being), and SDG 5 (Gender Equality). It also aligns with SDG 10 (Reduced Inequalities) and SDG 13 (Climate Action) when we shift toward sustainable farming. Women's empowerment in agriculture and their inclusion in nutrition planning is not just a social justice issue; it's a strategic necessity. A food-secure India will only be possible when women are not just feeding the nation but also nourished, respected, and empowered to lead its future.

CIRDAP Knowledge Series: 30

The Role of Agricultural Heritage Systems in the Integrated Rural Development

Dr.Ali Kiani Rad,
Associate Professor & Director General,
Agricultural Planning, Economic and Rural Development Research Institute (APERDRI)
I.R. IRAN

CIRDAP Official YouTube Link

https://www.youtube.com/watch?v=bFOQjA0xmWA&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=14

SUMMARY

Dr. Ali emphasizes the policy relevance of Globally Important Agricultural Heritage Systems (GIAHS) as a framework that integrates traditional farming wisdom with modern sustainability goals. Rooted in centuries-old practices that ensured food security, biodiversity, and cultural resilience, GIAHS offers a counterbalance to the ecological and social challenges created by industrial agriculture. By safeguarding landscapes, indigenous knowledge, and community-based resource management, the initiative strengthens rural livelihoods, reduces migration pressures, and revitalizes cultural and social capital.

SDG Linkage: 1, 2, 11, 12, 15

Policy Insights: Sustainable rural development is not only about preserving heritage but also about creating inclusive, resilient futures where agriculture, ecology, and community thrive together.

Understanding Agriculture

The speaker of this webinar focuses on agriculture, and Dr. Rad says that we need to understand the concept in a broader manner. Agriculture starts from the gene and ends in the cell. He explains the whole cycle of the agriculture process. He explains how entities from the natural environment, such as resources, eco-system, bio-diversity, climate, and atmosphere act as inputs. The input supply is connected to production, aggregation, processing, distribution, and finally to markets. During this process, the requisite value is added. He adds that having a circular economy is the best plan for development.

He further mentions that farmers had to establish complex and innovative land use and management practices due to factors such as geographical isolation, fragile eco-systems, limited natural resources, and extreme climate conditions. Several species and varieties of crops were planted to minimize risks.

Globally Important Agricultural Heritage Systems (GIAHS)

The speaker further explains the unique agricultural systems wherein long-term efforts by the farmers led to food and livelihood security, rich biodiversity, use of indigenous technology and practices for agricultural production, and resource management, making a very productive landscape and valuable cultural heritage. This was the start of the GIAHS program.

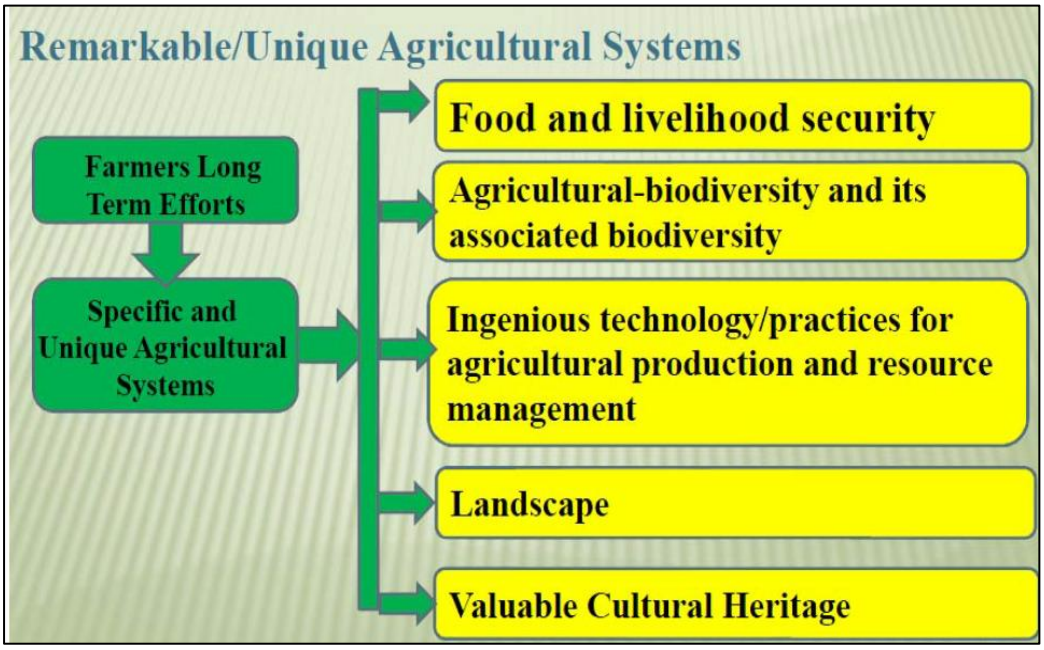


Figure 1: Factors leading to unique agri-systems

Looking at hindsight, Dr. Rad mentions that century-old agricultural practices were condemned for not yielding the desired results. This led to low production and income, and hence, they were disregarded in development plans and programs. Various agriculture facilities, services, markets, incentives, etc., were thus directed towards modern agriculture.

He says that the failure of industrial and modern agriculture, despite the values of science and technology in agriculture, led to the problems of climate change and damage to agriculture, increasing competition for exploitation of natural resources, weakening the livelihood resources of farmers and villagers, reduction of ecological reserves and biodiversity, migration of young people from agriculture and rural sector, gradual deterioration of cultural values and lastly reduction of social capital in farmers and villages.

Evolution of GIAHS

The speaker shares that in 2002, during the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa, the Food and Agriculture Organisation (FAO) of the United Nations launched a Global partnership initiative to protect and support family farming and to conserve "***Globally Important Agricultural Heritage Systems***". By 2012, having crossed a decade, the GIAHS had designated more than 16 sites in various countries and earned an international reputation for various intergovernmental fora. This also included conducting and organizing various conferences, seminars, and capacity-building programs related to the domain.

In 2013, at the 148th session of the FAO Council, members agreed that GIAHS should become an integral part of FAO's framework and receive a formal status. By 2022, having completed two decades, the GIAHS will have organized capacity-building workshops for local farming communities, civil society organizations (CSOs), and Government officials. The programs have promoted policies and incentives to support the dynamic conservation and potential GIAHS and help implement concrete rural development actions while promoting traditional knowledge and local cultures.

The speaker emphasized the point that since 2005, FAO has designated 86 systems in 26 countries as agricultural heritage sites, and currently, 10 new proposals from six new countries are under consideration.

Mission of GIAHS

Talking about the main focus of GIAHS, the speaker mentions that it envisages identifying and safeguarding Globally Important Agricultural Heritage Systems and their associated landscapes, agricultural biodiversity, and knowledge systems through catalyzing and establishing a long-term program to support such systems and enhancing global national and local benefits, derived through their dynamic conservation, sustainable management and enhance viability.

Objectives

- To leverage global and national recognition of the importance of agricultural heritage systems and institutional support for their safeguarding.
- Capacity building of local farming communities and local and national institutions to conserve and manage GIAHS, generate income, and add economic value to goods and services of such systems in a sustainable fashion.
- To promote enabling regulatory policies and incentive environments to support the conservation, evolutionary adaptation, and viability of GIAHS.

Process of GIAHS

The five-step process includes:

- Preparation and submission of GIAHS proposals
- Acceptance and screening of GIAHS proposals
- Evaluation and designation of the GIAHS sites by the Scientific Advisory Groups (SAGs).
- Certification and Registration
- Monitoring and Evaluation

In continuation, he stresses the point that the proposal to get selected requires a very strong historical relevance. Moreover, it should be of contemporary importance to it as well for making it through the selection process. Then, it should explain five major heads, such as food and livelihood security, agro-biodiversity, local traditional knowledge systems and cultural value systems, and social organizations. It should take into account landscapes and seascapes and should be rich in heritage value. Finally, the action plan needs to be very specific and focused.

Further, in his presentation, the speaker delves into the relationship between sustainability and social, economic, and environmental factors and how they are needed for a flourishing system and the betterment of all.

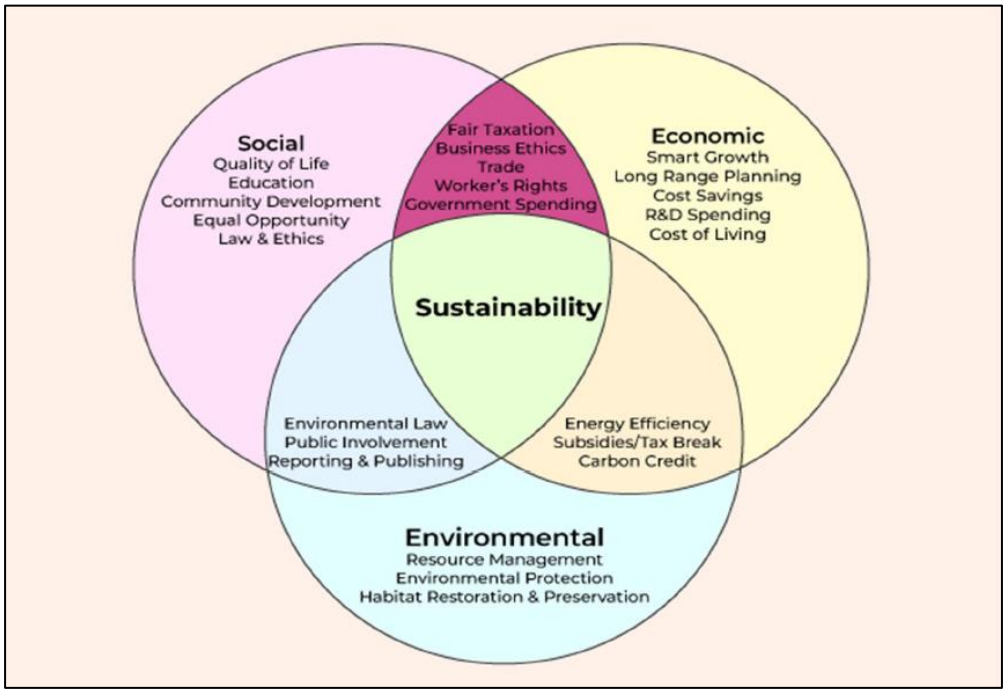


Figure 2: Relationship between GIAHS and Sustainable Development

Intersectionality of GIAHS and Rural-Sustainable Agriculture Development

The speaker emphasizes that preserving Globally Important Agricultural Heritage Systems (GIAHS) isn't just about safeguarding landscapes—it's about nurturing communities. These traditional farming systems carry the wisdom of generations and offer a model of rural life where local culture, biodiversity, and sustainability coexist. By involving communities in their preservation, GIAHS not only strengthens food security and livelihoods but also makes villages more vibrant places to live. This, in turn, reduces migration and even encourages reverse migration as people begin to see value in returning to their roots. It's a reminder that development doesn't always mean leaving the village—it can also mean reviving it.

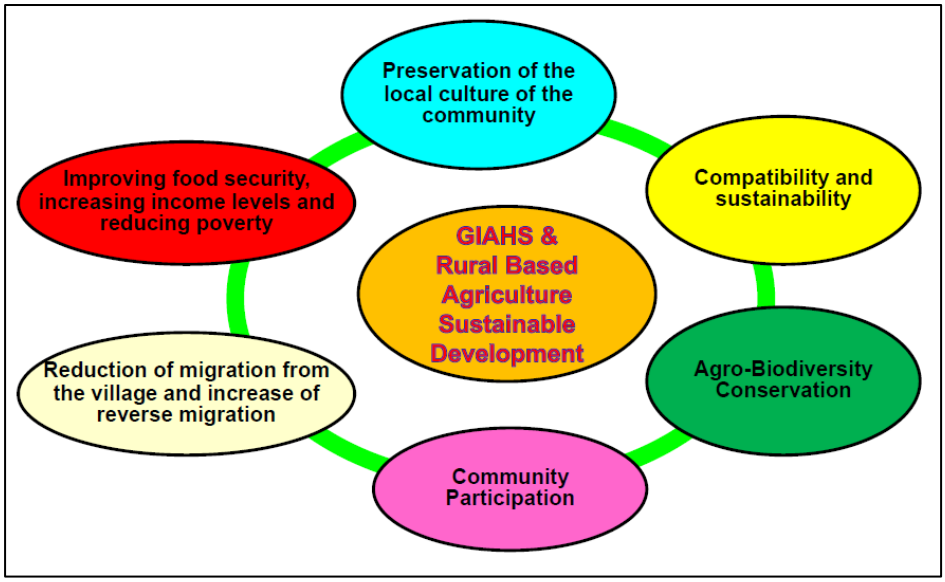


Figure 3: GIAHS and Rural Based Agriculture Sustainable Development

Bringing GIAHS to Life: From Global Recognition to Local Action

The GIAHS program works at three key levels to safeguard traditional agricultural systems. Globally, it helps the world recognize and celebrate landscapes rich in agro-biodiversity while sharing successful practices from different countries. At the national level, it encourages governments to weave the GIAHS approach into their development plans and policies. Most importantly, at the local level, it supports communities in protecting and adapting their age-old farming practices, ensuring they thrive in today's world. This multi-layered strategy ensures that the essence of sustainable agriculture is both preserved and passed on.

GIAHS and the Path to the SDGs

The Globally Important Agricultural Heritage Systems (GIAHS) initiative directly contributes to several Sustainable Development Goals. By protecting traditional farming systems, it promotes SDG 2 (Zero Hunger) through food security and nutrition, SDG 12 (Responsible Consumption and Production) by sustaining ecological knowledge, and SDG 15 (Life on Land) through biodiversity conservation. Moreover, its community-driven approach aligns with SDG 1 (No Poverty) and SDG 11 (Sustainable Communities). GIAHS is not just about preserving the past—it's about building a resilient and inclusive rural future that leaves no one behind.

CIRDAP Knowledge Series: 31

Webinar on Malaysia Rural Development Policy in the context of Sustainable Development Goals (SDGs)

9 May, 2024

10:00 am (Bangladesh Time)
12:00 pm (Malaysian time)

Click here for registration of the webinar

Speaker

Ms. Nazlinda binti Zamani

Principal Assistant Secretary
Strategic Planning Division
Ministry of Rural and Regional Development, Malaysia.

CIRDAP

Organized by CIRDAP | Venue: Virtual Via Zoom Conference | icd@cirdap.org www.cirdap.org

SDG and Malaysia Rural Development Policy

Ms. Nazlinda binti Zamani,
Principal Assistant Secretary, Strategic Planning Division,
Ministry of Rural and Regional Development, Malaysia

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=RUAy6royYmk&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=13

SUMMARY

In this deliberation the speaker provides an overview of Malaysia's rural development policies and their integration with the SDGs, highlighting both achievements and persistent challenges. Although Malaysia has reduced poverty significantly, rural communities- comprising about 20% of the population-still face income disparities, higher poverty rates, and limited access to technology compared to urban areas. The government's evolving rural development strategies, from infrastructure expansion post-independence to the current 12th Malaysian Plan, emphasize ten thrust areas: competitive rural economies, entrepreneurship, human capital, infrastructure, youth and women empowerment, prosperous lifestyles, good governance, biodiversity, and housing. These thrusts are explicitly mapped to SDGs, ensuring that rural development aligns with goals such as poverty eradication, gender equality, sustainable communities, and environmental protection.

SDG Linkage: all 17 SDGs

Policy Insights: Malaysia's multi-sectoral, participatory approach-engaging ministries, stakeholders, and communities- to bridge rural-urban divides, harness new technologies, and create inclusive, sustainable pathways for rural prosperity.

Overview

This webinar focuses on rural Development in Malaysia, an upper middle-income country that has made notable progress in reducing poverty yet still faces challenges in its rural regions. The country has 26,400 villages and 15434 village committees. The rural population is about 24.7%, and the urban population is 75.3%. With around 20% of its population living in rural areas, the discussion centers on how Malaysia defines "rural," the socio-economic conditions of these communities, and the policies shaping their development pathways. Malaysia's rural areas cover just over 20% of the country's population, roughly 7 million people out of 34 million. As an upper-middle-income nation with a per capita GDP of around US $14,400 (nominal), it has made great strides, yet rural communities continue to face higher poverty and unemployment. Around 12% of rural Malaysians live below the national poverty line, compared to just 3% in urban regions. Despite rural residents often earning less than the RM 8,479 average household income in 2022, the national unemployment rate remains low (about 2.9%). Any discussion on rural Development in Malaysia must begin here: with communities striving for more equitable access to opportunities and livelihoods and their realities shaping sustainable policies for growth.

However, the speaker says that the percentage of the rural population has been decreasing since 1970, from 71.6% to only 24.9% of Malaysia's total population. Further, most of the rural population is between 15 and 30 years old, and the majority of the population is male. She further points out that most internal migration in Malaysia takes place from urban to urban and urban to rural, in contrast to rural to urban as seen elsewhere. Regarding the monthly average income, she shares that though both have progressed over time, the gap has also increased between urban and rural figures. The poverty line has decreased over the years, but

in 2016, they changed the way it is calculated, and that led to an increase in the graph. Talking about the poverty line income as of 2022, the speaker shares that it is RM 2589 or USD 554.24.

What is Policy?

The speaker draws light on the fact that Malaysia has policies in place to cater to all domains, be it rural development policy, food and agriculture policy, tourism policy, entrepreneurship policy, and so on. So, the policy is basically a basic framework for the implementation of government plans. The policies are developed and implemented to meet socio-economic objectives such as economic growth, income distribution, stability, and welfare. This is followed by an action plan to achieve the policy objectives.

Talking about the process of policy development, she says that a series of engagements are conducted with stakeholders concerned. Also, a ministry policy may not be designed by that particular ministry only. All related ministries may contribute and converge in making a wholesome decision. An impact assessment is done to see how much effect a designed policy would have on the target groups concerned. Every five years, Malaysia has a new Master plan in place. Currently, the 12th Malaysian Plan is in order and will expire in 2025.

SDGs and Malaysian Policies

The speaker deliberates on the SDG focus in Malaysian policies, stating that in Malaysia, there is an SDG Council chaired by the Prime Minister and a Steering Committee led by the Secretary General of the Ministry of Economy. There are five working groups to monitor the implementation of each SDG goal. She then shares snapshots of the statuses of each indicator, briefly explaining the goals achieved and the roadmaps planned.

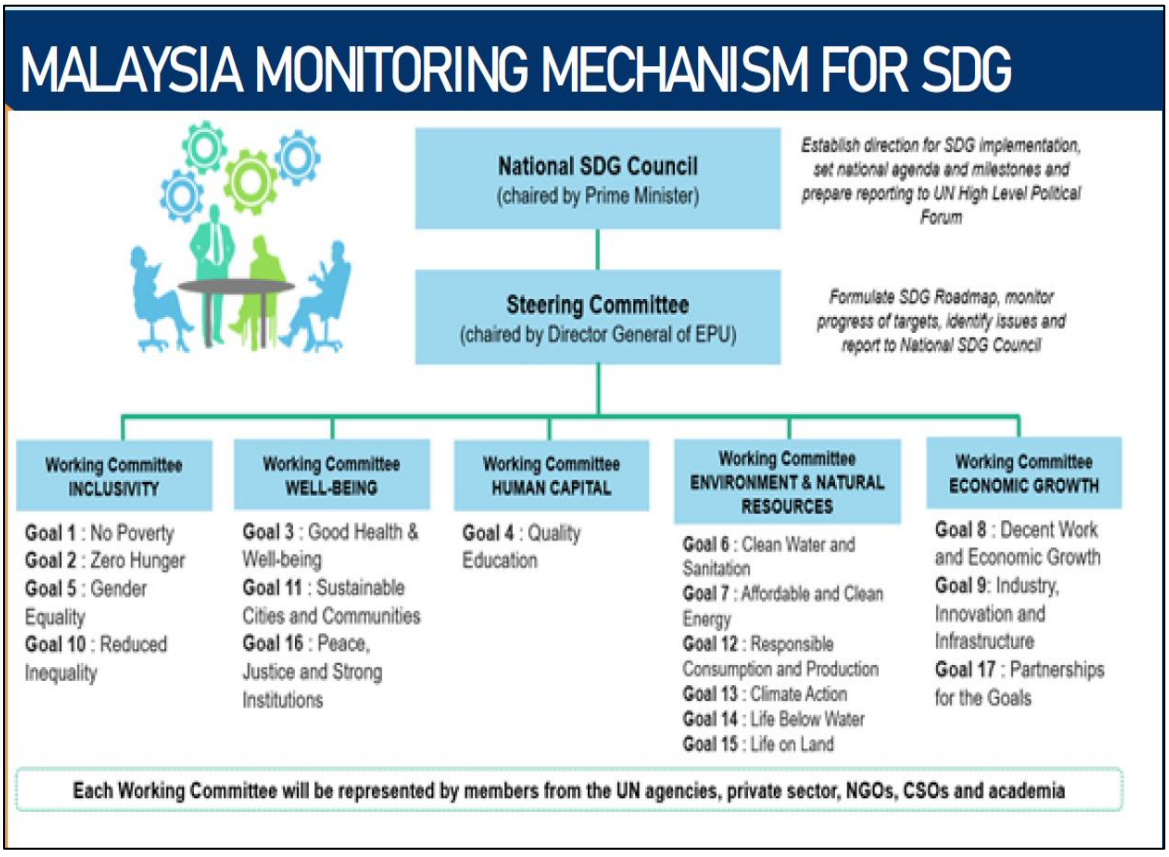


Figure 1: Malaysia monitoring mechanism for SDGs

Issues and Challenges

Proceeding towards issues and challenges faced in policy implementation, the speakers share the ways in which the Malaysian government resolves issues. She states that one major issue is the decreasing rural population, which might also be taking place in all CIRDAP member countries due to similar factors. She states that the widening gap between urban and rural area incomes is also one of the determining factors.

Next, she speaks about how keeping up to date with upcoming technologies is a challenge. She says that post the pandemic, the use of the internet, online applications, and so on has increased dramatically. So, the rural population must keep abreast with the Industrial Revolution 4.0/new technologies for better assimilation with the mainstream population. Talking about agriculture, she says that now rural dwellers may use apps to see the quality of their agriculture, levels of nutrients required, water and soil conditions, etc., and improve their products.

However, another issue that arises is the shift from agriculture to the service sector. Bow that rural tourism is on the rise, the focus from agriculture is shifting. Another challenge that is now arising is the declining rural population, which is mostly below 65 years of age. Lastly, the issues of poverty exist and need immediate focus.

Rural Development Policy

Having attained freedom from the British in 1957, the country focused on providing basic infrastructure and modernization and diversification of crops. So, basic infrastructure for development was focused on water, electricity, road access, etc. Then, by the 1970s, they focused on poverty eradication, forming a New Economic Policy and New Land Development Scheme. Then, by 1990, the government focused upon a New Philosophy and strategy for development, focusing on human capital and targeting schemes for the hard-core poor. As they progressed further, by the year 2000, there was the expansion of rural infrastructure and amenities followed by the Rural Transformation Plan. By 2021, the 12th Malaysian Plan was in place.

To take stock of the status of rural development, they have a ten-thrust area focus that includes various domains, as shown below.

Figure 2: Thrust areas focused under Rural Development Policy in Malaysia

She further deliberates on each thrust area, which is summarised as follows:

A competitive and sustainable economy: This is linked to SDG 1, 2, 8, and 9 and focuses on initiating transformative rural economic activities, production of high-quality local products in large quantities to benefit from economy of scale, and lastly, improving the well-being of the rural community. Therefore, their focus is on rural tourism, entrepreneurship training and education programs, industrial complexes, training and career programs, and income enhancement programs.

Entrepreneurship as the catalyst for Rural Economy Development: This involves focusing on entrepreneurship as the leading career choice of rural communities, strengthening the entrepreneurship financial support system as well as physical facilities in the rural areas, improving product development, and mainstreaming traditional knowledge. This has to be achieved through entrepreneurship training, focus on waste-to-health programs, and maintaining a database for robust use.

Excellent Human Capital: Focusing on comprehensive rural human capital development, the Plan is to expand the latest model of early childhood education programs, improve teachers' professionalism, change the mindset of the rural community, and lastly, design an inclusive, flexible, and effective capacity development that fulfills the local requirements. This has to be done through skills training, programs on 4IR, e-learning and simulation programs, and improvised facilities and modules for better learning outcomes.

Advanced and Complete Infrastructure: Herein, the policy statement focuses on complete coverage of rural infrastructure, telecommunication and broadband access, and efficient and suitable public transport systems in rural areas. This is to be achieved through the social amenities program, internet connectivity and ICT awareness, rural water supply program, rural electrification program, and access to rural roads.

Eminent Rural Youth: This thrust area focuses on inclusive skill education, benefiting from sustainable income through entrepreneurship, and developing competent youth with the spirit of patriotism for rural leadership. This is to be achieved through training on automation, making and identifying youth icons, programs on patriotism and nationhood, and a focus on youth leadership.

Progressive Rural Women: The focus of this thrust area is on uplifting rural women's economy, optimizing support services, and empowering rural women's leadership. This is to be achieved through providing proper capacity building and skill enhancement through training, focusing on entrepreneurship for rural women, financial literacy, women entrepreneurship programs, and leadership seminars.

Prosperous Rural Lifestyle: The thrust area here focuses on increasing awareness of empowering rural communities to adopt healthy lifestyles and prosperous rural living. The action plan includes designing and facilitating health support programs, fire prevention and safety training, risk disaster management training, recreational programs, and health education.

Good governance and effective delivery system: The thrust area here requires focus on integrated and coordinated implementation of rural development policies, effective, efficient, and high integrity in rural governance, as well as charismatic rural leadership. This can be achieved through the Public Private People Partnership (PPPP) model, engagement sessions, floating courses for village committees, and national village profiling and identifying the best one for awards.

Biodiversity and Sustainable Environment: This thrust area focuses on biodiversity and environmental resources management with sustainable demand and supply practices, ensuring a clean and safe environment for current and future generations and protection of wildlife habitat in rural areas. Programs designed here include a backyard vegetable garden, premium eco-tourism, and an environment-friendly village.

Housing, Regional Development, and Integrated Rural Settlement: This thrust area has its mandate on increasing homeownership among the target groups in rural areas, comparable quality of life in rural areas vis a vis urban area, sustainable and outstanding rural settlement by 2030, and facilitating progressive aboriginal, native of Sabah and Sarawak communities. This is to be done through providing programs for housing for the Rural poor, affordable housing, 21st-century village programs, and community empowerment programs.

Key Takeaways

Wrapping up her talk on policies in Malaysia, the speaker emphasizes the point that SDGs need to be integrated with policies for a better outcome. The integration of SDGs focuses on goal achievements. SDGs and rural development go hand in hand, so all policies for rural discourse should be linked and mapped to SDGs. The ten chapters in Rural Development Policy 2030 reflect on the priority areas and target beneficiaries for prosperous rural living.

Aligning with SDGs

In her talk, the speaker focuses on SDGs, and policies, and without the mapping of all the SDGs desired results cannot be achieved. Hence, all seventeen SDGs are necessary for a nation's development.

CIRDAP Knowledge Series: 32

Webinar on Celebrating The Worlds Oceans Day (June 8)
One Ocean, Three Approaches, Five Issues, Seven Solutions

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10 June, 2024

18:00 hrs. (Bangladesh Time)
17:30 hrs. (India Time)

Click here for registration of the webinar

Speaker

Sunil Murlidhar SHASTRI FRGS FRSA
Consultant, Educator and Speaker
Ocean and Environmental Governance

CIRDAP

Organized by CIRDAP | Venue: Virtual Via Zoom Conference | icd@cirdap.org www.cirdap.org

One Ocean, Three Approaches, Five Issues, Seven Solutions

Dr. Sunil Murlidhar Shastri
Ocean and Environmental Governance

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=vq5Z_TN_Jrc&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=15

SUMMARY

In this deliberation Dr. Shastri reframes ocean governance by emphasizing that there is only one interconnected ocean, making its protection a global imperative rather than a fragmented responsibility. He highlights urgent challenges of climate change, biodiversity loss, and pollution, while proposing seven solutions- ranging from science and technology to legislation, civil society engagement, financial initiatives, and education- that demand coordinated policy action.

SDG Linkages: 1, 2, 8, 13 1nd 14.

Policy Insights: Stronger institutions, inclusive participation, and innovative financing are essential to safeguard ocean health. Ocean policy is not just environmental it is social, economic, and moral. So that governance frameworks should integrate equity, justice, and sustainability across borders.

One Ocean: Changing the paradigm

The speaker for this webinar, Mr. Sunil Murlidhar Shastri, delivers a novel thought in his presentation. He emphasizes that it is essential to understand that there is only one ocean, just like there is only one Earth or only one moon. He reiterates his arguments by starting with a photograph taken from the moon. He says that from the picture, one can see land and water and that water is only one ocean. He says that different people have different perspectives regarding the number of oceans that exist. According to some, there are only three oceans: India, the Atlantic, and the Pacific; however, some count five oceans: Arctic, Southern, Indian, Atlantic, and Pacific. There is another set of people who say there are seven oceans if you split the Atlantic and the Pacific into North and South. Thus, he believes and argues that there is only one water body, one ocean.

He further elaborates this argument by talking in detail about the volume of water the ocean has. He says that about five moons can be placed side by side across the Pacific. The Earth is said to be having 97% of water. He says that the Pacific alone is larger than the surface area of Mars. While looking at the polar ends, it can be seen that the antipode just offshore of Chile and Peru is just offshore of Vietnam and China, and all the continents can fit in the Pacific, which has 50% of all water on Earth. He refers to the Spilhaus Projection 1942 to emphasize his point that Antarctica is taken as the centre of the world, and all oceans appear interconnected; it is all one water body.

He states that the ocean is 71% of the Earth's surface, but it offers 99% percent of the living space (biosphere). The Sea: Land ratio is 60:40 in the Northern Hemisphere and 80:20 in the Southern Hemisphere. The average depth is 3733m (the average elevation of land is 835m), and the deepest point is 11022m (Mount Everest is 8849m). The Mid-Oceanic Ridge is 64000km long (4 times longer than all the mountain ranges on land combined) and over 2000km wide 96.5% of all water on Earth is in the ocean; ice on land 2%; groundwater 1.0%; rivers and lakes 0.2%; water in the atmosphere 0.1%.

When talking about VUCA, the speaker says that we live in a world that is characterized by Volatility, Uncertainty, Complexity, and Ambiguity. However, he proposes to change the

outlook about the oceans using VUCA as having a better *Vision* of the ocean, *Understanding* the body of the ocean, having better *Clarity* about the knowledge of the oceans, and lastly, having *Agility* to ameliorate the problems faced by the oceans.

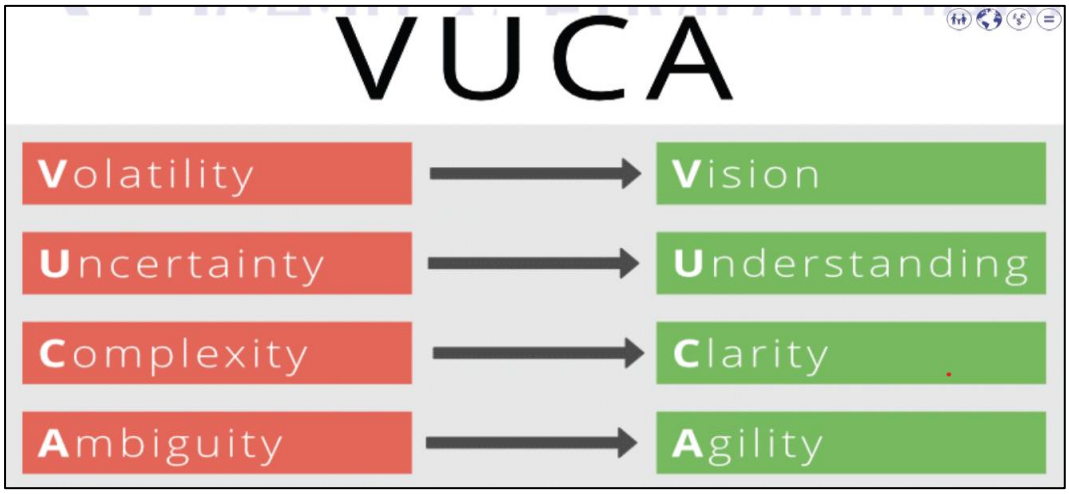

Figure 1: Changing the paradigms of VUCA

ABCD of Challenges

The speaker proposes this categorization of challenges for a better understanding. He opines that we aim to achieve peace through equity and justice, which can be done by balancing people and the planet and by not running after profits. This will further help combat death, disease, and destruction. Talking about the dividend, he says that nations all across should aspire to be democratic. The demographic dividend, wherever possible, should be used at its best for the development of the nations. Lastly, the demand for goods and services can be increased by increasing the demographic dividend.

The Three Approaches

As he progresses with his talk, the speaker shares his three approaches.

1. Advice: Sharing about his personal loss of losing his mentor, Elisabeth Mann Borgese, and his father in a very short span of time, the speaker shares that both highly influenced him in his life, and it was quite a void when both of them passed away. He got an opportunity to develop a course for which he took the title from T.E. Lawrence's book, 'Seven Pillars of Wisdom' and delivered his first Master class. He shares that most of his clients are educational and research institutions, as well as intergovernmental and non-governmental organizations, and he likes to talk as it is his main source of livelihood.

2. Advocacy: In this section, the speaker shares his concerns for achieving peace and justice. He cites examples of Prof. Peter Singer, who gives away almost 40% of his earnings in charity, calling it a moral duty. Talking about national and international levels, he feels that if countries that were members of OECD or NATO and the like could fulfill their commitments and contributions, many of the world's problems could have been solved by now.

3. Action: The speaker shares that he has followed what he preaches and has been giving away 10% of his gross income since 2002 and motivates others too to do the same. He says that would help alleviate poverty, hunger, lack of education, shortage of water, lack of sanitation, provision of healthcare, and little contributions count.

Five Issues

Next, he talks about five issues. He elaborates on each one of them vividly.

1. Why are we where we are?

Herein, he talks about how humans are never satisfied with the resources they have in hand. They have conspicuous consumption patterns and continue to increase pollution, be it on land, air, or water.

2. What are the existential issues facing us?

Talking about existential issues, the speaker compares COVID to the size of marbles, Climate Change to a tennis ball, the Disruption of the Nitrogen Cycle to a baseball, and Loss of Biological Diversity to a football size, saying that we have caused huge and irreparable dame to the biodiversity as humans. He recommends three books for a better understanding, namely Stern Review (Economics of Climate Change 2006), Kate Raworth (Doughnut Economics 2017), and Dasgupta Review (Economics of Biodiversity 2021).

3. Why is the ocean significant for our survival?

The Pacific alone is bigger than the surface of Mars and can accommodate all seven continents. Only about 5% of the ocean has been explored. It absorbs 25% of Carbon Dioxide, generates 50-80% of Oxygen, is 70% of Earth's surface, receives over 80% of land-based pollution, absorbs 90% of excess heat from emissions, carries 95% of world trade, contains 97% of Earth's water and offers 99% of the biosphere (living space). Also, the so-called 'cloud' is actually in the ocean, given almost 99% of communication cables are laid under the ocean.

4. Where in nature can we find simple solutions?

Taking a cue from Greta Thunberg, the speaker shares that the solutions lie in front of us; we need an eye to understand them better. The solution is planting trees and sustaining the green cover that we already have. He opines that Mangroves, Seagrass, and Corals are our triple insurance against an imminent climate catastrophe.

5. How must our narratives change?

Having highlighted how we, as humans, have already caused a lot of damage to the oceans and biodiversity, the speaker hails that it is time to change the narratives—saying that the ocean is too big to fail or it is too big to fix needs to be corrected. The new narrative has to be that the ocean is too big to ignore and that certain issues need immediate attention.

Solutions: 1. Science and Technology

The speaker proposes and very strongly too, that science and technology hold solutions to today's problems. It is all about seeking knowledge and acquiring wisdom. Wisdom needs to be practiced while putting technology to better use, as it is a double-edged sword. He says that science is all about imagination. He reminisces about his mentor throughout the webinar and shares that she used to say that utopians of today are realists of tomorrow. Realists of today are dead tomorrow. Imagination is the key to a better future.

Solutions: 2. Geopolitical Economy

In this particular idea, the speaker draws attention towards the haves and have-nots, i.e., which are the countries that provide the raw material, provide labor, etc, and which are the countries that enjoy the finished products. He focuses on the carbon trail left behind in the whole cycle of production, consumption, and residue and its aftermath. He vehemently opposes the

privatization of profits and the socialization of costs. Talking of the transboundary nature of impacts, he says that it is increasingly evident, be it pollution, disasters, and epidemics, that all are globally present.

Solutions: 3. Institutions and Organisations

In the next solution, the speaker ideates that all countries need to be democratic and that there should be consensus when making certain decisions. A vote is desired, not the practice of veto. He further deliberates that there should be less file work and processes that challenge the smooth implementation of programs; rather, there should be free-flowing governance that reaches the last mile. Though democracy may have some shortfalls, he says, it is still the best option to ply with.

Solutions: 4. Legislation and Implementation

Vying on the importance of legislation and implantation, the speaker stresses the point that continuous development, periodic review, and uniform application of the rule of law need to take place. He says that one should always perform the rightful actions and move towards a better course of life, in this context, moving from lawlessness to law-fullness.

Solutions: 5. Role of Civil Society

Stressing the important role played by the civic society, the speaker mentions that we are all part of it, but the main stakeholders are the women and youth. Hence, we need to carefully make use of our duties and responsibilities to foster a sustainable world. Just like there is the concept of Corporate Social responsibility, there should be Individual Social responsibility as well. When citizens take up ownership of any responsibility, it is bound to see success. Hence, that ownership in people needs to be inculcated.

Solutions: 6. Financial Initiatives

The speaker reiterates his mentor, Elisabeth's approach, that to raise funds, one needs to have a compelling argument to convince the donor. He emphasizes the point that to get work done, money is required. He goes on to list some sources such as vying for Public Private Partnership (PPP), Private Finance Initiative (PFI), Foreign Direct Investment (FDI), the Word Bank Group – IBRD, IDA, IFA, ICSID, MIGA, the Regional Development Banks – ADB, AfDB, IADB, and EBRD, etc.

Solutions: 7. Education and Awareness

The last solution the speaker proposes is education and awareness. He tells us that out of these seven solutions or pillars if we are able to identify with one, we should adopt it as our central pillar. He stresses the importance of education, mid-career training, life-long learning, etc. Bringing diverse groups and having dialogues and public speaking engagements are all needed for flourished growth.

Final thoughts

Finally, in his wrap-up notes, Shastri summarises that doing the right thing holds the key. Narratives need to be changed, and any stagnation needs to be dealt with. This change should come from within. He mentions that a PIN Diagram, i.e., Position (intransigent), Issues (common), and Needs (same) need to be understood. He uses this PIN diagram to express an Oceanic Atoll where only a small piece is visible at the surface of the ocean. Still, as one dives deep, it all comes together as one piece on the same foundation (thus referring to the fact that everyone has the same basic needs for *roti*, *kapda,* and *makaan*). He further stresses the point of honesty and Clarity of purpose. And one needs to keep chipping in to yield results!

Finishing his presentation with the top ten solutions to reverse climate change, he lists refrigerators, wind turbines, reduced food waste, solar Farms, adoption of a Plant-Rich Diet, Tropical Forest Restoration, Educating Girls, Family Planning, Silvopasture, and Rooftop solar.

Oceans and the SDGs

As Dr. Sunil Shastri emphasized, we must stop thinking of oceans as separate entities divided by borders-they are, in truth, one interconnected body sustaining life on Earth. Protecting this single ocean aligns directly with the Sustainable Development Goals, especially SDG 14: Life below Water. However, it does not end there; ocean health supports food security (SDG 2), climate action (SDG 13), and sustainable livelihoods (SDG 1 & 8). Saving our ocean is not just environmental—it is social, economic, and moral. We owe it to the planet and ourselves.

CIRDAP Knowledge Series: 33

Webinar on the International Day of Awareness of Food Loss and Waste

29th September, 2024

11:00 am (Bangladesh Time)
12:00 pm (Thailand time)

Click here for registration of the webinar

Speaker

Dr. Nuanchan Singkran

Associate Professor
Faculty of Environment and Resource Studies Mahidol University, Thailand.

CIRDAP

Organized by CIRDAP

Venue: Virtual
Via Zoom Conference

icd@cirdap.org
www.cirdap.org

Food loss and waste reductions: Think globally, act locally

Dr. Nuanchan Singkran,
Associate Professor
Faculty of Environment and Resource Studies, Mahidol University, Thailand

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=nKEf5TCcCag&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=11

SUMMARY

The session, led by Dr. Nuanchan Singkran, emphasizes that while global food production is sufficient, inefficiencies in storage, distribution, and consumption result in massive losses that undermine food security, waste resources, and exacerbate climate change. Adoption of integrated strategies that combine local action with global frameworks, including improved supply chain management, awareness campaigns, and enabling regulatory environments to minimize waste.

SDG Linkage: 1, 2, 8, 12, 13

Policy Insights: Tackling food waste is not only an environmental imperative but also a socio-economic necessity, requiring coordinated policies, community engagement, and cross-sectoral collaboration to ensure sustainable rural and urban development

Definitions of food loss and waste

In a world where millions go hungry every day, it is heart-breaking that so much food is still lost or wasted, from farms to forks. In this webinar, Dr. Nuanchan Singkran reminds us that food loss and waste are not just technical issues; they are ethical, environmental, and economic concerns. Her talk urges us to think globally about the scale of the problem but act locally, starting with the choices we make in our communities. Beginning her talk with the difference between food loss and food waste, Dr. Singkran elaborates that Food loss is the decrease in edible food mass from the production, postharvest, & processing stages in the food supply chain (Parfittet al. 2010) while food waste is the food loss from the retail and consumption stages in the food supply chain (Parfittet al. 2010). She further mentions that the production and consumption stages account for the most food loss and waste (Boston Consulting Group 2018). She brings in some interesting facts about these concepts. She says that 733 million people go hungry globally (FAO et al. 2024), while 1/3 (1.3 billion tons) of the world's food is yearly wasted &worth almost 1 trillion USD (FAO 2011). 1.05 billion tons of food were wasted in households, food services, and retail in 2022. The waste rate = 132 kg/capita (UNEP 2024). She mentions that food loss & waste generate 8-10% of GHGs and is a methane hotspot. (IPCC 2019). One ton of CH_4 is equivalent to 28-36 tons of CO_2 over 100 years (IPPC 2021).

Vastness of Food loss and Food waste

The speaker further shares that food loss and food waste can be measured across the regions, as shown in the figure below. She says that food loss happens at the production stage, during handling and storage, processing, distribution and marketing, and lastly at the consumption stage. She further explains that though food loss is maximum at the consumption stage in North America and Oceania region, it is maximum at the production stage in Sub-Saharan Africa. So, as discussed during the talk, sensitization should be focused on the farmer, and consumers need to be sensitized. The fact cannot be denied that food waste also takes place during logistics, distribution, etc., so different kinds of sensitization are needed, and capacity building is the key. Therefore, the whole value chain needs to be strengthened.

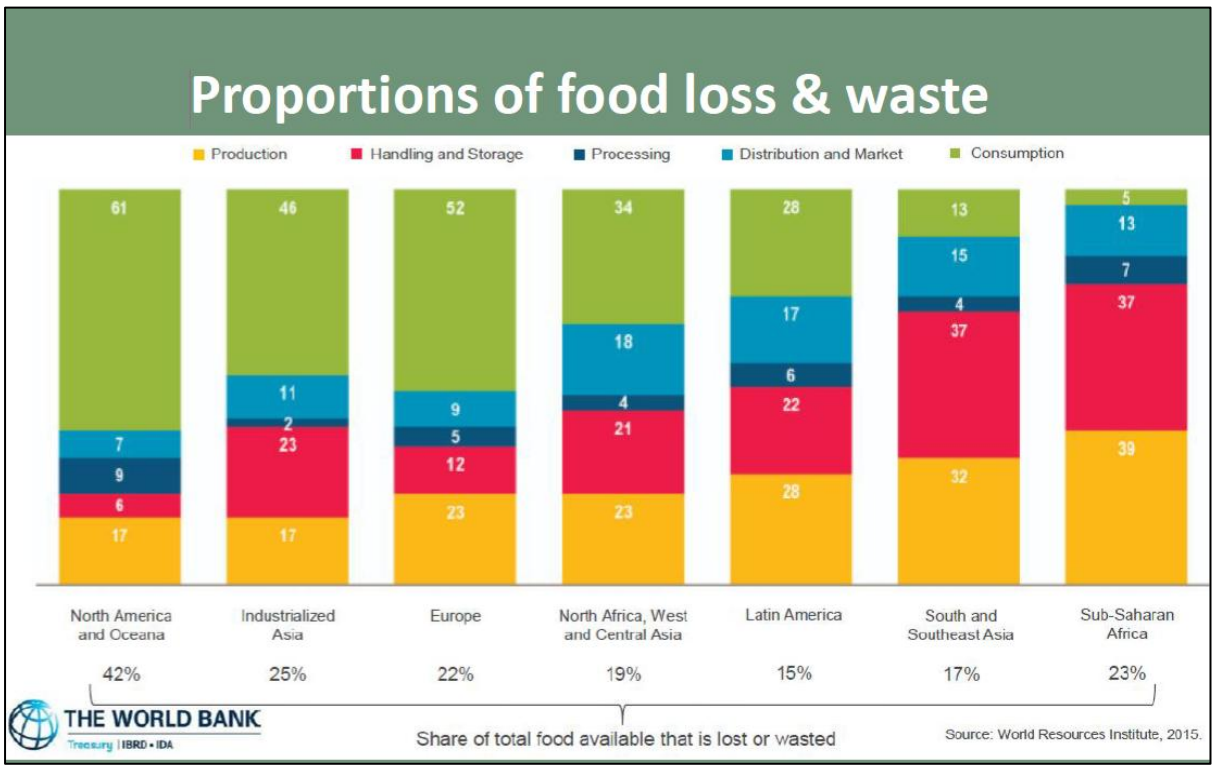

Figure 1: Proportion of Food loss and waste

Reduction framework for food loss & waste

Dr. Singkran walks us through a thoughtful framework for tackling food loss and waste, starting from production and handling all the way to retail and consumer behavior. She highlights that solutions must be context-specific: what works in urban supermarkets might not fit rural farms. The key, she says, is building awareness, improving supply chains, and fostering collaboration between producers, policymakers, and people like us who shop, cook, and eat. She emphasizes that the last thing food should do is end up in a landfill because when it does, it releases harmful greenhouse gases like methane. Instead, she urges us to think of better uses for surplus or leftover food. If it is still edible, let's get it to those who need it most; there's no excuse for hunger when food is being wasted. And if it is not fit to eat, it can still serve a purpose: animal feed, compost for our soil, or even bioenergy. Every bit diverted from the bin is a step toward a more sustainable and just food system. She then proposes a few steps to overcome the challenge of food loss and food waste:

- Developing research & knowledge
- Formulating strategies for action
- Partnering for outcome improvement
- Investments

This particular framework is explained in detail in the figure below. She proposes designing a food loss index, food waste index, and consumption index. She proposes formulating strategies to reduce waste, get funding, improve production systems, etc., to beat the problem of food loss and food waste.

Reduction framework for food loss & waste				
Framework	**Methodology**	**Examples of implementation**		
Developing research & knowledge	Estimating food loss & waste in a country.	Food loss index Estimating food loss during production or in the food supply chain before it reaches retailers.	Food waste index Estimating food waste at the end of the supply chain by retailers and consumers.	Consumption inefficiency index Food waste/food consumption.
Formulating strategies for action	Legislation, circular economy practices, etc.	Legislation implementation Incentivize food loss & waste reduction and penalize people who throw away edible food.	Technological enhancement for a food supply chain (e.g., post-harvest handling, storage, distribution, etc.)	Production system improvement (e.g., processing, recycling, treatment)
Partnering for outcome improvment	Stakeholder collaborations	Organic waste composting project at local level (e.g., community, village, city).	Public campaign on food loss & waste reduction (to raise awareness of people)	Community-based solid waste management project (running by local people and agencies)
Investments	Fund and resource mobilization	Investing the circular economy system/project	Capacity building & training (must be sufficient to tackle the problems)	Donations and fund setting
https://wwf.panda.org/discover/our_focus/food_practice/food_loss_and_waste/, https://www.ifco.com/countries-with-the-least-and-most-food-waste/, Bissessur (2019), Singkran (2020)				

Figure 2: Reduction Framework for food loss and waste

Alignment with SGDs

In today's world, where millions go hungry while tons of food are discarded, tackling food loss and waste has become an urgent global priority. The issue is not just about food; it is about sustainability, equity, and climate resilience. The challenge of reducing food loss and waste is deeply tied to several Sustainable Development Goals (SDGs). SDG 2 urges us to end hunger, ensure food security, and promote sustainable agriculture, raising the urgent question: how do we act to reduce global food waste and protect both people and the planet? SDG 12 focuses on sustainable consumption and production, with Target 12.3 specifically calling on all of us to halve food loss and waste by 2030. Finally, SDG 13 reminds us that food waste is a major contributor to climate change, emitting around 3.3 billion tons.

CIRDAP Knowledge Series: 34

Webinar on Disaster Risk Reduction

14th October, 2024

11:00 am (Bangladesh Time)
12:00 pm (Thailand time)

Click here for registration of the webinar

Speaker

Dr. Nuanchan Singkran

Associate Professor
Faculty of Environment and Resource Studies,
Mahidol University, Thailand.

CIRDAP

Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

Organized by	Venue: Virtual	Coordinator
CIRDAP	Via Zoom Conference	Ms. Hurain Jannat
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Natural Disaster Reduction and a Proposed Management Framework

Dr. Nuanchan Singkran,
Associate Professor, Faculty of Environment and Resource Studies
Mahidol University, Thailand

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=ocgDhXqwLLY&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=10

SUMMARY
Dr Singkran highlights Thailand's experience of disaster risk reduction and proposes a more participatory management framework. She stresses that Thailand's National Disaster Prevention and Mitigation Plan provides a structured, top-down approach and suffers from limited community involvement, one-way communication, and overreliance on structural measures. She emphasizes that resilient disaster management is not only about infrastructure but about empowering communities to co-create safer, sustainable futures.
Her proposed Flood Risk Management Framework calls for collaborative floodplain management through a unified Floodplain Management Entity (FME), ensuring local stakeholders share responsibility alongside government agencies.
SDG Linkage: 11, 13, and 17.
Policy insights: Accurate risk assessment, early warning systems, contingency planning, and continuous community education are critical for resilience building. By embedding two-way communication, transparency, and stakeholder feedback into disaster governance, policies can shift from reactive responses to proactive, adaptive strategies.

Understanding Natural Disaster

The speaker for this webinar, Dr. Nuanchan Singkran, starts by defining Natural Disaster as "an event caused by a natural hazard, which refers to a natural process or phenomenon that can result in loss of life, property damage, and environmental impacts, such as earthquake, storm, flood, and tsunami." (International Encyclopaedia of Public Health, 2nd edition, 2017). Referring to the data from the Centre for Research on the Epidemiology of Disaster (CRED 2024), she mentions the number of disasters that took place across the world in 2023 and also the top ten countries where they occurred. Asia leads the board, followed by America and Africa. These disasters include drought, earthquakes, floods, extreme temperatures, dry and wet mass movements, storms, volcanic activities, and wildfires. She stresses the point that in the reference years 2003-22, floods have had maximum occurrences followed by storms. Thus, Asia has had the maximum number of casualties, followed by South Asia and Africa. Talking about the number of deaths by disaster type for 20032-22, it has been quite large in 2023, as compared to previous years.

Disaster Management Process

In this part of the webinar, the speaker walks us through the basic yet critical steps of building a sound disaster management plan. It all begins with one simple but often overlooked task—*accurately identifying the disaster*. Whether it is a flood, earthquake, drought, or cyclone, knowing what we are dealing with sets the foundation for all that follows. When we clearly understand the nature and scope of a disaster, we can better plan our mitigation strategies, like strengthening infrastructure, improving early warning systems, or setting zoning regulations in vulnerable areas. Once the disaster is identified, the focus shifts to emergency response. This is the phase where time is of the essence. Who does what, when, and how must be decided in advance. Planning for immediate action—rescue operations, medical response, evacuation protocols, and ensuring access to basic supplies like food, water, and shelter—is crucial to save lives and reduce suffering.

After the initial emergency is handled, the attention turns toward recovery. This is where communities begin to rebuild—*physically, emotionally, and economically*. But before jumping into reconstruction, it is important to pause and conduct a thorough disaster assessment. What went wrong? What could have been done better? This reflection feeds directly into better preparedness next time. The final step is mitigation—implementing strategies to reduce future risks. These stages are not always linear, but together, they form the backbone of a thoughtful and responsive disaster management framework—one that's grounded in local realities but forward-looking in its resilience goals.

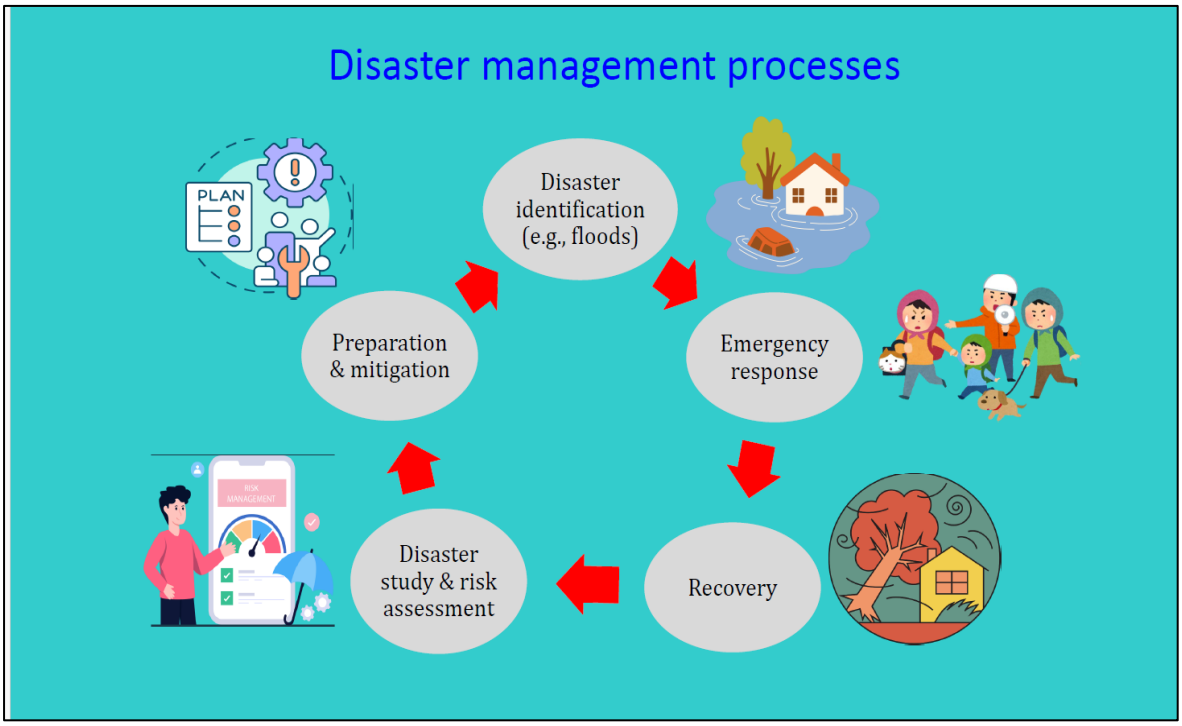

Figure 1: Disaster Management Process

Various actions involved in the disaster management process involve:

Emergency response: Herein, the action involves evacuating people, pets, animals, properties, etc. from the inundated areas. Further, providing the flood victims with safe shelters for temporary stays and providing food, clothes, medicine, physicians, & necessary things.

Recovery: After the disaster, the process of recovery takes place. This could be recovering of infrastructures, factories, buildings, houses, agricultural areas, etc., or the environment or mental health of affected people/pets.

Disaster management process: Risk study & assessment

The speaker says that disaster management begins with understanding risk, and in the case of floods, this starts with a focused flood study. It involves identifying the nature and extent of the flood problem, how often floods occur, their causes, and the scale of impact. Mapping out areas at risk helps communities visualize which zones are most vulnerable. Categorizing flood hazards—from low to high—allows for prioritizing interventions.

Following this, flood risk assessment becomes crucial. It is not just about how likely a flood is to occur but also about the consequences it can have on individuals, communities, and the

environment. In essence, flood risk is measured as the probability of a flood happening multiplied by the severity of its potential impact. This assessment forms the backbone of effective planning, helping governments and communities prepare better, mitigate damage, and save lives.

Disaster management process: Preparation & mitigation

Once risks are understood, the next step in disaster management is preparation and mitigation. This means acting before disaster strikes. For flood-prone areas, it starts with robust floodplain management, reviewing what is already in place, continuing what works, and planning wisely for the future. Equally important is having a reliable early warning system so communities are not caught off guard. Local flood-watch networks, made up of trained volunteers and residents, can provide real-time updates and strengthen community response. Contingency plans—clear, actionable steps—should be in place at the local level and regularly rehearsed so everyone knows what to do when water levels rise. Lastly, educating people and communicating clearly about flood risks can make all the difference. When communities understand the risks and know how to respond, they become far more resilient.

National disaster prevention and mitigation plans of Thailand

Next, the speaker talks about Thailand's National Disaster Prevention Plan. She says that Thailand's National Disaster Prevention and Mitigation Plan (NDPMP) takes a structured, top-down approach to disaster management, coordinated through line ministries and government agencies. It serves as a central framework to handle all types of disasters, whether natural or man-made, under the National Disaster Prevention and Mitigation Act of 2007. This legal foundation ensures that disaster response is not just reactive but part of a well-planned, proactive system supported by relevant policies and measures. The goal is clear: to keep communities safe through coordinated, timely, and efficient action.

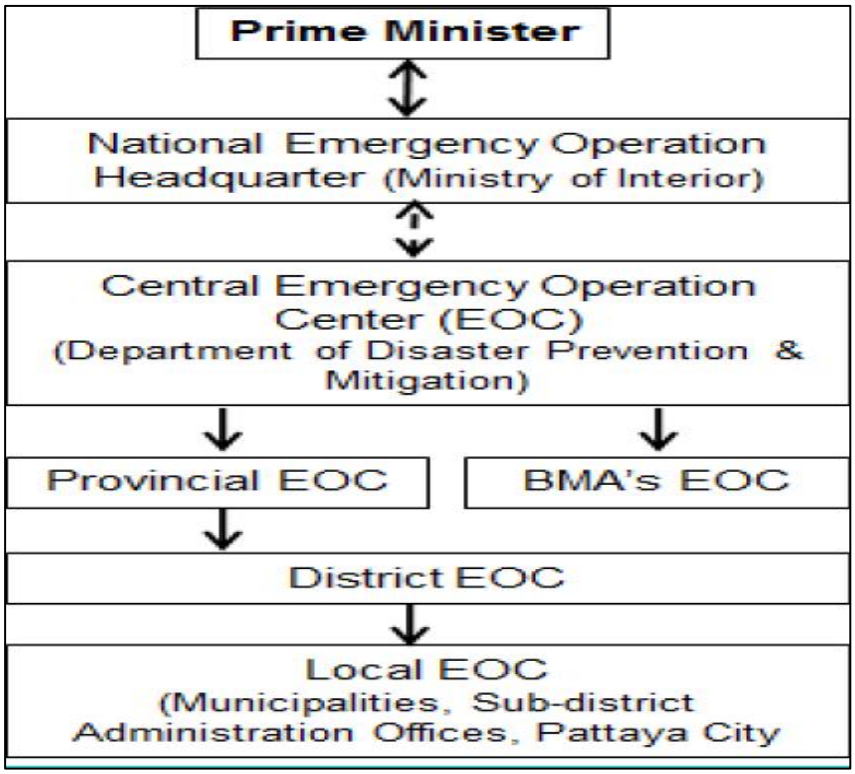

Figure 2: Structure of the NDP and Mitigation Plan of Thailand

The speaker continues to mention the challenges in the plan. She says that Thailand's disaster management approach has several critical gaps. It lacks meaningful community participation, leading to weak collaboration. Communication is mostly one-way, limiting awareness. The system leans heavily on structural measures while neglecting softer, preventive strategies. Moreover, risky development continues in flood-prone areas, and responses focus only on current floods, not long-term preparedness.

Looking at the challenges that exist, she proposes a flood risk management framework. She suggests that to manage major flood events better, a shift is needed from top-down control to collaborative floodplain management. This proposed framework gives local stakeholders a central role, working alongside government agencies through a unified Floodplain Management Entity (FME). It prioritizes two-way communication, ongoing feedback, and shared responsibility in every stage, from flood studies to plan execution, ensuring grounded, responsive solutions.

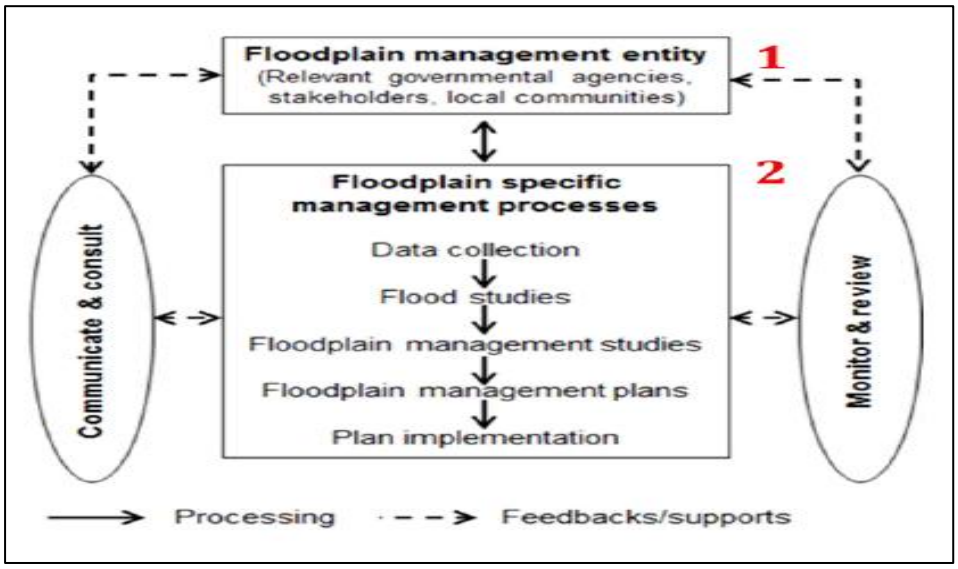

Figure 3: Proposed Flood Risk Management Framework

She further deliberates that community participation is the priority for making plans effective at a local level. Two-way communication is an effective way to facilitate community participation. The results should be exhibited publicly, discussed at community meetings, commented on by outside agencies, and further improved by incorporating the reviews and feedback of stakeholders. Local government agencies should implement all relevant plans.

Aligning with the SDGs: A Way Forward

Managing floods is not just about responding to emergencies; it is about building resilient systems that protect lives, livelihoods, and ecosystems. The proposed floodplain management framework strongly echoes the spirit of the Sustainable Development Goals, particularly SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals). Promoting local participation, transparent governance, and climate-responsive planning offers a path toward safer, more sustainable futures for flood-prone communities across Thailand and beyond.

CIRDAP Knowledge Series: 35

Webinar on Small Enterprises to strengthen Rural Economy: Challenges and Opportunities

November 19, 2024

11:00 am (Bangladesh Time)
Tuesday

Click here for registration of the webinar

Speaker

Dr. S. Glory Swarupa

Director General, National Institute for Micro, Small and Medium Enterprises (NI-MSME), An organization of the Ministry of MSME, Government of India

CIRDAP

Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

Organized by	Venue: Virtual	Coordinator
CIRDAP	Via Zoom Conference	Ms. Hurain Jannat
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Small Enterprises to Strengthen Rural Economy: Challenges & Opportunities

Dr. S. Glory Swarupa,
Director General,
National Institute for Micro, Small and Medium Enterprises (ni-msme),
Ministry of MSME, Government of India

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=vYetQ8a3WpY&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=9

SUMMARY

In her deliberation Dr. Swaarupa highlights the pivotal role of Micro, Small, and Medium Enterprises (MSMEs) in strengthening India's rural economy by driving employment, innovation, and inclusive growth. Contributing nearly a third of GDP, over a third of manufacturing output, and almost half of exports, MSMEs are portrayed as engines of livelihoods and decentralised development. Her deliberation outlines the classification of MSMEs, institutional support through ni-msme and allied agencies, and the sector's persistent challenges such as limited credit, market access, and technology adoption. It traces the historical evolution of ni-msme into a global Centre of Excellence, detailing its vision, mission, training programmes, and international collaborations. Key government schemes including SFURTI, PMEGP, PM Vishwakarma, Mahila Coir Yojana, NRO-SVEP, and MUDRAare discussed as interventions to empower artisans, women, and marginalized entrepreneurs.

SDG Linkage: 1,8,9,10

Policy Insights: MSMEs contribute directly to Sustainable Development Goals by reducing poverty, creating decent work, fostering innovation, and promoting equality, positioning them as vital instruments for resilient and just rural economies.

Overview of MSME

The Micro, Small, and Medium Enterprises (MSME) sector continues to be the unsung backbone of India's economy, especially in rural areas. In 2021–22, MSMEs contributed nearly 29% to the national GDP and accounted for 36% of manufacturing output. They are second only to agriculture in terms of employment generation, providing jobs to over 22 crore people across the country. With over 5.2 crore MSMEs registered under Udyam (including Udyam Assist), the sector is diverse and vibrant, producing more than 6,000 products, as catalogued by the Development Commissioner's office in Hyderabad. In 2022–23, MSMEs also powered India's global trade footprint, contributing an impressive 44% to exports. These numbers are not just statistics—they reflect millions of rural livelihoods, home grown innovations, and the promise of decentralized, inclusive economic growth.

Talking about the new definition of MSME, she says that in India, the classification of Micro, Small, and Medium Enterprises (MSMEs) is based on investment and annual turnover, ensuring uniformity across manufacturing and service sectors. A Micro Enterprise is defined as one with an investment of up to ₹10 million and a turnover of up to ₹50 million. A Small Enterprise can invest up to ₹100 million with a turnover limit of ₹500 million. Meanwhile, a Medium Enterprise may invest up to ₹500 million and have an annual turnover not exceeding ₹2,500 million. This classification helps in targeting policies, credit access, and incentives more effectively, aligning with national goals for inclusive growth and rural entrepreneurship.

Next, she gives a glimpse about the Ministry of MSME and how it takes care of rural economy and promoting micro-enterprises. Stating about the Office of Development Commissioner (DC-MSME), she shares that 32 MSME Development & Facilitation Offices (MSME-DFOs), 23 MSME Technology Centers, 7 MSME Testing Centers, 7 MSME Testing Stations, are set up to take care of enterprises all across the states. Then there is Khadi and Village Industries Commission (KVIC), National Small Industries Corporation (NSIC), National Institute for Micro, Small and Medium Enterprises (ni-msme), Mahatma Gandhi Institute for Rural Industrialization (MGIRI), and Coir Board to take care of the rural industrialisation, women empowerment and economic development. Secondly, they cater to the needs of other Ministries and lastly mitigate the challenges faced in MSME sector.

Major Challenges Faced by MSME Sector

The speaker then talks about the challenges faced by the MSME sector. She deliberates on many points in detail. She remarks that the MSME sector in India, while dynamic and diverse, faces several persistent challenges that hold back its full potential. Many small enterprises still remain outside the formal economy, limiting their access to critical support systems. Credit and finance continue to be major hurdles, especially for first-generation entrepreneurs. Limited market access, outdated technologies, and slow digital adoption further constrain their growth. Infrastructural gaps and the need for constant skilling or reskilling add to the struggle. Recognizing these barriers, the Ministry of MSME has rolled out several schemes and initiatives aimed at empowering MSMEs and addressing these pain points holistically.

The speaker fondly recalls the Kakinada Experiment of 1964, led by renowned psychologist Prof. David McClelland. It was a ground-breaking initiative that focused on building achievement motivation among the youth of the fishermen community in Andhra Pradesh. This was, in fact, India's first-ever structured Entrepreneurship Development Programme (EDP). What began as a bold social experiment went on to inspire success stories like Vijay Electricals and Raja Cycle Company, marking a turning point in grassroots enterprise development.

Genesis: National Institute for MSME (ni-msme)

While talking about the genesis of MSME (ni-msme), the speaker shares that the genesis of MSME's premier institution can be traced back to the early 1960s, when it began as the Central Industrial Extension Training Institute (CIETI) in New Delhi, following recommendations from the Working Group of the Third Five-Year Plan. It was later relocated to Hyderabad and renamed the Small Industry Extension Training (SIET) Institute. Over the years, it earned recognition as a Centre of Excellence by UNIDO. In 1984, it became NISIET, and finally, on 11th April 2007, it was rebranded as the National Institute for Micro, Small and Medium Enterprises (ni-msme), reflecting the evolving scope and importance of the sector and it celebrated its diamond jubilee in 2022.

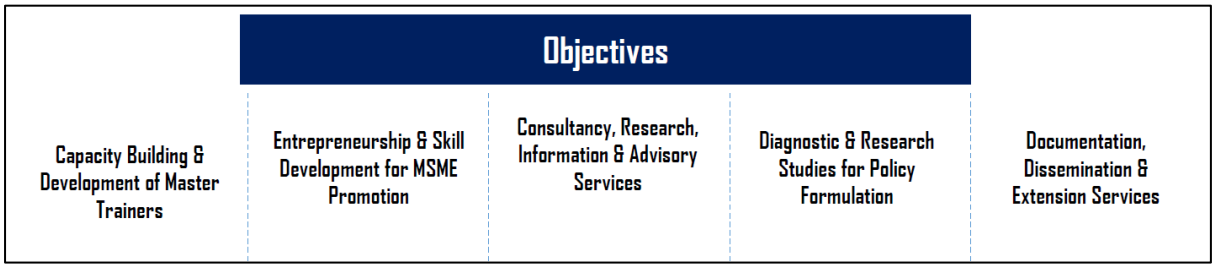

Figure 1: Objectives of National Institute for MSME (ni-msme)

Vision and Mission of National Institute for MSME (ni-msme)

After talking about the genesis of the institute, the speaker mentions that the institute's vision is to emerge as Centre of Excellence in Innovation and Entrepreneurship for sustainable growth of MSMEs while conforming to national priorities for attaining global standards. Talking about its mission, she says it aims to:

- To play an active role in MSME policy formulation and implementation in priority sectors aligned with Sustainable Development Goals(SDGs
- To undertake demand driven Training, Research & Consultancy involving Industry and Academia
- To develop curriculum, offer short/long term courses and executive education programmes on entrepreneurship and MSME development as part of lifelong learning
- To impart innovative skills, support incubation, facilitate technology transfer, multiplication and commercialization including evolving Innovations & Pilot Testing
- To create Master Trainers for providing mentoring & hand-holding services to potential and practicing entrepreneurs.
- To establish linkages with international agencies, different Ministries of Government of India, and state governments where demand exists for MSME development.

The ni-msme Services include Training for cadre officers such as IAS, IES and the like, conduct research, provide Consultancy, design Educational Programmes, etc. Also, the institute brings out a journal called SEDME which stands for Small Enterprises Development Management Extension and also JIEMS which is Journal of Innovation, Entrepreneurship, Management and Skill Development. When it comes to trainings, the institute offers various programs in on /off Campus or in hybrid Mode for:

- Executive
- Management
- FDP/ ToT
- Entrepreneurship
- Skill

For its exceptional contribution the ni-msme is awarded with National Standards for Civil Services Training Institutions (NSCSTI) Accreditation Certificate as "UTKRISHT"/ उत्कृष्ट, 3-StarRating by Capacity Building Commission (CBC). She mentions that all this possible by delivering best training and educational programs under the schools mentioned below:

- Schools of Excellence
- School of Enterprise Development (SED)
- School of Enterprise Management (SEM)
- School of Entrepreneurship & Extension (SEE)
- School of Enterprise Information & Communication (SEIC)

And under each school, they have several centres. Some of them are listed here:

- National Resource Centre for Cluster Development
- Intellectual Property Facilitation Centre
- Livelihood Business Incubator
- Financial Innovation & Research for Sustainable Enterprises
- Digital Branding

Their Core Competencies include Skill Building, Information Dissemination & IT Training, Execution & Extension focusing on Innovation, Incubation, Entrepreneurship, Start-ups,

Consultancy, Counselling, B2B & Conventions, Education Documentation & Publications, Survey Evaluation & Research and so on.

Their achievements (since inception) are that they have trained about 11,019 International Executives from about 145 Developing Countries. This also includes CIRDAP country members and she invites all participants attending the webinar to reach out for future collaborations. She shares that the institute has very strong national and international collaborations too.

Figure 2: Scheme for Fund Regeneration of traditional Industries (SFURTI)

The speaker shares that they are the nodal agency for SFURTI for implementing the scheme. This included planning soft interventions, building their capacity and marketing the goods in the exhibitions, presentation of their products, and adopting all the new technologies related to their packaging and presentation. There are about 27 Clusters to implement the scheme. The SFURTI program has brought tangible benefits to artisans and small producers across India. By organizing them into cohesive clusters, it has helped enhance their productivity, ensured better access to technology and infrastructure, and improved their market linkages. Participants in the program often see increased incomes, reduced exploitation by middlemen, and opportunities for skill development. Most importantly, SFURTI revives traditional crafts and livelihoods, offering dignity and economic stability to thousands engaged in heritage industries.

Prime Minister Employment Generation Program (PMEGP)

Another popular scheme the speaker talks about is Prime Minister's Employment Generation Programme (PMEGP). The Prime Minister's Employment Generation Programme (PMEGP) is a flagship central sector scheme launched by the Government of India by merging two earlier initiatives—PMRY and REGP. It is implemented at the national level by the Khadi and Village Industries Commission (KVIC) under the Ministry of MSME and at the state level by KVIBs, DICs, and banks. PMEGP aims to create self-employment opportunities in both rural and urban areas by supporting the establishment of new micro-enterprises. It brings together traditional artisans and unemployed youth, helping them start businesses close to

home and reduce migration to cities. The scheme also focuses on improving the income and sustainability of these ventures, enhancing wage capacity, and contributing to the overall growth of employment in the country.

PM Vishwakarma, a Central Sector Scheme, was launched on 17th September, 2023 by the Prime Minister to provide end-to-end support to artisans and craftspeople who work with their hands and tools. The Scheme covers artisans and craftspeople engaged in 18 trades viz.,

Benefits

Recognition: Recognition of artisans and craftspeople through PM Vishwakarma certificate and ID card.

Skill Upgradation: Basic Training of 5-7 days and Advanced Training of 15 days or more, with a stipend of Rs. 500 per day.

Toolkit Incentive: A toolkit incentive of upto Rs. 15,000 in the form of e-vouchers at the beginning of Basic Skill Training.

Credit Support: Collateral free 'Enterprise Development Loans' of upto Rs. 3 lakh in two tranches of Rs. 1 lakh and Rs. 2 lakh with tenures of 18 months and 30 months, respectively, at a concessional rate of interest fixed at 5%, with Government of India subvention to the extent of 8%. Beneficiaries who have completed Basic Training will be eligible to avail the first tranche of credit support of uptoRs. 1 lakh. The second loan tranche will be available to beneficiaries who have availed the 1st tranche and maintained a standard loan account and have adopted digital transactions in their business or have undergone Advanced Training.

Incentive for Digital Transaction: An amount of Re. 1 per digital transaction, upto maximum 100 transactions monthly will be credited to the beneficiary's account for each digital pay-out or receipt.

Marketing Support: Marketing support will be provided to the artisans and craftspeople in the form of quality certification, branding, on-boarding on e-commerce platforms such as GeM, advertising, publicity and other marketing activities to improve linkage to value chain.

The scheme will on-board the beneficiaries on Udyam Assist Platform as 'entrepreneurs' in the formal MSME ecosystem. Enrolment of beneficiaries shall be done through Common Service Centres with Aadhaar –based biometric authentication on PM Vishwakarma portal.

Mahila Coir Yojana

Skill Upgradation & Mahila Coir Yojana (MCY) is one of the key schemes under the Scheme Coir Vikas Yojana which provides development of domestic and export markets, skill development and training, empowerment of women, employment/entrepreneurship creation and development, enhanced raw material utilization, trade related services, welfare activities for the coir workers, etc. MCY in particular, aims at women empowerment through the provision of spinning equipment at subsidised rates. This programme is intended to provide self-employment opportunities to rural women artisans in regions processing coconut husk. Over the last two decades, production of coir fibre has substantially increased in India. Conversion of coir fibre into yarn on motorized ratts in rural households provides scope for large scale employment, improvement in productivity and quality of coir fibre, better working conditions and higher income, which ultimately leads to the improvement of standard of living of rural woman artisans. The programme envisages providing of training only to women artisans.

The financial assistance for procurement of machines/equipment may be obtained under PMEGP scheme for setting up of new coir units for which the maximum project cost is uptoRs.25 lakhs.

National Resource Organisation (NRO)

The NRO and NRLM play a strong role in supporting 13 states in preparing Detailed Project Reports (DPRs) and implementing the Start-up Village Entrepreneurship Program (SVEP), Impact Assessment studies and Business Development Service Providers (BDSPs) for the promotion of micro-enterprises. The National Resource Organization (NRO) under ni-msme engages in various activities to support MSMEs, including training and capacity building through skill enhancement programs for entrepreneurs and employees. It also offers research and consultancy services, such as market research, feasibility studies, and business plan development. Cluster development is another key focus area for SRLM projects in which promote Cluster concepts to enable be stakeholders to access available livelihoods interventions.

MUDRA

The speaker mentions that as per the 2013 NSSO survey, India is home to nearly 5.77 crore small and micro enterprises—mostly individual-run or own account ventures—that together provide livelihoods to around 12 crore people. What's striking is that over 60% of these units are owned by individuals from Scheduled Castes, Scheduled Tribes, or Other Backward Classes. These are people who keep the wheels of our informal economy turning, often with very little support. Yet, most of them remain outside the formal banking system, relying either on personal savings or high-interest informal loans to sustain their work. Recognizing this gap, the MUDRA Loan Scheme was launched as a way to offer accessible, low-cost credit to these entrepreneurs—so that lack of capital doesn't become a barrier to their dreams or to inclusive economic growth.

Building Resilient Economies through MSMEs and the SDGs

This insightful webinar by the speaker underscored how strengthening micro, small, and medium enterprises (MSMEs) directly contributes to several Sustainable Development Goals. From creating decent work and boosting incomes (SDG 8), to supporting innovation and sustainable industrialization (SDG 9), MSMEs are vital engines of inclusive growth. The session also reminded us that empowering small entrepreneurs—especially those from marginalised backgrounds—aligns with SDG 10 (Reduced Inequalities) and SDG 1 (No Poverty). Strengthening this sector is not just good economics; it's a step towards a more just and sustainable future.

CIRDAP Knowledge Series: 36

International Crops Research Institute for the Semi-Arid Tropics: Five Decades of Excellence in alleviating poverty in South Asia

December 5, 2024

11:00 am (Bangladesh Time)
10:30 am (India Time)

Click here for registration of the webinar

Speaker

Dr Sreenath Dixit

Principal Scientist and Strategic Advisor, Office of the Director General, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Telangana 502324 India.

CIRDAP

Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

Organized by	Venue: Virtual	Coordinator
CIRDAP	Via Zoom Conference	Ms. Hurain Jannat
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International Crops Research Institute for the Semi-Arid Tropics: Five Decades of Excellence

Dr. Sreenath Dixit
Principal Scientist and Strategic Advisor, ICRISAT

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=6f22pnK1HKc&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=8

SUMMARY

Dr Dixit underscores ICRISAT's pivotal role in advancing dryland agriculture through science-driven, market-oriented, and participatory approaches that directly align with global policy priorities and the Sustainable Development Goals. By conserving genetic diversity, developing climate-resilient crop varieties, and reviving traditional water systems like the Haveli model, ICRISAT strengthens food security, poverty reduction, and climate action. Its emphasis on inclusive innovation- empowering women farmers, promoting biofortification, and integrating digital technologies-supports gender equality, sustainable industrialization, and environmental stewardship.

SDG Linkage: 1,2, 5,9, 13, 17.

Policy Insight: With global outreach across Asia and Africa, and partnerships that foster knowledge-sharing, ICRISAT exemplifies partnerships for translating research into resilient livelihoods, equitable growth, and sustainable ecosystems for dryland communities worldwide.

ICRISAT and Its Outreach

ICRISAT is a pioneering, international scientific agricultural research for development organization specializing in improving dryland farming and agri-food systems—a deep understanding of issues and challenges of the drylands. Drylands constitute a very significant percentage of our global agricultural land; about 44% and approximately 2.7 billion people depend on them, and almost half of the world's livestock is reared on these drylands. The headquarters of ICRISAT are in India, which has sizeable agriculture that depends on drylands. However, it does have a global outreach with its offices in Africa as well.

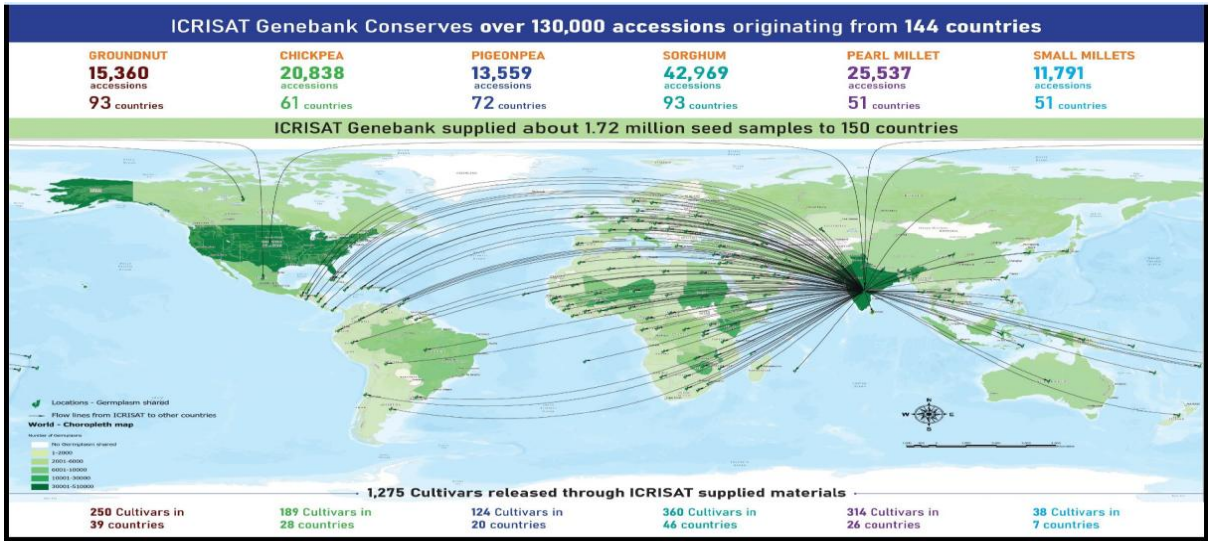

Figure 1: Networking of ICRISAT's gene bank globally

ICRISAT has focused on the most resilient, climate-smart, and nutritious legumes and cereal crops critical to the drylands. The idea is to add a Value web/value chain approach to the crops for better visibility and demand. There is a strong focus on delivery and innovations at scale, too. The organization's vision is to harbor prosperous, food-secure, and resilient dryland tropics, and its mission is to reduce poverty, hunger, malnutrition, and environmental degradation in the dryland tropics.

It was founded in 1972, and its relationship with the government of India began. Dr. M.S. Swaminathan was one of the founding members of ICRISAT, and he believed that it could bring prosperity not only to India but to the world as well. ICRISAT is the only International Agricultural Research Center (IARC) with headquarters in India.

The first gene bank was set up in 1979. ICRISAT focused on designing the earliest crop experiments for dryland cereals and legumes. It initiated village-level studies in India and set up departments on campuses. It focused on the revival of neglected crops, and it collected more than 15000 accessions of groundnuts, more than 20000 accessions of chickpeas, also called Bengal gram, from about 61 countries, arhar or toor from 72 countries, and nearly 430000 accessions of sorghum from Asia and Africa from nearly 100 countries. Nearly 25000 accessions of Pearl millet or Bajra were collected from 51 countries. Just before 2023, the year of millet, ICRISAT collected 12000 accessions of small millet, too.

Dr. Dixit goes on to explain that chickpea is a winter crop, and its yield is higher when temperatures are low. However, ICRISAT identified that certain varieties of chickpeas could be yielded in higher temperatures. Thus, there was cropping and availability of chickpeas in Southern India and in Southeast Asian countries, where they were part of savory dishes.

ICRISAT's research approach

Deliberating upon the systems perspective at ICRISAT, the speaker shares that though they focus on high-yielding varieties that have resistance to different diseases, the focus has always been on the systems. ICRISAT provides what markets need, thus having a Market-oriented focus and using Evidence-based solutions. They have a multi-disciplinary approach, focusing on Environmental and business sustainability models and Participatory approaches. They try to maintain local, regional, and global partnerships across regions to maximize knowledge-sharing.

The speaker then lists out various research specialties such as crop genetics, pre-breeding, breeding and seed systems, genomics, systems biology, and crop informatics. He says that gene editing is allowed in the country, and a lot of possibilities can be harbored. So, the idea is to identify a particular gene in a crop that is responsible for either limiting or enhancing the yield. If there is a possibility to tweak a gene, say for drought resistance, that can actually be a path-breaker. He further adds that ICRISAT works on crop physiology, crop protection and modelling, Socioeconomics, Systems-based natural resource management, Digital innovations and technologies, and Interdisciplinary research. Crop diversification, Crop-livestock integration, and Biofuels are some other fields that ICRISAT focuses on.

Facilities and Services provided by ICRISAT

The speaker further dwells upon the facilities and services provided by ICRSAT. He shares that there is a Centre of Excellence on Climate Change Research for Plant Protection, a Centre of Excellence in Genomics and Systems Biology facility, a Remote Sensing and Geographic Information Systems, Phenotyping Facility, Plant Quarantine Laboratory, Soil Laboratory: FAO accredited, Skills Transfer Business Incubation Services, GenBank, etc.

Mandate Crops

The speaker highlights some of the mandate crops in detail.

Sorghum: 333 varieties released in 46 countries, and the seed production of these varieties: 21,239 t. Striga, midge resistance, drought tolerance, biofortification, hybrids 3-4 t/ha etc.

Pearl Millet: 289 varieties released in 26 countries, and seed shared with farmers, NARES, NGOs 6,612 t, High iron and zinc, dual purpose lines, drought and Striga tolerance.

Groundnut: 230 varieties released in 39 countries, 129,730 t seeds shared, Disease-resistant, drought tolerant, early maturing, high oleic acid varieties, confectionary types.

Chickpea: 185 varieties released in 27 countries, and >276,900 t seed shared, extra early varieties 80-85 days cf160 days, Pan-genome assembled (3,366 genomes sequenced).

Pigeonpea*:* 121 varieties released in 19 countries, and 23,445 t seed shared, super early <100 days to maturity, Fusarium wilt, and sterility mosaic disease resistance.

Finger Millet*:* 29 varieties released in 7 countries, and 453 tons seed shared, average. Yield <2 t/ha of yield potential, pipeline lodging resistance, high protein and good malting.

Small Millets*:* Conserved in the ICRISAT Genebank: Little millet, Foxtail millet, Barnyard millet, Proso millet and Kodo millet, Highlighted during the International Year of Millets 2023.

Oil Seeds*:* Request from our partners to focus also on sunflower, sesame and rapeseed. As part of the drylands cropping system and contributing to edible oils for cooking and food processing.

Reviving Haveli Cultivation: Blending Tradition with Innovation

The Haveli system, a time-tested rainwater harvesting method from central India's Malwa region, offers a beautiful example of how traditional wisdom can guide modern sustainability efforts. The speakers shared that it was originally built during the Chandela dynasty, and this system uses earthen embankments to store surface runoff during the monsoon (kharif) season. Come winter (rabi), the same area transforms into fertile agricultural land. Recent innovations like adding a protective core wall, checking dams with weirs, and lean stone masonry reinforced structures have strengthened the system while keeping costs low. With smart instrumentation to monitor water balance, this revived approach is turning once-fallow lands into productive fields, enhancing both surface and groundwater availability. The result? More resilient farming, crop diversification, and sustainable intensification offer a hopeful path forward for water-stressed regions.

Figure 2: Water reservoirs

Next, the speaker talks about addressing water scarcity in rain-fed ecosystems through NRM interventions. Citing the example of Parasai Sindh watershed, Jhansi in Central India, he says that after they revised the Havelis, the cultivation increased and there was a drastic reduction in dryland areas. So, when this was scaled up, the results showed that significant fallow lands in upstream locations were brought back into productive cultivation, the cropping intensity increased from 120% to 180%, the crop yield increased by 50-150% and the household income nearly tripled. He gives more examples from Lalitpur and Jhansi, where they have been successful in rejuvenating water bodies, leading to an increase in agriculture, better livelihoods, impact on girl child education, and a better quality of life.

Technology abounds

The speaker further throws light on various technologies and innovations. He mentions about Digital Technologies Palntix, Sowing, STARS-One, and ISAT. He also mentions low-cost aflatoxin detection kits, such as lateral flow immunoassay tests for the whole value chain and simple test kits using cELISA, wherein no extensive laboratory facilities are needed. He explains that high-end technologies have led to better water management, pest and disease management, and climate-smart technologies that have led to the Bio-reclamation of degraded lands, Decentralized wastewater treatment systems for safe re-use in agriculture, and microdosing.

Opportunities to join hands with ICRISAT

Inviting collaboration with ICRISAT, the speaker highlights that ICRISAT is open and ready to collaborate. With a lean, responsive structure and a renewed focus on listening to partners, they are actively exploring joint funding and research opportunities. Their global reach has grown through an enhanced communications platform, and they remain flexible to pursue new areas of work. They look forward to building close, impact-driven partnerships because real change happens when all work together.

Significant Contributions

While wrapping up his talk, the speaker highlights that ICRISAT played a major role in celebrating the International Year of Millets in 2023. Various activities were planned and implemented in India and abroad. The focus crops of the International Year of Millets 2023 are the dryland small grains that contribute to food and nutrition security. Also, he talks about Smart Food -including but not limited to ICRISAT's specialty crops, saying that if the food is nutritious and healthy, good for the planet (environmentally sustainable), then it should also be good for the farmer (climate-smart, potential to increase yields, multiple uses).

Addressing the SDGs: ICRISAT's Commitment to Action

ICRISAT's work is deeply aligned with the Sustainable Development Goals, translating global ambitions into grounded action. In their efforts to end poverty (SDG 1), they focus on strengthening dryland farming systems that create stable and dignified livelihoods. Through scientific innovation and farmer-centric approaches, they contribute to zero hunger (SDG 2) by ensuring food security even in the harshest climates, and their programs actively champion gender equality (SDG 5) by equipping women with the tools, resources, and recognition they deserve as agents of change in agriculture. In addressing climate action (SDG 13), ICRISAT promotes climate-resilient crops, sustainable water use, and low-emission farming practices. At the heart of it all lies Partnerships for the Goals (SDG 17) because meaningful impact is only possible when they collaborate across sectors, geographies, and disciplines to shape a more resilient and equitable future.

CIRDAP Knowledge Series: 37

Webinar on CIRDAP's Flagship Publication Rural Development Report 2023

January 27, 2025 (Monday)

12 pm (Bangladesh Time)

Click here to join the meeting
Meeting ID: 961 6475 4931
Passcode: 455787

Honorable Speaker
Prof. Dr. Mohammed Helal Uddin

Executive Vice Chairman, Microcredit Regulatory Authority, Bangladesh

CIRDAP
Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

Organized by	Venue: Virtual	Coordinator
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Assessing the Role of Food and Nutrition Security Policies of the CMCs in Helping the Poor and Attaining the Relevant SDGs

Mohammed Helal Uddin, Ph.D. (Maryland)
Executive Vice Chairman, Microcredit Regulatory Authority,
The Government of the People's Republic of Bangladesh
Professor, Economics, Dhaka University
Former Director (Research)/CIRDAP

CIRDAP Official YouTube Link

https://www.youtube.com/watch?v=CbX8snOzrKU&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=7

SUMMARY

In this deliberation Dr. Helal Uddin underscores how overlapping global shocks- from the COVID-19 pandemic to the Russia-Ukraine conflict - have intensified food insecurity across CIRDAP member countries, exposing deep structural vulnerabilities in rural livelihoods and national food systems. By examining trends in productivity, nutrition outcomes, affordability of healthy diets, and the uneven effectiveness of government interventions, the analysis reveals that current policies often fall short of protecting the poorest, especially small-scale farmers and low-income households. Ultimately, the session calls for a recalibration of food and nutrition security strategies so they not only respond to crises but also build resilient, inclusive systems that ensure no one is left behind on the path to sustainable development.

SDG Linkage: 1, 2, 3, 10, 13

Policy Insights: Achieving food and nutrition security goals requires context-sensitive, equity-driven policies that balance short-term safety nets with long-term investments in sustainable agriculture, market stability, and diversified rural livelihoods.

Introduction

The combined effects of the COVID-19 pandemic and the ongoing Russia-Ukraine war have deepened a troubling crisis across the globe, a sharp rise in food insecurity, especially among the world's poorest populations. Nowhere is this more visible than in the Asia-Pacific region, where vulnerable communities have been hit hardest. Disrupted supply chains, skyrocketing food prices, and restricted access to nutritious food have made daily survival increasingly uncertain for many. For governments and policymakers in the Centre for Multilateral Cooperation (CMC) countries, this has meant grappling with a new urgency: how to mobilize resources and design policies that genuinely reach the rural poor, who are often left behind during such emergencies. These populations, already on the edge, now face mounting economic and nutritional stress, further complicating recovery efforts.

This worsening food crisis is more than just a humanitarian concern; it is a setback for global commitments under the Sustainable Development Goals (SDGs). In particular, SDG 2 (Zero hunger) and SDG 1 (No Poverty) are at risk of being derailed unless timely, inclusive, and well-targeted policy responses are implemented. The webinar and related study aim to take stock of the food and nutrition security policies across CMC member countries, evaluating not just their intent but also their on-ground impact. Are these policies truly helping the rural poor? Are they inclusive, scalable, and responsive enough to address both current shocks and long-term vulnerabilities?

By assessing these policies through a people-centric lens and linking them to the broader SDG framework, the study offers a much-needed reflection on where we are and what needs urgent

correction. It serves as both a mirror and a map, revealing gaps but also pointing the way forward for a more resilient, equitable, and food-secure future.

Objectives

In the wake of global disruptions such as the COVID-19 pandemic and the Russia-Ukraine conflict, food insecurity has intensified, particularly affecting vulnerable populations in the Asia-Pacific region. Recognizing this, the speakers share the details of the study wherein the focus is to evaluate the effectiveness of food and nutrition security policies implemented by the Centre for Multilateral Cooperation (CMCs) in supporting rural poor communities and advancing Sustainable Development Goal 2 (SDG 2: Zero Hunger).

The specific objectives of the study are:

Assess Targeted Interventions for the Poor: The study seeks to identify and analyze interventions designed to assist economically disadvantaged groups within the current global economic landscape. This includes evaluating the impact of these measures on the rural poor in CMC countries and ensuring that policies are responsive to their specific needs.

Link Interventions to SDG 2 Indicators: By mapping existing interventions against SDG 2 indicators—such as the prevalence of undernourishment and food insecurity—the study aims to determine how these policies contribute to achieving targets like ending hunger and ensuring access to nutritious food for all.

Evaluate Progress Towards SDG 2 in CMCs: The research will assess the overall progress of CMC countries in meeting SDG 2 objectives, focusing on improvements in food and nutrition outcomes. This includes examining reductions in malnutrition rates, enhancements in food accessibility, and the sustainability of agricultural practices.

Through this comprehensive analysis, the study aspires to provide actionable insights that can inform policy adjustments, promote equitable food systems, and accelerate progress toward ending hunger and malnutrition in the region.

Linking SDG 2 and Nutrition Outcomes: Understanding the Connection

Food insecurity and hunger, though often used interchangeably, reflect two different realities. Food insecurity describes a household-level struggle when families are uncertain about their ability to access enough food due to economic or social constraints. Hunger, on the other hand, is deeply personal. It is the physical consequence one feels when food is simply not there. This distinction matters because it shapes how we design policies to address both. Governments around the world, including in the Asia-Pacific region, have introduced food and nutrition policies precisely to tackle these issues. These policies do more than fill empty plates—they aim to prevent hunger from happening in the first place. At their core, these efforts tie directly into Sustainable Development Goal 2 (SDG 2): Zero hunger, a global commitment to end hunger and ensure everyone has access to safe, nutritious, and sufficient food by 2030.

SDG 2 is not an isolated goal. It is interconnected with many other goals like poverty reduction (SDG 1), good health and well-being (SDG 3), and climate action (SDG 13). That means policies focusing on food and nutrition do not just impact SDG 2. They ripple outward, creating long-term positive effects across other development goals. To measure progress, the UN has outlined eight specific targets and 13 indicators under SDG 2—these range from reducing stunting in children to promoting sustainable agriculture. In short, food policies are not just about feeding people; they are about building healthier, more resilient societies. When

well-designed, these policies become powerful tools to combat inequality, improve health outcomes, and make sure no one is left behind.

What SDG 2 Really Means for Nutrition and Food Security

When we talk about Sustainable Development Goal 2: Zero hunger, it is not just about making sure people have enough to eat. It's about transforming the way we grow, distribute, and consume food, especially for those who are most at risk. The eight targets under SDG 2 form a roadmap to reshape food systems in ways that promote equity, sustainability, and resilience.

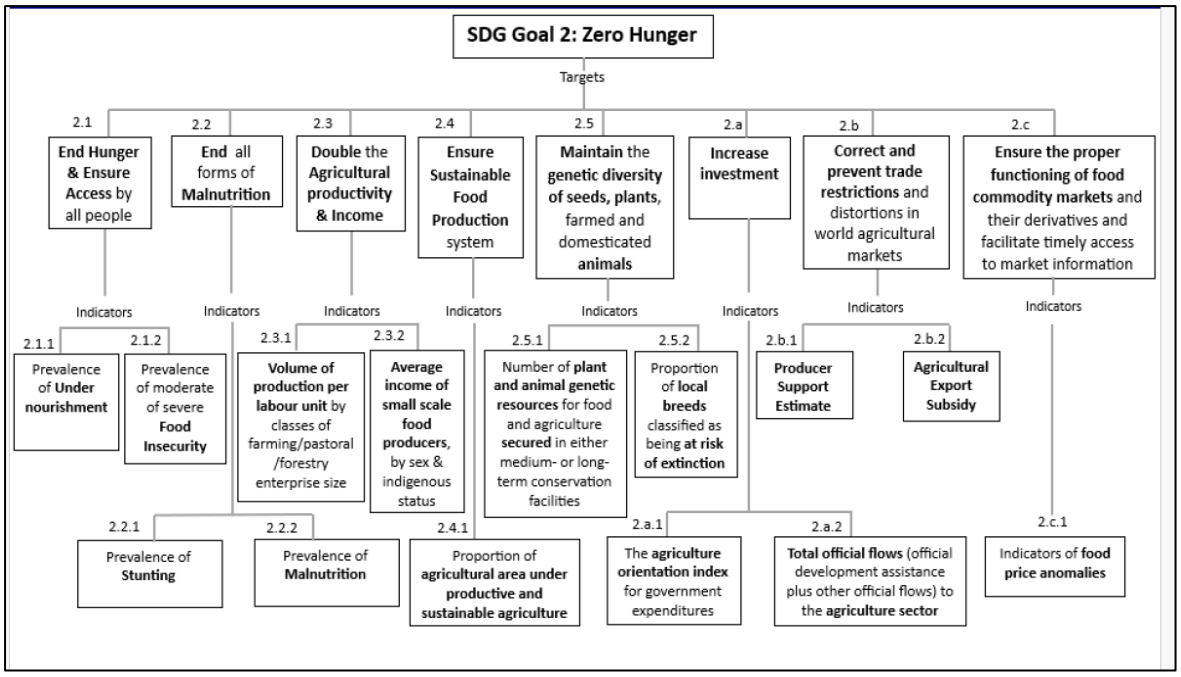

Figure 1: Indicators under SDG 2: Zero Hunger

Target 2.1 focuses on a fundamental human right, ensuring that everyone, especially the poor and vulnerable, has reliable access to safe and nutritious food by 2030. This is the heart of what zero hunger is about.

Target 2.2 goes a step further by aiming to eliminate all forms of malnutrition. That includes tackling undernutrition in children and addressing the hidden hunger of micronutrient deficiencies that often go unnoticed.

Target 2.3 recognizes the people behind our food: small-scale farmers. It calls for doubling their productivity and incomes by 2030, acknowledging that most of the world's food comes from their hard work, yet they often earn the least.

Target 2.4 is about resilience. It emphasizes the need for sustainable agriculture that can withstand climate shocks, resource scarcity, and market fluctuations—because a secure food system is one that lasts.

Target 2.5 reminds us that biodiversity is essential for food security. Protecting the genetic variety of seeds, plants, and animals ensures that future generations can adapt to changing climates and diets.

Then there are the means to make all this happen:

Target 2.a calls for greater investment in rural infrastructure—things like roads, irrigation, and technology—especially in the least developed countries, where agriculture is the backbone of the economy.

Target 2.b aims to reform global trade by removing unfair export subsidies and trade barriers that disadvantage small producers and distort markets.

Target 2.c highlights the need for better food market systems—ones that are transparent, accessible, and timely in sharing crucial information like prices and supply trends.

Together, these targets do not just represent policy goals. They reflect a vision for a world where no one goes hungry, where food systems are fair and sustainable, and where rural communities are empowered, not left behind.

Changes in SDG 2 Targets

The speaker then shares the trends in productivity, as mentioned in the report. He shares that after declining in 2016 and 2017, Sri Lanka saw a significant uptick in 2018 and 2019. However, of the 15 countries, India, Nepal, and the Philippines have the most extended spans of constant growth in their cereal yields. Countries, including Malaysia and Myanmar, experience negative rates of change in cereal yield. These trends may reflect various factors, such as environmental stress, changing land use patterns, or agricultural practices that need attention and adjustment to bolster food production.

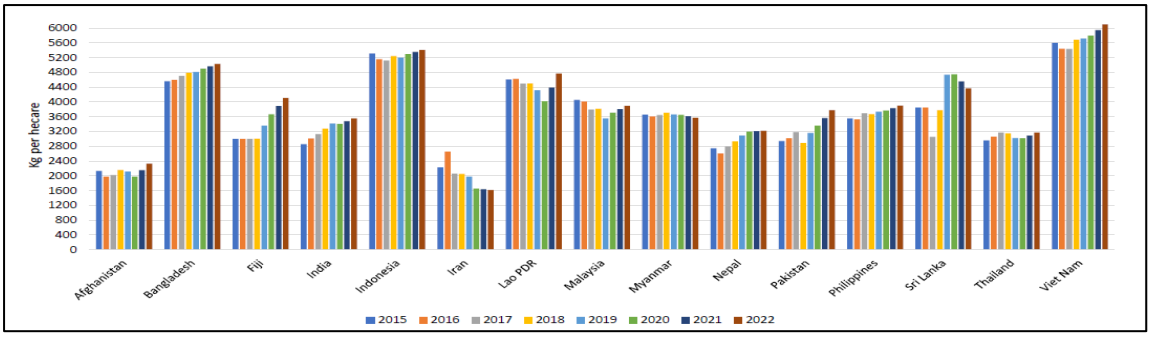

Figure 2: Trends in Productivity for various CMCs

When talking about agricultural land, he discusses that even though agricultural land as a percentage of the total land area seems preserved in a short time, the long-term trend shows the opposite trend for most countries, reflecting a concern for food security in the future. Next, he talks about the Food Production Index and shares that India's food production has continually shown an upward trend, with values steadily growing from 2015 to 2021, demonstrating thriving agricultural activities. A similar pattern is observed for Bangladesh, Nepal, Vietnam, and Pakistan, suggesting a positive agricultural performance. Conversely, Iran, Myanmar, Thailand, and the Philippines saw a declining trend in food production in recent years, presumably reflecting agricultural problems. Talking about Price and Trade distortions, the speakers deliberate that removing such distortions is often difficult for developing countries due to their heavy dependence on import/export duties for collecting government tax revenues. However, trends for food price anomalies and huge variability across countries are seen.

CMCs Progress on Nutrition Outcomes

The speaker shared a mixed picture of how CIRDAP member countries (CMCs) are faring on nutrition. The data shows that most of the countries are showing a drop in the prevalence of

undernourishment, meeting about 70% of their 2022 targets, well ahead of the 54% mark reached by ESCAP countries. It can be inferred from the data available that the progress is uneven across the tangent. For Afghanistan, food insecurity remains worrisome. Though stunting is on a decline overall, still countries like Pakistan, Afghanistan, and India show high rates. Anemia is another challenge that is yet to be overcome. India, Myanmar, and Afghanistan have seen increases, while Pakistan and the Philippines have made headway. In several other countries—such as Iran, Indonesia, and Thailand, anemia among women of reproductive age is on the rise. These patterns suggest that while progress is being made, several countries are still struggling to meet the SDG nutrition goals, especially when it comes to reducing anemia.

Cost and Affordability of a Healthy Diet in CMCs

Talking about the cost and affordability factors of a healthy diet in CMCs, the speaker mentions that to achieve the energy and food-based dietary recommendations (FBDG) for a typical individual within energy balance at 2330 kcal/day, the least costly locally accessible items are considered the cost of a healthy diet. The three reference diets utilized in the cost and affordability analysis are healthy, nutrient-adequate, and energy-sufficient. Whether the falling trend results from a fall in their income, rising prices, or increasing income less than the price hike, their average purchasing power has declined in recent years. Bangladesh started with a healthy diet cost of $2.88 in 2017 and experienced steady increases, with a spectacular 4.47% increase in 2021. India, among the other CMCs, has to bear the minimum cost to afford a healthy diet in 2021 ($3.07 per day), characterized by a moderate, steady cost increase. Even though Nepal showcased steady progress with a 4.95% increase in 2021, its people still had to bear $4.62 per day to afford a healthy diet, the highest among the CMCs. Indonesia and Iran, which already had high costs, saw sharp rises, especially Iran, with a 16% jump in 2021, the highest among CMCs. The Philippines also faced a steady increase, ending in a 6% spike that year. Thailand's costs rose more gradually but consistently. These rising prices have made healthy diets unaffordable for many. Across the board, fewer people can now afford nutritious food. This decline is likely due to the rising cost of healthy diets combined with stagnant or falling incomes among lower-income groups.

Factors behind the fall in affordability

The increase in the cost of a healthy diet has to come mainly from the inflation of food prices driven by the supply-side phenomenon. Afghanistan saw relatively modest inflation, close to 5%, until 2022, when it experienced a significant spike of 13.7%. Bangladesh, India, and the Philippines maintained relatively stable inflation rates over the years, with India and the Philippines experiencing a recent increase in the COVID period. In contrast, Iran has had exceptionally high inflation since 2015, reaching an alarming 45.8% in 2022. Inflation in the Lao PDR increased over the COVID period starting in 2020 and peaked at 23%. The data reveals that Sri Lanka's inflation spiked significantly in 2022, reaching 45.2%, the highest among nations, owing to the country's economic crisis. However, countries like Fiji, Malaysia, and Thailand maintained lower inflation rates, with occasional fluctuations. The high level of inflation drove up the cost of a healthy diet.

Ineffectiveness of Government Policies

While discussing the ineffectiveness of government policies, the speaker mentions that an increase in labor productivity increases producers' earnings. It raises the food supply in the markets, which in turn helps improve households' affordability by lowering costs and thus reducing prices. Despite lower prices, farmers benefit from higher income due to increased production volume. He further questions how small-scale farmers in the bottom-income strata can experience increased productivity and income. Since agricultural profits are still modest,

small farmers are increasingly moving to non-farm employment. Concerns about food security are being raised by the fact that many people are opting to completely stop farming, particularly when important products do not have reliable global markets during emergencies.

Notwithstanding government initiatives and SDG commitments, farm production has only marginally grown. Trade restrictions and tariffs are still in place, often to support government coffers and stabilize domestic food prices. However, international initiatives to lower trade barriers in the agricultural industry are at odds with these actions. Achieving a balance between fair trade and local stability on a global level is extremely challenging.

Towards Food Security in CMCs: A Balanced Policy Approach

Inflation remains a persistent threat to food security across CMCs (CIRDAP Member Countries). Rising prices can hit the poorest the hardest, especially when essential food items become unaffordable. While inflation is a macroeconomic issue, its impact is very real at the household level. That is why governments must treat inflation not just as an economic metric but as a social concern, especially when it compromises access to food. Fiscal support for the vulnerable during inflationary periods is not optional; it is necessary. Another critical challenge is price instability. Volatile food prices, often worsened by cross-border trade disruptions or sudden export bans, as seen when India restricts rice or onion exports, can leave import-dependent CMCs scrambling. To cushion such shocks, there is an urgent need for coordinated regional responses and mid-term policies that promote price stability. Encouraging private players in the supply chain, maintaining low import tariffs on essential goods, or offering input subsidies to small farmers are some viable strategies. However, these need careful balancing; support for farmers should not lead to price hikes for consumers.

Long-term food price stability will depend on productivity—both in agriculture and labor. But productivity gains take time. So, while countries invest in better farming techniques, mechanization, and infrastructure, short-term safety nets like social security programs (SSNs) are crucial. Another concern is the declining interest in agriculture among small producers, often due to poor returns. This trend, if not reversed, could compromise food security. Making farming attractive again—through subsidies, guaranteed procurement, or innovation—is imperative. However, we must also recognize that rural families increasingly depend on non-farm income. Thus, policy must pivot from an “either/or” mindset to a “both/and” approach, supporting both farm and off-farm livelihoods. While SDG 2 rightly emphasizes boosting smallholder productivity and eliminating hunger, its one-size-fits-all approach can be problematic. What works in Bangladesh may not work in the Philippines. India’s ongoing debate on minimum price support is a case in point. Each country needs room to adapt these global targets to local realities. In short, CMCs must pursue a balanced, context-sensitive approach—one that promotes resilience through both productivity and inclusiveness. A holistic vision of food security will require more than agriculture—it will demand empathy, collaboration, and the courage to reshape policy through the eyes of people experiencing poverty.

Linking with SDGs

At the heart of it, food and nutrition policies in the CMCs are about more than just ensuring meals on the table; they are about giving people a fair shot at a healthier, more secure life. These efforts tie directly into SDG 2: Zero Hunger, but they also support goals like ending poverty, improving health, and reducing inequality. The path forward is not one-size-fits-all. What matters is that policies are rooted in local realities and focused on lifting the most vulnerable so that no one is left behind on the road to sustainable development.

CIRDAP Knowledge Series: 38

Why do Organized and Unorganized Marketing Channels Co-exist? A Case of Milk Marketing in Nepal

February 12, 2025 (Wednesday)

11:00 am (Bangladesh Time)
10:30 am (India time)

Click here for zoom link

Honorable Speaker
Binoy Goswami, PhD

Binoy Goswami, PhD
Associate Professor,
Faculty of Economics
South Asian University,
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CIRDAP

Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

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Why do Organized and Unorganized Marketing Channels Co-exist? A Case of Milk Marketing in Nepal

Dr. Binoy Goswami, Maheshwar Giri
Faculty of Economics
South Asian University, New Delhi, India

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=H5oxyJhYnJI&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=6

SUMMARY

In this presentation the speakers talk about Nepal's dairy sector to illustrate why organized and unorganized milk marketing channels continue to coexist, each serving distinct needs shaped by transaction costs, socio-economic conditions, and infrastructural constraints. While organized channels offer quality assurance, structured payments, and institutional support, small-holder farmers often rely on unorganized networks for flexibility, immediate cash flow, and trust-based relationships. Based on the findings of recent research, the speakers highlight that factors such as transportation difficulties, fat-based pricing uncertainties, production fluctuations, education, household size, and access to extension services significantly influence farmers' marketing choices.

SDG Linkage: 1, 2, 8, 9 and 10.

Policy Insights: Enhancing infrastructure, improving pricing transparency, and expanding extension services can support a gradual, equitable shift toward formalization of dairy markets.

Coexistence of Organised and Unorganised Marketing Channels in Nepal

In this particular webinar, the speaker, Dr. Binoy Goswami from South Asian University, New Delhi, deliberates upon the issues and implications related to the coexistence of organized and unorganized marketing channels in Nepal with respect to milk as a product. This particular study is in collaboration with his research scholar, Maheshwar Giri. Organized channels, such as cooperatives and private dairies, provide structured systems for milk collection, processing, and distribution. They often ensure quality control, standardized pricing, and access to broader markets. These channels are instrumental in supporting large-scale production and meeting urban demand. Government initiatives, like per-liter cash incentives for milk sold through cooperatives, aim to bolster these organized systems and encourage farmers to participate.

In this particular study, the speaker tells us about the situation in Nepal. He shares that the dairy sector is a crucial pillar of Nepal's economy, contributing significantly to both agricultural GDP (33%) and national GDP (9%) (MoALD, 2022). Despite a remarkable 6.1% annual growth in milk production over the past decade, domestic production has struggled to keep pace with rising demand, driven by factors like population growth, urbanization, and a growing taste for dairy products in urban areas (MoALD, 2022). He mentions that Nepalese farmers use half of the milk that they produce for self-consumption, and only the remaining half reaches the market for sale. About 66% of marketable milk is sold through unorganized channels, and the remaining 34% passes through organized channels (MoALD, 2022).

Nepal's Dairy Policy 2022

To increase the volume of milk sold through organized channels and boost domestic production, Nepal's Dairy Development Policy 2022 aims to:

- Double per capita milk availability from 79 liters to 158 liters.
- Raise the share of milk sold through organized channels to 60% by 2043 (MoALD, 2022).

In line with the national goal, the provincial and local governments have introduced a per-litre cash transfer scheme for milk sold through organized channels, particularly through farmers' cooperatives. This initiative aims to encourage a shift from unorganized to organized channels based on the belief that organized channels ensure fair prices and ethical practices, attract investment, and enhance overall milk production (MoALD, 2016; National Cattle Research Program, 2019).

However, despite these initiatives, unorganized marketing channels continue to persist alongside organized marketing channels. This raises an intriguing question as to why farmers may prefer unorganized marketing channels over organized channels despite the incentives provided by the government to promote organized marketing channels. It becomes pertinent to examine the pecuniary and non-pecuniary transaction costs associated with organized and unorganized marketing channels and other factors that may influence the choice of marketing channels by the farmers.

The Significance of Unorganized Channels

Despite the advantages of organized channels, unorganized systems comprising local vendors, direct-to-consumer sales, and small-scale processors remain prevalent. These channels offer flexibility in immediate cash payments and cater to local preferences.

For many small-holder farmers, unorganized channels are more accessible and require fewer logistical commitments, making them a practical choice for daily transactions. The speaker then shares the factors that influence the farmers' choices. Farmers' decisions between organized and unorganized channels are influenced by various factors, including:

- *Payment Timeliness:* Unorganized channels often provide immediate payment, whereas organized systems may have delays.
- *Volume Requirements:* Organized channels may demand consistent supply volumes, which can be challenging for small-scale producers.
- *Quality Standards:* Meeting the stringent quality criteria of organized channels can be difficult without proper infrastructure.
- *Trust and Relationships:* Long-standing relationships with local vendors can influence farmers to continue with unorganized channels.

Understanding the Complexities of Milk Marketing Channels

Milk marketing presents unique challenges that set it apart from many other agricultural commodities. Its high perishability demands quick handling and rapid sales. This urgency often leads to higher transaction costs for farmers and vendors alike. Adding to the complexity, the quality of milk varies widely, influenced by factors like the type of cattle, feed quality, and even the region in which it is produced.

These differences make it tough to apply a one-size-fits-all pricing system. In such a setting, trust becomes central, especially in informal or unorganized markets where formal testing and enforcement are minimal.

Objectives of this Study

The speaker then dwells upon the objective of this study, wherein he and his scholar look at the existing duality of organized and un-organized milk marketing channels with respect to milk. However, the specific objectives were to explore the milk marketing channels available for milk-producing farmers in Nepal and to analyze the influence of transaction costs and other factors on farmers' decisions regarding the choice of different milk marketing channels.

Data and Methodology

Primary Data from 102 households was collected through the survey method from the Lalitpur district of Nepal between November 2023 and January 2024. Lalitpur district, covering an area of 396.9 sq. km, shares its northern border with Kathmandu district, home to Nepal's national capital. The Lalitpur district comprises of rural, semi-urban, and urban areas. The sampling technique used was multi-stage sampling wherein, in the first stage, the cattle-rearing regions were divided into two sub-regions: rural and semi-urban. In the second stage, seven localities from the rural region and four localities from the semi-urban region (10% farmers from each region) were selected as respondents.

The study areas in the rural region included Mahankal Gaunpalika (Bukhel, Kaleshwor, Manikhel, and Gotikhel), Konjyosom Gaunpalika (Sankhu), and Bagmati Gaunpalika (Ghusel and Bhainse). The semi-urban regions in Godawari Nagarpalika included Kotdanda, Godawari Nayabato, Godawari Patalechhap, and Jharuwarashi.

Methods

To understand why farmers in Nepal choose between organized and unorganized milk marketing channels, this study paid close attention to something called transaction costs, the extra effort, time, or money involved in making a sale. These costs were grouped into two broad categories: **pecuniary** (direct, monetary) and **non-pecuniary** (non-monetary or intangible).

Collecting data on the pecuniary side, things like transportation expenses or market fees, was relatively straightforward. But the non-pecuniary side was more complex. This includes both measurable factors like distance to market or time spent and more abstract ones such as physical effort, negotiation difficulties, or risks related to spoilage and delayed payments. Since these are subjective and can vary from farmer to farmer, the speaker used a five-point rating scale to assess how much of a problem each of these was perceived to be. The scale ranged from:

1 = Not a problem
2 = A minor problem
3 = A problem
4 = A relatively significant problem
5 = A major problem

Once all responses were collected, a factor analysis was performed on 15 of these intangible non-pecuniary cost variables. This helped reduce the data into key components that captured the most variation across farmers' experiences, essentially identifying which cost-related challenges mattered most.

To determine how these factors actually influenced the choice of marketing channel, the speaker used a Probit regression model. The dependent variable was binary, assigned a value of 1 if a household sold milk through an organized channel and 0 if they used an unorganized one. The model also controlled for other socio-economic characteristics of the households,

allowing us to isolate the impact of transaction costs on marketing decisions. This combination of qualitative insights and quantitative techniques aimed to offer a clearer picture of the real-world choices dairy farmers make, going beyond just price or distance and capturing the subtle trade-offs that shape their daily decisions.

Results of the Study

The speaker then shares the results of the study in relation to both organized markets and unorganised markets. Speaking first of un-organized market channels, he shares that farmers sell their milk directly to buyers such as individual households, local teashops, or sweet shops (no transportation costs incurred). This arrangement relies on mutual trust and informal agreements. The price, quantity, and sales terms are mutually agreed upon without standardized quality measurements, making this system susceptible to practices like adding water to milk. Farmers typically deliver the milk themselves to the buyers, although in some cases, buyers come to the farmers' homes to purchase milk. The payments are made in cash, typically at the end of the month, and prices are influenced by the local market rate for the factory-processed and packaged milk.

Talking about the organized marketing channel, he shares that farmers deliver their milk to collection centres (no transportation costs), where it is weighed, tested, and paid for. During the summer, milk collection occurs twice daily, once in the early morning and again in the evening. In winter, the collection is typically once a day. Only the fat percentage is tested at the collection centres. Prices are based on the fat percentage (minimum price per unit of fat percentages set by the Government: Rs.6.81 per FAT% and Rs.3.60 per SNF%). Payment usually happens every 30 days in cash or deposits in farmers' bank accounts.

Marketing Channels Across Households with Different Size Categories of Daily Milk Production Capacity and herd size

Headings	Size-categories	Organized channel (A)	Unorganized channel (B)	Mixed (Both A & B)	Others	Total
Daily Milk Production Capacity (liters/day)	0 to 10 liters.	52.94	41.18	5.88	-	100
	10 to 20 liters	78.95	15.79	2.63	2.63	100
	20 to 30 liters.	86.67	-	6.67	6.67	100
	More than 30 liters.	93.33	6.67	-	-	100
	Overall	**73.53**	**20.59**	3.92	1.96	100
Herd size (No. of adult milch cattle)	One cattle	10.53	84.21	5.26	-	100
	Two cattle	76.19	14.29	9.52	-	100
	Three cattle	100	-	-	-	100
	More than three cattle	86.49	5.41	2.7	5.41	100
	Overall	73.53	20.59	3.92	1.96	100

Source: Author's calculation using survey data

Figure 1: Results of Marketing Channels in Nepal

The speaker opines that larger producers find institutional networks more efficient for handling larger volumes. In comparison, smaller producers diversify their marketing approaches, mostly relying on formal channels, but a significant share of small producers

engaged in informal channels. The larger herd sizes lead to the choice of institutional intermediaries, while smaller herd sizes prefer direct marketing. The speaker found that price discovery and uncertainty are not a major concern in either channel due to effective information dissemination. He also noted that transportation challenges occurred as a major issue for 45% of organized and 78% of unorganized channels, highlighting the need for logistical improvements.

The fluctuations in Milk Production appeared to be well-managed in organized channels but were a challenge for many in unorganized channels. Moreover, a Fat-Based Pricing System in organized channels occurred as 30% of producers found it problematic. The speaker also found delayed payments and accounting practices were not a major concern in either channel, fluctuations and fat-based payment systems being the ones.

Running regression tests also confirms the same results. The speakers mention the factors influencing the choice of milk marketing channels.

Transportation difficulties in unorganized channels: Positive and significant coefficient → Producers prefer organized channels when transport is challenging.

Fat-percentage-based pricing in organized channels: Negative and significant coefficient → Producers opt for unorganized channels due to pricing uncertainty.

Milk production fluctuations in unorganized channels: Positive and significant coefficient → Producers choose organized channels to manage production variability.

Apart from the transaction cost influencing the choice of people based on the above three factors, socio-economic factors also impact the choices.

Age of household head: Households with elderly heads prefer organized channel

Education of household head: Positive and significant coefficient → Educated households prefer organized channels

Experience in the dairy sector: Positive coefficient but negligible marginal effect → No meaningful impact on channel choice.

Family size: Positive and significant coefficient → Larger families slightly prefer organized channels (2% marginal effect).

Next, the speaker shares that access to Extension Services is also a determining factor and Households with access are 7% more likely to choose organized channels.

Why Do Organized and Unorganized Milk Marketing Channels Co-exist?

Deliberating upon the results achieved through the study carried out in Lalitpur. The speakers discuss further why organized and unorganised milk marketing channels co-exist. He shares that organized channels, such as milk cooperatives and private dairies, offer structure and reliability. They are equipped with chilling plants and storage facilities that reduce the risk of spoilage, a critical asset in the dairy business. These systems also run **s**tandardized quality checks, like fat and solids-not-fat (SNF) tests, to ensure consistency. But for small farmers, these tests can sometimes backfire, leading to deductions that lower their earnings. Despite this, organized channels often empower producers by reducing their reliance on intermediaries, helping them negotiate better prices and avoid the hassle of finding new buyers each day.

On the other hand, even with the rise of organized systems, unorganized milk marketing continues to hold its ground, particularly among small-holders. One key reason is

accessibility. These markets allow farmers to sell small volumes without the pressure of meeting strict quality benchmarks. Instead of lab reports, mutual trust between buyer and seller is the norm, which simplifies things and saves time and money. However, this informal nature also comes with downsides, including concerns around milk quality, such as dilution or adulteration, which erode consumer trust in the long run.

Simply put, each meets a different set of needs. Organized channels are well-suited for producers who seek structure, consistency, and institutional support, especially those with larger herds or access to extension services. Unorganized channels, on the other hand, are ideal for small-holders who prioritize convenience, cash flow, and direct relationships with their customers. Some consumers even prefer buying fresh farm milk directly from known sources, sustaining the demand for informal transactions.

Other Social and Economic Influences

It is not just about infrastructure or prices. Education plays a big role, too. More educated farmers are more likely to opt for organized marketing, perhaps because they better understand quality parameters, fat pricing structures, or how to navigate formal systems. Similarly, larger families, which often produce more milk, lean towards organized channels for their ability to manage bigger volumes. Access to extension services, like training or awareness programs, also makes a big difference. Farmers who receive such support are more informed about incentives, pricing policies, and the benefits of formal networks, making them more inclined to choose the organized route. In sum, farmers in Nepal are making careful, calculated choices based on what suits their production levels, financial needs, and access to infrastructure. The coexistence of both marketing systems reflects the diversity of farming practices, market access, and trust in institutions. This highlights the need for flexible policy approaches that support both systems while nudging towards greater formalization where feasible.

Implications for Policy and Development

Understanding the coexistence of these channels is crucial for policymakers aiming to enhance the dairy sector. Efforts to integrate unorganized channels into more structured systems should consider the socio-economic realities of small-holder farmers. Providing support in terms of infrastructure, training, and financial services can facilitate smoother transitions and improve overall efficiency in the dairy supply chain.

This body of research paints a clear picture: *both organized and unorganized milk marketing channels serve specific needs and reflect different sets of trade-offs*. While organized systems bring consistency, quality control, and financial transparency, unorganized markets offer flexibility, trust, and ease of access, which are particularly valuable for small and marginal farmers. For any meaningful reform in the dairy sector, it is crucial to understand these dynamics and support solutions that bridge the best of both worlds. The story that emerges from this study is one of balance and practicality. Larger dairy producers in Nepal are naturally drawn to organized marketing channels because these systems help them manage bulk sales efficiently and offer greater cost-effectiveness.

On the other hand, smaller producers often stick with unorganized channels, relying on trusted community networks and straightforward transactions that do not involve complex grading or delayed payments. Interestingly, farmers in both systems do not incur direct marketing expenses, showing that the choice is not just about cost. It is about convenience, trust, and suitability. The coexistence of both marketing channels is not a flaw; it is a response to the varied needs of producers. Organized systems bring in structure, better logistics, and a degree

of reliability. Unorganized systems offer flexibility, immediate payments, and a human touch through long-standing buyer-seller relationships.

Finally, factors like education, household size, and access to livestock extension services significantly shape a farmer's ability and willingness to engage with organized channels. Supporting these areas could encourage a gradual and informed shift towards more formal systems without undermining the vital role unorganized networks play in local economies. Addressing the challenges and leveraging the strengths of both organized and unorganized channels can lead to a more resilient and inclusive dairy sector, contributing to Nepal's broader development goals.

Linking to the SDGs: A Pathway to Inclusive and Sustainable Dairy Development

The dynamics of Nepal's milk marketing channels intersect with several SDGs. Firstly, by improving market access and ensuring fair pricing, farmers' incomes can be enhanced and linked to SDG 1 (No Poverty); efficient milk distribution contributes to food security and nutrition, thus connecting to SDG 2 (Zero Hunger), by ensuring fair pricing, reducing post-harvest losses, and encouraging quality production, both organized and unorganized channels contribute to stable livelihoods. Also, strengthening the dairy sector promotes employment and economic development. It connects to SDG 8 (Decent Work and Economic Growth). It also aligns with SDG 9 (Industry, Innovation, and Infrastructure) through the urgent call for investment in rural transport and milk collection systems, which can transform access to markets for remote producers. Lastly, the inclusive approach of recognizing the value of both marketing systems promotes SDG 10 (Reduced Inequalities) by accommodating both large and small producers, ensuring that growth in the dairy sector is not just efficient—but also equitable.

CIRDAP Knowledge Series: 39

'Artificial Intelligence in Improving Farmer's Livelihood'

February 20, 2025 (Thursday)

11:00 am (Bangladesh Time)
10:30 am (India time)

Click here for zoom link

Honorable Speaker
Sachin Hegdekudgi

Chief Executive Officer,
Founder and Director
RootsGoods Private Limited,
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India

CIRDAP

Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

Organized by	Venue: Virtual	Coordinator
CIRDAP	Via Zoom Conference	Ms. Hurain Jannat
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Artificial Intelligence in Improving Farmer's Livelihood

Mr. Sachin Hegdekudgi,
Chief Executive Officer, Founder and Director,
RootsGoods Private Limited, Bengaluru, Karnataka, India.

CIRDAP Official YouTube Link
https://www.youtube.com/watch?v=pda3Fk9_Ecs&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=4

SUMMARY

In this deliberation Mr. Sachin Hegdekudgi, CEO of RootsGoods presents a compelling model of how AI-driven, post-harvest innovation can transform agricultural markets by reducing subjectivity in crop grading, improving price realization, and strengthening farmer–buyer linkages. By offering objective quality assessment, transparent matchmaking, logistics support, and spot payments, the platform addresses long-standing inefficiencies that contribute to high post-harvest losses and income instability. Its collaboration with research institutions, use of bioinformatics and genomics, and integration with FPOs and KVKs demonstrate how technology can be embedded within existing agricultural ecosystems to enhance trust and adoption.

SDG Linkage: 1, 2, 12, 13

Policy Insights: AI has potential to support fair markets, reduce waste, and build climate-resilient value chain which are the key priorities for governments seeking inclusive rural development.

Introduction

This webinar focuses on Root Goods, which is based in Bengaluru, India. It is an interactive multi-disciplinary marketplace for farmers to grade, negotiate, sell, and transport their commodities from farms to wholesale buyers. They have built a platform for quality assessment and management of crops post-harvest, primarily maize. They also provide free services to farmers about weather and soil analysis to strengthen the agricultural community with transparent and necessary information. At the time of the presentation, RootsGoods focused only on maize. They use AI deep-learning algorithms and data sets like bioinformatics, genomics, photographic data, etc., for a quality assessment of maize, mainly at the farm level.

The speaker shares his personal experiences and reasons behind this company. First, he came from South India and lived near Jog Falls, the tallest waterfall in South India. Hence, his affinity towards forests, flora, and fauna is a reason for his inclination to work in this domain. Secondly, after his graduation, he worked with Tata Steel in Jamshedpur, which gave him the experience of working in rural areas, as mega-plants are basically constructed outside cities. There, he learned about challenges in rural areas, especially in reference to the east part of India. His travel to China and Hong Kong was also a reason for selecting maize as the crop in this context.

Tackling a Persistent Problem: Subjectivity in Crop Grading

For many farmers across India, the hardest part of the harvest is not growing the crop; it is selling it at a fair price. One of the key issues they face is the subjective nature of quality assessment during price negotiations. Without standardized grading, farmers are often at the mercy of buyers who undervalue their produce. This lack of transparency not only impacts their income but contributes to a staggering post-harvest loss of nearly 21%, mainly because produce does not move efficiently through the supply chain.

Another challenge mentioned by the speaker relates to the language spoken by the farmers across different states of India. As they have clients from states like Tamil Nadu, Andhra Pradesh, Karnataka, and Telangana, they realized language was an issue.

An AI-Powered Solution for Smarter Selling and Buying

To solve this, a team of researchers and technologists has developed a SAAS (Software as a Service) application that brings fairness, accuracy, and planning into the agri-marketplace. Using Artificial Intelligence and Machine Learning, the mobile app can objectively assess crop quality, giving both farmers and buyers a clear, unbiased picture of what is being sold. This digital tool helps farmers prepare in advance, allowing them to plan sales pipelines more strategically while enabling buyers to procure based on consistent standards.

So, there are three main stakeholders of post-harvest: the farmers, the buyers, and the logistics. The farmers share their location and images of their harvest. The RootsGoods team assesses the weather data, and through multiple sets of bioinformatics data to reinforce the results, they learn about the quality of the harvest. Based on the assessment, a quality certificate is generated and shared with the farmers and the buyers. Based on this, the farmer proposes his selling offer, and the buyer proposes his buying offer. Once it matches, this company picks up the goods from the farm level and transports them to the buyers' warehouse, playing the role of logistics.

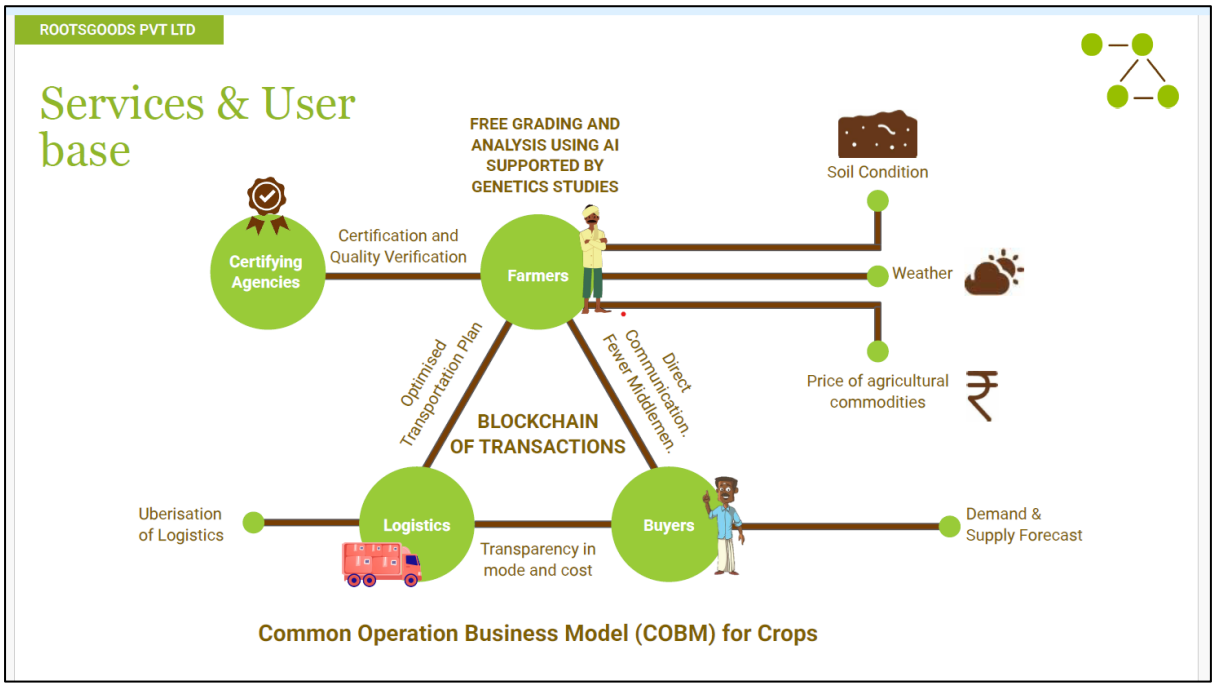


Figure 1: Services and User Base of RootsGoods

What Sets This Solution Apart

One thing that sets them apart is that they pay the farmers on the spot. In the context of trading, this is called Spot Trading. So, to summarise the whole process, first, there are AI-based quality assessment services, followed by matchmaking between the farmers and buyers based on that certificate, then logistics from the farm to the warehouse, and finally, spot payment to the farmers.

Given that they were a new start-up, they were short on capital and human resources and decided to focus on one crop, keeping in view the services that were to be provided.

Unlike many agri-tech interventions that are either too technical or too removed from the realities of rural farming, this application is built by a multi-disciplinary team with expertise spanning agriculture, data science, climate change, and business planning. Their holistic approach ensures that the technology fits into the farmer's context and does not alienate them from the fruits of development.

He cites an example wherein diversity in culture and language among various states from South India was observed in relation to disease occurrence in the fields and the indigenous ways of farmers dealing with them. So, in some places, they would segregate the affected farm area from the rest. In other places, they would burn the disease-affected area, and so on. However, when RootsGoods entered the market, they brought in an objective viewpoint and solution to such problems in alignment with cultures.

Collaborations and Real Impacts

Looking at the challenges that persist across the domain of farmers and buyers, RootsGoods collaborated with the University of Agriculture Sciences, Bangalore, and MANAGE Hyderabad, connecting to universities in Europe where the speaker studied. They ensured that their solution was affordable and data-driven. Moreover, they were able to generate bioinformatics data and genomics data, which could be used to calculate the shelf of corn from the maize.

Initially, they faced hiccups in terms of technology, penetration in the market, and winning the trust of the farmers. But the team overcame these challenges by making their way with the heal of *Krishi Vigyan Kendras* (KVKs)-translating to Agriculture Science Centre- which helped them connect to Framer Producer Organisations (FPOs), thus giving RootsGoods a pivotal point of entry and connecting to the farmers.

Figure 2: Market Strategy of RootsGoods

This led to the rolling-out of their business model, wherein the buyers pay the fee on each transaction made as farmers are less willing and cannot afford to pay for these services. Thus, the three-pronged approach was:

- Reducing the losses
- Increasing the profits
- Monitoring the regulatory requirements of the government

The results speak for themselves. Farmers using the app have seen a significant improvement in market price realization thanks to better visibility into the quality of their produce and access to real-time market data. Post-harvest loss at the farm level has been brought down from 8% to just 2%. On the other side, buyers benefit from improved procurement planning, leading to reduced warehouse losses from 12% to 3% and better price control. In short, both ends of the supply chain win. They have covered about 40000 farmers from Southern India. They are expanding towards Gujarat and Punjab as well.

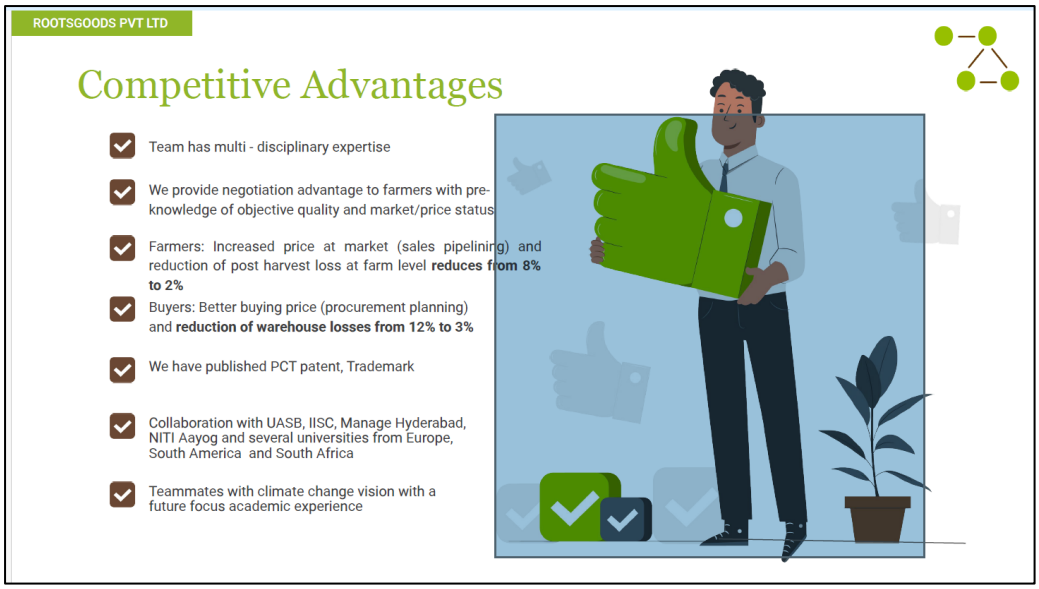


Figure 3: Competitive Advantages of RootsGoods

A Vision for Resilient, Transparent Markets

What makes this innovation especially promising is its future-focused mindset. The team is committed not just to better pricing but to building climate-resilient agri-markets that are sustainable and inclusive. By leveraging AI in a meaningful way, this intervention aligns with broader goals of food security, environmental sustainability, and rural empowerment. It is not just about selling smarter. It is about building a fairer system that supports both people and the planet. The company drew support from NABARD, IITs, and IIMs and also found good coverage in the media, which strengthened its image as a successful start-up. They were able to file for patents in Europe as well as in India. They have trademarked their logo as well. They would now like to consider their options for pre-harvest of maize as well. The company also would like to explore diversifying its work on millets, sorghum, and the like and would like to build a sustainable system.

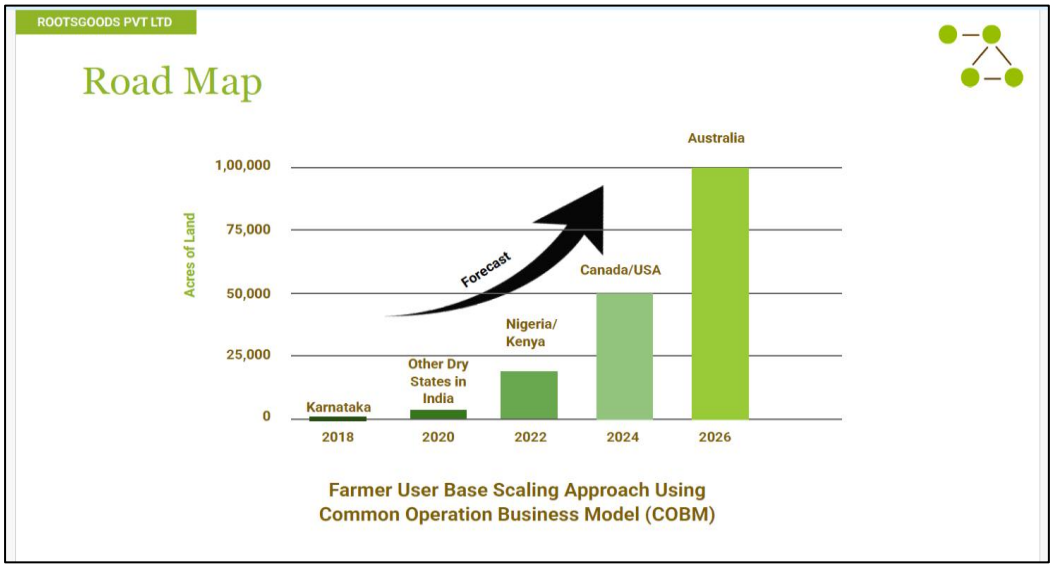
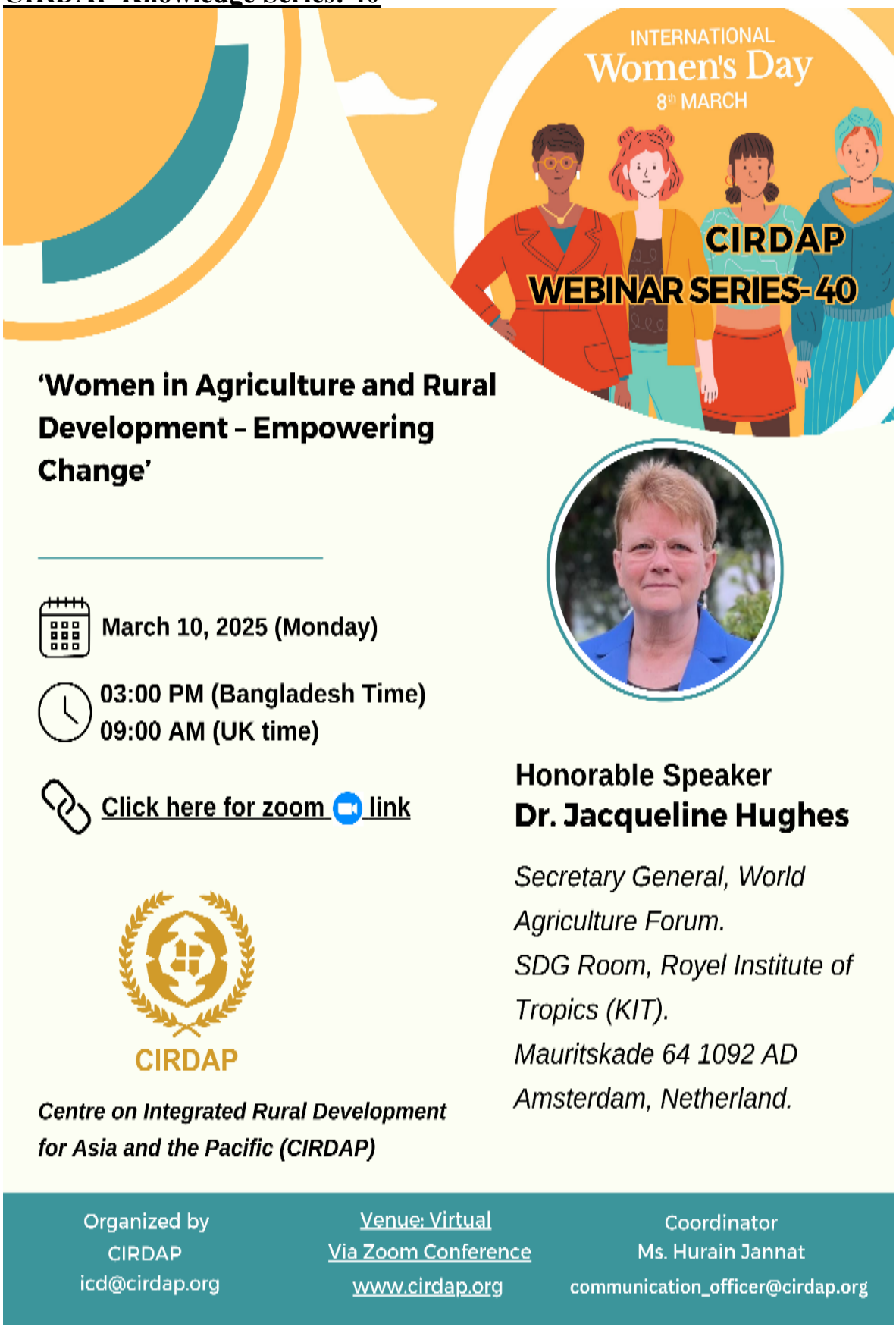


Figure 4: Roadmap of RootsGoods

Empowering Farmers, Advancing the Goals

Based in Bengaluru, this Start-up called RootsGoods is making a big difference in the lives of the maize farmers through its quality assessment certification and by playing the role of a match-maker between the farmers and the buyers. This helps the farmers get on-the-spot payment without any hassle, and the buyers get quality stuff right in their warehouses. Thus, this intervention aligns with SDGs 1 (No Poverty) and 2 (Zero Hunger), which increase income for farming families, help them get a good earning, and decrease waste. Their quality assessment device certification achieves SDG 12 (Responsible Consumption and Production) while also lowering post-harvest loss. Furthermore, RootsGoods is advancing agriculture's resilience and efficiency in support of SDG 13 (Climate Action), illustrating that even small, regional innovations may have a significant impact on the world.

CIRDAP Knowledge Series: 40



Women in Agriculture and Rural Development

Dr. Jacquelin Hughes,
Secretary-General,
World Agriculture Forum SDG Room,
Royal Institute of Tropics (KIT), Netherlands

CIRDAP Official YouTube Link

https://www.youtube.com/watch?v=nf5U4NU-miA&list=PLAcfHOqDrw_Au9DYJnLUaJNjRWFjxhHJe&index=3

SUMMARY

In this presentation Dr. Jacquelin Hughes from World Agriculture Forum underscores that women are indispensable to global agriculture yet remain constrained by systemic inequalities in land rights, resources, education, digital access, and decision-making power. Despite decades of reforms since the Beijing Declaration, gender-responsive laws and investments remain insufficient, leaving women farmers overworked, underpaid, and underrepresented. The speaker highlights six priority policy areas- secure land tenure, climate-resilient agriculture, digital inclusion, girls' education, rural care infrastructure, and women-led climate governance- as essential levers for structural change. Addressing everyday gender biases, discriminatory cultural norms, and unequal religious interpretations is equally critical for transforming women's lived realities.

SDG Linkage: 2,5, 8, 13.

Policy Insights: Closing gender gaps in productivity, wages, and leadership would reduce food insecurity, boost global GDP, and accelerate climate resilience.

Recognising Women's Central Role in Agriculture

This timely webinar, organized in the spirit of International Women's Day, brought together critical reflections on the intersection of gender and agriculture. The speaker, Secretary-General of the World Agriculture Forum, opened with a heartfelt appeal: that while commemorative days come and go, the struggles of women, particularly in rural and agricultural communities, are everyday realities. She noted that despite progress, women across the world, especially in developing countries, continue to face systemic barriers to equality. The agricultural sector, which employs nearly half of all women in some regions, remains deeply gender-imbalanced. Access to land, finance, training, and decision-making power still eludes most women farmers.

Yet, the speaker insisted, women are not simply victims of these systems; they are often the invisible backbone of them. From planting to post-harvest work caregiving to a community organization, their unpaid labor holds much of rural life together. The recognition of their contributions, however, lags far behind. In developing agriculture sustainably and equitably, we cannot ignore the gender lens. Women are central—not supplemental—to the future of food security and rural prosperity. She notes that it will take more than a hundred years to break the shackles of poverty. The speaker drew inspiration from Emmeline Pankhurst, the trailblazing leader of the British suffragette movement, who championed women's right to vote in the late 19th and early 20th centuries.

Her famous words—"*We are here not because we are lawbreakers; we are here in our efforts to become lawmakers*"—resonated powerfully through the webinar. Pankhurst's legacy, the speaker noted, reminds us that structural change often begins with courageous defiance and relentless advocacy. Citing an example from India, the speaker mentions that 74.8% of women in India are agriculture workers but only own 9% of the land in their name. Citing an example

from the South Asian region, she says that women have less than 50% participation in the labor force.

Measuring Progress and Naming the Gaps

While we have indeed come a long way since the Beijing Declaration of 1995, which placed women's rights firmly on the global agenda, the speaker cautioned against complacency. She shared that although over 1500 legal reforms have since been enacted across 193 countries, no single nation has yet achieved full legislative alignment with gender equality goals. Startlingly, not one country has passed all the required laws to guarantee equal rights in marriage, prevent gender-based violence, ensure equal pay, and secure access to sexual and reproductive health. She pointed out that gender equality still feels like a "nice-to-have," not a "must-have" in many policy circles.

Citing an example from Nepal, the speaker mentions that between 2001-2009, women's land ownership increased threefold after tax exemption was incentivized. But she questions whether this should have happened without any incentivization. Worse still, some key indicators under Sustainable Development Goal 5 (SDG 5), which focuses on achieving gender equality and empowering all women and girls, are either stagnating or reversing. She mentions that not investing in education and training for girls amounts to 10 trillion dollars globally. Citing the example of Sub-Saharan Africa, she says that it shoulders the burden of not investing in education and training for girls, amounting to 210 billion dollars, which is more than 10% of the gross domestic product.

If we could close the digital gender divide, especially in low- and middle-income countries, we could save around 500 billion dollars over the next five years. She says that if we have the right policies and investments, equality is within reach. For example, women occupy only 27% of seats in national parliaments and 35% in local governments globally. Child marriage persists, domestic violence remains widespread, and women in agriculture continue to be overworked, underpaid, and underrepresented. The speaker emphasized that if we continue at this pace, gender parity in global policy-making may not be achieved before 2063. This is not a future we should accept.

From Advocacy to Structural Change

With clarity and conviction, the speaker mapped out practical, evidence-based solutions, many of which already exist. She outlined six priority areas where investment could catalyse immediate progress. These included (1) securing land rights and productive resources for women farmers, (2) promoting climate-resilient, agro-ecological systems, (3) bridging the digital gender divide and addressing online abuse, (4) ensuring girls' education and skills for agricultural innovation, (5) investing in care infrastructure like childcare in rural areas, and (6) advancing women-led climate policy and reparative justice for environmental harms. These are not abstract ideas; rather, they are grounded interventions backed by data. She emphasizes that we need gender-responsive financing. This is particularly important for clean energy, where women can also be in leadership positions.

Maintenance of the small-scale clean energy infrastructure or small farms is where women can excel with training. If we can close this gender divide, it will lead to providing equality. We also need to address digital violence, which is often focused on women and young people. Talking about investing in the care economy, the speaker emphasizes that child care is a matter of concern. If good childcare is provided, women may use their time in other productive domains without any worry. She talks about gender-responsive climate policy-making led by women so that focus can be drawn on women's resilience to climate change and the loss of

biodiversity. For example, closing the gender gap in farm productivity and wages could increase global GDP by nearly $1 trillion and lift 45 million people out of food insecurity. The cost of inaction, the speaker warned, is far higher than the cost of investment. She stressed that women do not just need more "adapted" roles—they need equal footing as decision-makers, leaders, and owners in the food and agricultural system. Rural women do not want handouts; they want fair opportunities, systemic recognition, and shared power.

Unpacking Everyday Gender Biases

The speaker shared a compelling reflection on how gender biases, often subtle yet deeply entrenched, shape perceptions, behaviours, and opportunities for women, especially in agriculture. Gender bias, she explained, is not only about overt favouritism toward one gender but also about *gender blindness*—the tendency to ignore gender altogether. Both forms of bias can be equally harmful. She illustrated how even everyday language reinforces inequality. Assertive women are often labelled "bossy," attentive ones are called "nagging", and passionate ones are dismissed as "emotional".

These labels subtly discredit women's intelligence and leadership. Instead, the speaker suggested reframing such traits as "persistent," "passionate," and "opinionated"—because words matter, and they shape unconscious biases. She then presented a thought-provoking thought experiment: imagine a "successful surgeon" and a "compassionate caregiver." Most people, even unconsciously, picture a man as the surgeon and a woman as the caregiver. This mental shortcut, she argued, is a result of years of social conditioning and language that quantifies male success while assigning subjective traits to women.

The speaker emphasized that dismantling these biases starts with recognition. Only then can real change happen, not just in policies but in mindsets. Agriculture, like many sectors, needs more inclusive narratives and equitable opportunities that acknowledge women's full range of capabilities.

Faith, Family, and the Foundations of Gender Inequality

In her talk, the speaker offered a nuanced reflection on how religion, family structures, and culture intertwine to shape gender roles, often to the disadvantage of women. She pointed out that while religion provides meaning and identity to many, its institutional interpretations have largely been shaped by men. This has led to a pattern across most major faiths where women are expected to obey, serve quietly, and often deny themselves agency. These roles are not divinely ordained, she stressed, but socially constructed and reinforced by centuries of male-dominated religious authority. She also contrasted her experiences working in matrilineal and patrilineal societies. In matrilineal communities, such as those in parts of Ghana, Kerala, and Meghalaya, she observed a greater sense of equity and respect for women's voices, even among male leaders. These societies, while not perfect, foster more inclusive understandings of gender and inheritance.

In contrast, patrilineal cultures, which dominate much of the world, including most of India, tend to limit women's roles to caretaking and compliance, often sanctioned by cultural or religious norms. The speaker made it clear that the problem is not religion itself but how it has been interpreted to reinforce hierarchy. To move forward, she urged a collective rethinking—one that retains faith but discards the gender bias embedded within it. For real change, she said, we must allow belief and tradition to evolve with justice, equality, and compassion at their core.

Linking to the SDGs: A Collective Mandate

In conclusion, the speaker firmly anchored her appeal to the Sustainable Development Goals—not just SDG 5 on gender equality, but across the board. SDG 2 (Zero Hunger) cannot be achieved if we do not equip women with the resources and autonomy to farm, feed, and flourish. SDG 13 (Climate Action) demands inclusive, gender-responsive approaches that acknowledge women's role in adapting to and mitigating environmental change. SDG 8 (Decent Work and Economic Growth) will remain unfulfilled unless women's labour—especially in informal and agricultural sectors—is dignified, protected, and remunerated. Achieving these goals requires more than policy alignment—it requires political will, funding, and cultural transformation. The speaker urged everyone—governments, NGOs, UN bodies, and citizens—not to treat gender equality as a peripheral issue but as a central strategy for sustainable development. Women, she affirmed, have always fought for others, now they must also fight for themselves. It is time to ensure women not only vote in systems; they shape them. The call to action was clear: gender equality is not just good for women; it is essential for a better world.

ANNEX 1: Mapping of Sustainable Development Goals and 40 Webinars

SDG	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total
Webinar																		
1	☆	☆	☆	☆				☆		☆		☆						7
2				☆				☆					☆			☆	☆	5
3	☆	☆									☆							3
4	☆		☆	☆	☆			☆										5
5		☆											☆		☆			3
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13	☆	☆				☆					☆					☆		5
14		☆			☆											☆		3
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24											☆		☆				☆	3
25	☆				☆			☆										3
26	☆	☆										☆	☆	☆				5
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28	☆		☆	☆	☆					☆						☆		6
28		☆	☆		☆					☆			☆					5
30	☆	☆									☆	☆			☆			5
31	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	17
32	☆	☆						☆					☆	☆				5
33		☆										☆	☆					3
34											☆		☆				☆	3
35	☆							☆	☆	☆								4
36	☆	☆			☆								☆				☆	5
37		☆																1
38	☆	☆						☆	☆	☆								5
39	☆	☆										☆	☆					4
40		☆			☆			☆					☆					4

ANNEX-2: CIRDAP Knowledge Series (List of the Webinars)

CIRDAP Knowledge Series: 1
Title - Pandemic disease prediction and management: A case of the outbreak of COVID-19 in Thailand.
Speaker - Dr. Nuanchan Singkran, Associate Professor, Faculty of Environment and Resource Studies, Mahidol University, Thailand. September 16, 2021

CIRDAP Knowledge Series: 2
Webinar on Indian Youth Development Index and Global Youth Development Index with particular reference to CIRDAP Member Countries
Speaker - Prof. Vasanthi Rajendran, Rajiv Gandhi National Institute of Youth Development (RGNIYD), India. September 27, 2021

CIRDAP Knowledge Series: 3
Webinar on "Disaster Management in Bangladesh" International Day on Disaster Reduction webinar topic: "
Speaker - Prof Dr. Mehedi Ahmed Ansary, Department of Civil Engineering, BUET. 13 October 2021

CIRDAP Knowledge Series: 4
Webinar on Celebration of International day of Rural Women (15th October)
Keynote Speaker: Mr. Arfe Elahi, a2i, Bangladesh
Speakers:
Ms. Rossukhon Rose Makaramani, Associate Professor, Suan Sunandha Rajabhat University (SSRU), Thailand;
Mr. George C. Babu, Agricultre Specialist, Climate Smart Irrigated Agriculture Project (CSIAP), Ministry of Agriculture, Sri Lanka; and
Ms. RakhI Boruah, Programme Coordinator, the Centre for Disability in Development (CDD), Bangladesh. 17 October 2021

CIRDAP Knowledge Series: 5
Celebrating the World Soil Day**;** webinar on "The innovation solutions to soil for long-term food security and sustainable ecosystem"
Speaker: Dr. Bunjirtluk Jintaridth, expert in Acid Soils, Land Development Division, Thailand 5 December 2021

CIRDAP Knowledge Series: 6
Webinar on "Innovations in Asia: Making Organic Agriculture More Sustainable"
Speaker: Dr. Shaikh Tanveer Hossain, Senior Program Officer, Agriculture Division
Asian Productivity Organization (APO), Tokyo, Japan**.** 13 January, 2022

CIRDAP Knowledge Series: 7
Celebrating the World Oceans Day; Webinar topic "Ocean in a changing world: how we can help"
Speaker: Dr. Suchana Apple Chavanich, Professor, Chulalongkorn University, Reef Biology Research Group, Department of Marine Science, Faculty of Science, Bangkok, Thailand. 8th June, 2022

CIRDAP Knowledge Series: 8
Webinar on the World Rural Development Day: What is it, why does it matter and how to get involved?
Speaker - Dr. Cherdsak Virapat, DG CIRDAP. 6th July, 2022

CIRDAP Knowledge Series: 9
Webinar on the Sustainable Development Goals' research and responses; with focus on *"Carbon sequestration of public parks and urban greening improvements in a megacity"*
Speaker - Associate Prof. Dr. Nuanchan Singkran, Associate Professor, Faculty of Environment and Resource Studies, Mahidol University, Thailand. 7th August, 2022

CIRDAP Knowledge Series: 10
Celebrating the International Day of Rural Women; Webinar title - "SDG 3 Good Health and Wellbeing: The Situation of rural women".
Speaker - Dr. Usharani Boruah, Librarian, CIRDAP. 17 October, 2022

CIRDAP Knowledge Series: 11
Webinar on Climate Smart Water Management in the Context of Pakistan
Speaker - Dr. Manzoor Ahmad Malik, Director (Retired), Freelance Consultant and Master Trainer; Pakistan Council of Research in Water Resources, Pakistan. 2nd November, 2022

CIRDAP Knowledge Series: 12
Celebrating the World soil day; webinar on "The use of Vetiver Grass for Protection of Soil Erosion in Bangladesh".
Speaker – Prof. Dr. Md. Shariful Islam, Professor, Department of Civil Engineering, Bangladesh University of Engineering And Technology (BUET). 5th December, 2022

CIRDAP Knowledge Series: 13
Webinar on "Governance to Good Governance – Need & Role of Social Accountability Tools"
Speaker - Dr. K.Prabhakar, Assistant Professor, Centre for Good Governance & Policy Analysis (CGGPA), National Institute of Rural Development & Panchayati Raj (NIRDPR), MoRD, GoI. 21st December 2022

CIRDAP Knowledge Series: 14
Webinar on "Identifying the Gender-Nutrition intersections in India: Quantitative and Qualitative Evidence"
Speaker - Dr. Ruchira Bhattacharya, Assistant Professor, Head in-Charge, NIRD-PR, New Delhi, India. 27th February, 2023

CIRDAP Knowledge Series: 15
Webinar on the Best Practices of IRD/ Rural Development policies
Speaker - Dr. Muhammad Israr, CIRDAP IRD Expert and Secretary and, Agriculture, livestock, fisheries and Cooperative Department, Government of Khyber Pakhtunkhwa, Pakistan. 28th February, 2023

CIRDAP Knowledge Series: 16
Webinar on the International Women's Day
Speakers - Ms. Hurain Jannat, Communication Officer, CIRDAP; and
Ms. Anju Dhungana, Senior Women Development Officer, Ministry of Federal Affairs & General Administration, Nepal. 8th March, 2023

CIRDAP Knowledge Series: 17
Webinar on the International Day of Forest
Speaker - Dr. Muhammad Israr, CIRDAP IRD Expert and Secretary and, Agriculture, livestock, fisheries and Cooperative Department, Government of Khyber Pakhtunkhwa, Pakistan. 21st March, 2023

CIRDAP Knowledge Series: 18
Celebrating United Nations' World Health Day; Water associated diseases - how to monitor aquatic bodies for ensuring community health?
Speaker - Dr. Grinson George Padinjakara, Principal Scientist (Fisheries Resource Management), Fishery Resources Assessment Economics & Extension Division, ICAR-Central Marine Fisheries Research Institute, Kochi, Kerala, India. 13 April, 2023

CIRDAP Knowledge Series: 19
Webinar on Earth Day
Speaker - Dr. Muhammad Israr, CIRDAP IRD Expert and Secretary and, Agriculture, livestock, fisheries and Cooperative Department, Government of Khyber Pakhtunkhwa, Pakistan. 22nd April, 2023

CIRDAP Knowledge Series: 20
Celebrating the World Ocean Day; webinar on "*Planting mangroves for multiple benefits"*
Speaker - Prof. Wong Poh Poh (Retired). 8th June, 2023

CIRDAP Knowledge Series: 21
Celebrating the World Environment Day; webinar title: Strategic Environmental Assessment and sustainable regional development in Bangladesh'
Speaker - Dr SM Zobaidul Kabir, Deputy Secretary, GOB & Adjunct Research Fellow, The University of Newcastle, Australia. 13 June, 2023

CIRDAP Knowledge Series: 22
Webinar on "Lomani Gau Initiative: Community-based climate change adaptation for Gau"
Speaker - Prof. Joeli Veitayaki (Retired), Former Acting Campus Director, USP Samoa Campus, University of the South Pacific (USP). 27th July, 2023

CIRDAP Knowledge Series: 23
Webinar on Water-Quality based Risk Assessment Framework for Open-access Aquatic Resources using Citizen Science & Satellite Remote Sensing
Speaker: Dr. Grinson George, Senior Program Specialist (Fisheries), SAARC Agriculture Centre (SAC),BARC Complex, Farmgate, Dhaka, Bangladesh. 22 March, 2022

CIRDAP Knowledge Series: 24
Celebrating the International Day for Disaster Risk Reduction
Speaker - Mr. Tinnakorn Tatong, Inspector General, Department of Mineral Resources, Ministry of Natural Resource and Environment (MoNRE), Thailand. 13 October, 2023

CIRDAP Knowledge Series: 25
Celebrating the International Day of Rural Women (October 15)
Speaker - Ms. Saifun Nahar, Deputy Director & Project Director: RWSEEDE, Bangladesh Academy for Rural Development (BARD). 15 October, 2023

CIRDAP Knowledge Series: 26
Celebrating the World Fisheries Day; Webinar title: Sustainable Fisheries and Aquaculture: Impact of Climate Change and Mitigation Measures
Speaker - Dr. Grinson George Padinjakara, Principal Scientist (Fisheries Resource Management), Fishery Resources Assessment Economics & Extension Division, ICAR-Central Marine Fisheries Research Institute, Kochi, Kerala, India. 27 November, 2023

CIRDAP Knowledge Series: 27
Webinar on Sustainable Development Goals 'and Rural Development
Speaker - Ms. Nancy Shackell, Ph.D.
Senior Research Scientist, Ocean Ecology Section Ocean and Ecosystem Sciences Division DFO, Bedford Institute of Oceanography, Dartmouth, Canada. 18 December, 2023

CIRDAP Knowledge Series: 28
Celebrating the International Women's Day
Speaker - Dr. N.V. Madhuri, Head, Centre for Gender Studies and Development (CGSD), National Institute of Rural Development and Panchayati Raj, Rajendranagar, Hyderabad.
7 March, 2024

CIRDAP Knowledge Series: 29
Webinar title: "*Empirical and Qualitative Study of Nutrition Security in India"*
Speaker - Dr. Ruchira Bhattacharya, Assistant Professor, Head in-Charge, NIRD-PR Delhi Branch, New Delhi, India, 4 April, 2024
CIRDAP Knowledge Series: 30
Webinar on the Role of Globally Important Agricultural Heritage Systems (GIHAS) in the Integrated Sustainable Agricultural, Rural and Food Tourism Development.
Speaker - Dr.Ali KianiRad, Associate Professor & Director General (Head), Agricultural Planning, Economic and Rural Development Research Institute (APERDRI) I.R. IRAN
22 April, 2024

CIRDAP Knowledge Series: 31
Webinar on Rural Development in the context of Sustainable Development Goals (SDGs) - SGD and Malaysia Rural Development Policy
Speaker - Ms. Nazlinda binti Zamani, Principal Assistant Secretary, Strategic Planning Division, Ministry of Rural and Regional Development Malaysia
Date – 9th May, 2024

CIRDAP Knowledge Series: 32
Celebrating the World Oceans Day; webinar on "One Ocean, Three Approaches, Five Issues, Seven Solutions
Speaker - Sunil Murlidhar SHASTRI FRSA; Consultant, Educator and Speaker; Ocean and Environmental Governance
10th June, 2024

CIRDAP Knowledge Series: 33
Celebrating the International Day of Awareness of Food Loss and Waste
Speaker - Associate Prof. Dr. Nuanchan Singkran, Associate Professor, Faculty of Environment and Resource Studies, Mahidol University, Thailand.
29 September, 2024

CIRDAP Knowledge Series: 34
Celebrating the International Day for Disaster Risk Reduction
Speaker - Associate Prof. Dr. Nuanchan Singkran, Associate Professor, Faculty of Environment and Resource Studies, Mahidol University, Thailand. 14 October, 2024

CIRDAP Knowledge Series: 35
Webinar on 'Small Enterprises to Strengthen Rural Economy: Challenges & Opportunities'
Speaker: Dr. S. Glory Swarupa, Director General, National Institute for Micro, Small and Medium Enterprises (ni-msme), Ministry of MSME, Government of India**.** November 19, 2024

CIRDAP Knowledge Series: 36
Webinar on "International Crops Research Institute for the Semi-Arid Tropics: Five Decades of Excellence in alleviating poverty in South Asia"
Speaker: Dr. Sreenath Dixit, Principal Scientist and Strategic Advisor
Office of the Director General, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Telangana, India. December 5, 2024

CIRDAP Knowledge Series: 37
Webinar on 'Assessing the Role of Food and Nutrition Security Policies of the CMCs in Helping the Poor and Attaining the Relevant SDGs'
Speaker: Prof. Dr. Mohammed Helal Uddin, Executive Vice Chairman, Microcredit Regulatory Authority, Dhaka, Bangladesh. Jan 27, 2025

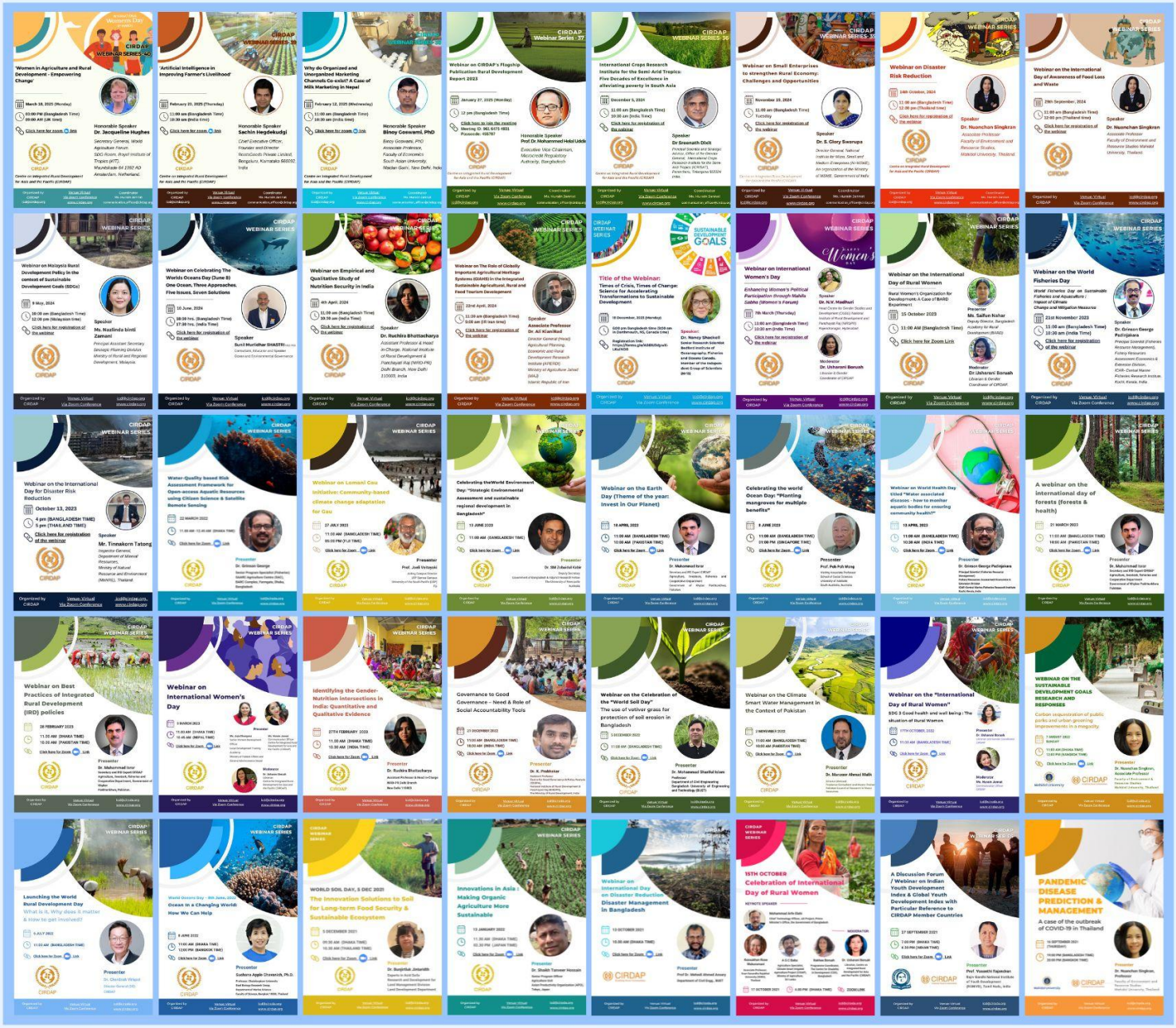
CIRDAP Knowledge Series: 38
Webinar on 'Why do Organized and Unorganized Marketing Channels Co-exist? A Case of Milk Marketing in Nepal'
Speaker: Binoy Goswami, PhD, Associate Professor, Faculty of Economics
South Asian University, Maidan Garhi, New Delhi, India. February 12, 2025 (Wednesday)

CIRDAP Knowledge Series: 39
Webinar on 'Artificial Intelligence in Improving Farmer's Livelihood' based in Bengaluru, Karnataka, India.
Speaker: Mr. Sachin Hegdekudgi, Chief Executive Officer, Founder and Director, RootsGoods Private Limited, Bengaluru, Karnataka, India. 20 February, 2025 (Thursday)

CIRDAP Knowledge Series: 40
Webinar titled "Women in Agriculture and Rural Development – Empowering Change" Honorable Speaker: Dr. Jacquelin Hughes Secretary General, World Agriculture Forum SDG Room, Royal Institute of Tropics (KIT) Mauritskade 64, 1092 AD Amsterdam, Netherlands Monday, March 10, 2025

ANNEX 3: CIRDAP Member Countries (CMCs)

Afghanistan, Bangladesh (Host), Fiji, India, Indonesia, Iran, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam.
Sustainable Development Goals (SDG)



CIRDAP

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978-984-37-0529-7
978-984-37-0529-7