



NEPAL FARMERS ADVISORY
COUNCIL PVT. LTD. (NFAC)



**THE PROCEEDINGS OF NATIONAL CONSULTATIVE WORKSHOP
ON FOOD LOSS AND WASTE MANAGEMENT FOR
PRODUCTIVITY GAINS, FOOD SECURITY, NUTRITION AND
CLIMATE RESILIENT AGRI-FOOD VALUE CHAIN IN NEPAL**

30 APRIL 2024



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National Consultative Workshop on Food Loss and Waste Management for Productivity Gains, Food Security, Nutrition and Climate Resilient Agri-Food Value Chain in Nepal

1. Background:

Nepal is an agriculture-based low-income country, with a GDP per capita of US\$ 1186 in 2023. Considering agriculture as a way of life, Article 51 (p.26) of the Nepal constitution states that the country's policies should have major provisions - such as land consolidation, increasing production and productivity, commercialization, industrialization, diversification and modernization of the agriculture sector. It has contribution of 24.12% in national GDP and engaging about 57.3% of the population (MoALD, 2023). The country comprises diversified geography in which mountain, hilly and terai regions cover 35%, 42% and 23% of lands respectively (MoALD, 2023). It is further reported that only 20.5% land is cultivated agriculture land, 7% land is still uncultivated and 39.6% covers the forest area, another 12% land is covered by grassland and pastures. In recent decade, area coverage by both seasonal and perennial agricultural commodities have been reducing and ultimately contributing to decreasing share in GDP. Although declining as a share in the economy, agriculture continues to play a large role, contributing more than 24.12 % in GDP in 2023. But the service sector is taking pace of increasing trend reaching to 46% contribution on GDP (MoALD, 2023).

On 30 April 2024, a Consultative Workshop on Food Loss and Waste Management for Productivity Gains, Food Security, Nutrition, and Climate Resilient Agri-Food Value Chains in Nepal was jointly organized by the International Food Policy Research Institute (IFPRI) and the Comprehensive Action for Climate Change Initiative (CACCI), in collaboration with the Nepal Farmers' Advisory Council and the Nepal Agriculture Economic Society. The primary objective of this consultation was to examine current policies, strategies, programs, and activities related to food loss and waste in Nepal, with a focus on their impact on productivity, food security, nutrition, and climate resilience within the agri-food value chain. This event aimed to lay the foundation for developing a robust evidence base on food loss in local supply chains and identifying strategic interventions and investments needed to mitigate this issue. By addressing these critical areas, the consultation sought to equip decision-makers with the knowledge required to effectively integrate food systems into national food security, nutrition, and climate action agendas, thereby enhancing the scope and ambition of Nepal's Nationally Determined Contributions (NDCs). The collaborative effort among IFPRI, CACCI, the Nepal Farmers' Advisory Council, and the Nepal Agriculture Economic Society underscores the importance of multi-stakeholder engagement in addressing food loss and waste, ultimately contributing to the creation of more sustainable and resilient food systems in Nepal.

2. Rationale:

Subsistence agriculture and crop-livestock integration are the main characteristics of Nepalese agriculture. Per capita arable land availability (0.082 ha/person) is less than half of the world's average. The small holding hampers commercialization and the realization of economics of scale for small sized farms by constraining farm mechanization.

Growth in agriculture has been slow and volatile, driven by higher relative prices for agricultural commodities and favorable monsoons rather than any productivity growth. According to The World Bank (2010) there are opportunities for growth by developing commercialized and high value agriculture (tea, spices and vegetables), though the sector is adequately tapping into opportunities despite a sizable domestic market for foods. This highlights several activities that could support agribusiness sector growth including:

- (i) Strengthening the production base as a foundation for agribusiness competitiveness,
- (ii) Supporting the scaling up of agribusinesses by facilitating access to finance, strengthening small and medium enterprises (SMEs), enhancing food safety, and implementing sanitary and phytosanitary standards (SPS). And
- (iii) Improving market relationship by supporting value chain linkages and investments in logistics and transport.

The central challenge for rural development in Nepal is to shift from subsistence to a commercial economy. Nepal's agriculture is largely based on low-value cereals and subsistence production, with mere 13 percent of output traded in markets. The current level of productivity of agricultural commodities is low and has considerable scope for increasing productivity and value-added sectors. This problem of low agricultural productivity arises due to fragmented subsistence farming, poor technical knowledge, and lack of irrigation facilities. Erratic weather patterns, pest epidemics, and lack of fertilizers and improved seeds exacerbate the problem.

Food systems and food security are reflected in a limited number of NDCs, yet the issue has the potential to contribute significantly to reducing emissions and strengthening economic and social development. It is estimated that countries lose up to 35% of their food annually at multiple points: in field due to spoilage and pest damage, through inadequate storage facilities, in transit or through non-consumption. Leveraging the opportunity to incorporate food loss and waste into the NDCs and national climate agendas will raise the issue through national policies that contribute to global climate goals, expand the scope and ambition of the NDCs and identify strategies or interventions for reducing food loss, translating in lost investment for food producers, particularly important for small and medium scale producers.

Nepal is highly vulnerable to the impacts of climate change, which has led to substantial food losses across the country. Extreme weather conditions, such as floods, unseasonal rain during the harvest season, high temperatures, wildfires, and prolonged droughts, have disrupted agricultural productivity and food security. Flooding often washes away crops and fertile soil, while unexpected rain during harvest periods can damage or destroy crops ready for collection. High temperatures can stress plants and reduce yields, and wildfires can decimate large areas of farmland. Droughts, on the other hand, lead to water shortages that are crucial for irrigation and crop growth. In addition to these climate-related challenges, Nepal also faces food losses due to natural calamities such as landslides and earthquakes. Landslides can bury fields and disrupt transportation networks, making it difficult to distribute food, while earthquakes can cause widespread destruction of agricultural infrastructure and storage facilities. These combined effects of climate change and natural disasters significantly threaten Nepal's food security, necessitating urgent measures to enhance resilience and adaptive capacities in the agricultural sector

3. Objectives:

The main objective of the workshop:

- i. To discuss the current policies, strategies, programs, and activities related to food loss and waste issues in Nepal.
- ii. To lay out stepping stones to develop the evidence base of food loss in local supply chains, identify strategic interventions, and investments to reduce food loss and waste.
- iii. To help the decision makers to make informed choices regarding the incorporation of food systems into national food security, nutrition, and climate resilient agri-food value chains.

4. Participants:

- Government officials
- Representatives from international organizations
- Experts in food loss and waste management
- Representatives from the private sector
- NGOs and civil society representatives
- Academia
- Media

The list of participants is presented in *annex-2*.

5. Inaugural Session:

The Inaugural Session of the National Consultative Workshop on Food Loss and Waste Management in Nepal was chaired by Dr. Yogendra Kumar Karki, Chairman, Nepal Farmers Advisory Council Pvt. Ltd and President of Nepal Agri-Economist Society. The Chief Guest was Honorable Minister Jwala Kumari Sha, Ministry of Agriculture and Livestock Development (MoALD), and the Special Guests included Dr. Rewati Raman Poudel, Secretary of the Ministry of Agriculture and Livestock Development (MoALD), and Dr. Suresh Chandara Babu from IFPRI. The session commenced with the national anthem, and Chief Guest Honorable Minister Jwala Kumari Sha inaugurated the event. Dr. Yogendra Kumar Karki, a renowned expert in agricultural, trade and marketing, provided insightful perspectives on the importance of addressing food loss and waste management. He emphasized the workshop's objectives, highlighting the critical need for collaborative efforts to achieve productivity gains, enhance food security, and promote nutrition. The session concluded with a call for collective action towards building a more sustainable and resilient agri-food value chain in Nepal. The pictures of inauguration session are highlighted in *annex-5*.

6. Paper Presentation:

| | |
|-------------|---|
| 09:45-10:05 | Introduction to CACCI Initiative: Dr. Suresh Babu, Senior Research Fellow, Head, Capacity Strengthening, IFPRI and Asia-Lead, CACCI |
| 10:05-10:20 | Food Loss and Waste Management: Government Policies and Programs: Dr. Hari Bahadur KC, DG |
| 10:20-10:35 | Role of Private Sector in Reducing Food Loss and Waste Management: Mrs. Mausami Shrestha, Senior Fellow, IIDS, Nepal and Executive |

| | |
|-------------|---|
| | Director, Shreenagar Agritech Industries Ltd. |
| 10:35-10:50 | Research and Innovation on Food Loss and Waste Management for Food System Transformation in Nepal: Dr. Devendra Gauchan, Adjunct Professor (IAAS, TU) and General Secretary, Nepal Agriculture Economic Society |

7. Highlights on Paper Presentation:

The presentation was conducted by four individuals:

Dr. Suresh Babu; Senior Research Fellow, Head, Capacity Strengthening, IFPRI:

The paper presentation by Dr. Suresh Babu outlines the collaborative efforts of CACCI-Asia and the Institute for Integrated Development Studies (IIDS) in Nepal to address food loss and waste as a pathway to climate action. He highlights progress in South Asia, including Nepal, India, and Sri Lanka, as well as initiatives in Central Asia and Southeast Asia. Key areas include workshops on climate change and agricultural transformation, methane assessment studies in Tajikistan, and potential support for climate initiatives in Kyrgyzstan and Uzbekistan. The document emphasizes the significant contribution of food and agriculture to greenhouse gas emissions and the need for multifaceted strategies to reduce food loss and waste, particularly in South Asia. Dr. Suresh concluded with a call for coordinated action involving experts, the private sector, and policy contributions to develop effective climate strategies. The detail of his presentation is given in the *annex-3*.

Dr. Hari Bahadur K.C; DG, Department of Agriculture: Dr. Hari Bahadur KC's presentation highlights significant postharvest losses in Nepal, noting that one-third of global food production is wasted annually. In Nepal, losses are due to water loss, mechanical damage, pest attacks, contamination, and physiological disorders, affecting both quantity and quality. The presentation emphasizes the need for improved postharvest management to enhance food security amid rising fruit and vegetable consumption and climate change impacts. It calls for advancements in handling, storage, transportation, coordinated policy interventions, systematic loss assessments, and strengthened institutional capacities to effectively reduce these losses and improve food safety. The detail of his presentation is given in the *annex-3*.

Ms. Mausami Shrestha; Senior Fellow and Executive Director, IIDS, Nepal and Shreenagar Agritech Industries Ltd.:

The paper presentation by Ms. Mausami Shrestha highlights the significant issue of food loss and waste in Nepal, emphasizing the crucial role of the private sector in mitigating these challenges. She points out that approximately 14% of food is lost due to inefficiencies in production, post-harvest handling, transportation, storage, processing, and packaging, while 17% is wasted at the retail and consumer levels. Companies like Shreenagar Agritech Industries Ltd. are leading efforts through their "4F" approach, incorporating technologies such as maize dryers, cold storage, egg processing plants, and biogas production. The presentation calls for greater collaboration between the private sector, government, NGOs, and other stakeholders, alongside supportive policies, public-private partnerships, awareness campaigns, and sustainable financing to effectively manage food loss and waste and enhance food security. The detail of her presentation is given in the *annex-3*.

Dr. Devendra Gauchan; General Secretary, Nepal Agriculture Economic Society:

Dr. Devendra Gauchan's paper underscores the pressing need to tackle food loss and waste (FLW) in Nepal due to its significant impact on food security, nutrition, and the environment. With an estimated 30-40% of food lost or wasted in the country, Dr. Gauchan emphasizes the importance of research and innovation to mitigate FLW across the supply chain. By investing in technologies and practices to reduce FLW, Nepal can enhance food security, mitigate climate change, and improve agricultural productivity. Dr. Gauchan advocates for integrating FLW reduction strategies into broader food system policies and programs to achieve sustainability and resilience. The detail of his presentation is given in the *annex-3*.

8. Discussions and Remarks:

Participants engaged in a fruitful discussion, sharing insights and experiences related to food loss and waste management. Challenges such as inadequate infrastructure, lack of post-harvest handling facilities, limited market access, and consumer behavior were identified. Opportunities for innovation, technology adoption, and policy reforms were also discussed. The major highlights of discussion are summarized here under:

I. Mr. Pralad Dahal: Chairman, Nepal Dairy Association

In the discussion, he highlighted the following points:

- **Lack of public awareness:** Public awareness is crucial in addressing food loss and waste issues. Schools play a vital role in promoting awareness among students. Assigning responsibilities to different agriculture-related organizations to educate students in schools could be an effective strategy.
- **Neglecting small improvements:** Paying attention to small details is essential for continuous improvement in food loss and waste management efforts.
- **Request for another workshop:** There is a request for organizing another workshop specifically focused on engaging dairy industry stakeholders to further discuss and address food loss and waste management challenges in that sector.

II. Mr. Jagnath Maharjan: Food Processing Industry (Chairman Khajuri)

In the discussion, he highlighted the following points:

- **Cultural aspects of food waste:** One significant point overlooked in the presentation on food waste management is the cultural dimension. In various cultural practices, food wastage is prevalent. For instance, during festivals in Newari culture and Tibetan funeral rites, food is often wasted. Addressing cultural practices related to food waste is essential for comprehensive management strategies.
- **Work on production process:** The production process is hindered by a deficiency in research and innovation. The private sector faces constraints in investing in these areas due to insufficient capital. Additionally, shortages in technology and skilled manpower exacerbate the situation, leading to increased production costs. Consequently, our competitiveness is compromised, impeding our ability to effectively compete with India and China.
For example; the disparity between the biscuit industries in India and China is significant. To address this gap, the government should enact improved policies and provide better facilities to create a conducive working environment.

III. Mr. Ram Prasad Pulami: Vice President, Nepal Agri-Economic Society

- Lack of policies to provide vehicles to the farmers and processors.
- Lack of co-ordination among 3 tiers of government.

IV. Mr. Puroshotam Khatiwada: Horticulturist

In the discussion, he highlighted the following points:

- **Policy frame work:** The absence of public awareness concerning Food Loss and Waste Management underscores the urgent need for a clear definition of these terms. It is apparent that relying solely on policy enactment is insufficient; therefore, the establishment of a structured framework is imperative. This framework must incorporate diverse strategies beyond mere policy implementation to effectively address the multifaceted challenges associated with food loss and waste management.
- Institutional set ups are vital for effective Food Loss and Waste Management contributions. Currently, our institutional framework is weak in this area. Strengthening these setups is crucial to address challenges and drive sustainable solutions.
- Less than 5% of the required investment has been made in this sector, resulting in significant losses.
- Only a negligible number of individuals are involved in the Food Loss and Waste Management sector.
- **Resources:** Our primary need revolves around securing adequate human and financial resources to address our challenges effectively. These resources are crucial for implementing initiatives, driving innovation, and achieving sustainable outcomes.

V. Dr. Biswash Gauchan: ED, IIDS

In the discussion, he highlighted that it was a very informative session. The Food Loss and Waste Management Sector is significantly lacking in policies, which is alarming considering its vital role in ensuring food security and safety. Establishing robust policies in this sector is crucial to effectively address the challenges of food loss and waste, thereby safeguarding the availability of safe and nutritious food for everyone.

VI. Ms. Sarita Tharu: Media

In the discussion, Ms. Sarita Tharu highlighted that engaging in discussions with the media on strategies to raise awareness among the general public is essential. By leveraging media platforms, we can effectively disseminate information and educate people about the importance of issues such as Food Loss and Waste Management. This proactive approach can empower individuals to make informed choices and contribute to sustainable solutions.

VII. Dr. Vinod Shah: FAOR, FAO

In the discussion, Dr. Vinod Shah highlighted that from the perspective of the Food and Agriculture Organization (FAO), addressing food loss requires an integrated approach. This entails considering the viewpoints of consumers, retailers, and producers. Despite this, concrete plans and projects are lacking, particularly at the field and consumer levels. FAO stands ready to support governments in implementing initiatives, emphasizing the importance of collaboration among all stakeholders to achieve meaningful impact.

VIII. Ms. Sharmila Banjade: Section Officer, National Planning Commission, Nepal

In the discussion, Ms. Sharmila Banjade emphasized the following point:

Lack of awareness: There appears to be a breakdown in communication between local and higher level.

9. Closing Remarks:

1. Dr. Suresh Chandra Babu; Senior Research Fellow, Head, Capacity Strengthening, IFPRI

He extended his gratitude to Dr. Yogendra Kumar Karki, Honorable Minister Jwala Kumari Sha, Dr. Biswas Gauchan, and all the esteemed guests for their active engagement and valuable contributions to the workshop. He acknowledged the pivotal role played by each attendee in making the event a success.

Furthermore, he highlighted the workshop's efficacy in providing a platform for robust discussions, knowledge dissemination, and networking opportunities. The participants emphasized the significant benefits derived from the sessions, workshops, and interactions throughout the event.

In expressing their appreciation, the attendees also conveyed their eagerness for more workshops of similar caliber in the future. He recognized the importance of continuous learning, collaboration, and professional development, and expressed a keen interest in participating in future endeavors aimed at furthering these goals.

2. Dr. Ram Krishna Shrestha: Joint Secretary, MoALD

In his closing remarks, Dr. Ram Krishna Shrestha emphasized the importance of identifying loss points within the value chain, particularly focusing on critical loss points in the dairy and livestock chain and addressing the significant data gaps to establish effective reduction mechanisms. He highlighted the urgent need to tackle the high impact of aflatoxin in maize and called for dedicated studies in the Food Loss and Waste Management sector. Dr. Shrestha proposed the implementation of a national framework for addressing food loss and waste, alongside the establishment of a dedicated National Centre of Excellence for research and action. He also stressed the promotion of technology and programs to enhance efficiency, encouraged private sector involvement in food loss reduction efforts, and advocated for increased investment in initiatives targeting food loss and waste reduction. Additionally, Dr. Shrestha recommended adopting an approach in climate finance

that addresses food loss and waste issues and exploring avenues for collaboration and innovation in food loss reduction strategies.

3. Dr. Rewati Raman Poudel: Secretary, MoALD

In his closing remarks, he highlighted the importance of linkage and coordination with the three tiers of government in addressing food loss and waste management. He emphasized that effective collaboration among local, provincial, and federal levels is crucial for achieving productivity gains, enhancing food security, and fostering climate resilience.

To tackle these challenges, he stressed the necessity of robust government support and the organization of provincial-level workshops. These workshops would serve as platforms for sharing best practices, building capacity, and developing integrated strategies to reduce food loss and waste. By doing so, we can improve agricultural productivity, ensure a stable food supply, and mitigate the impacts of climate change. Coordinated efforts across all levels of government are essential for creating sustainable and resilient food systems.

4. Honorable Minister Jwala Kumari Sha: Ministry of Agriculture and Livestock Development (MoALD)

Honorable Minister Jwala Kumari Sha began by expressing her gratitude to all the guests for attending the workshop and thanked the organizing team for bringing the critical topic of **Food Loss and Waste Management for Productivity Gains, Food Security, Nutrition and Climate Resilient Agri-Food Value Chain in Nepal** to the forefront. She noted that this is the first time this topic has been discussed, as previous discussions typically focused on irrigation and low production. Today, however, the focus is on Food Loss and Waste Management.

Honorable Minister emphasized that Nepal, is self-sufficient in the production of eggs, meat, milk, and curd, and we are striving to achieve the same independence in rice production. Despite this, 2 00,000 hectares of land remains uncultivated. Our goal is to utilize this land for cultivation to increase production.

Honorable Minister highlighted that in Newari culture, significant food loss occurs during festivals. Traditional mindsets in Nepal need to evolve towards modern agricultural practices. Addressing climate change is also crucial, as unfavorable air and water temperatures can lead to losses. Even with favorable climates and good production, the lack of proper markets causes food loss. We are not adequately addressing these problems or researching solutions to prevent food loss. If we do not focus on the root causes and find solutions, we may face food shortages in the near future.

To address these issues, Honorable Minister emphasized the need to engage technical experts to research the causes of food loss and develop solutions. There must be proper coordination between federal, provincial, and local governments to enhance food crop production. If produce cannot be sold in the market, we need alternative ways to utilize it. For instance, unsold tomatoes can be processed into tomato sauce

and other products, and unsold milk can be converted into various dairy products such as curd, buttermilk, cheese, butter, ghee, milk candy, and ice cream.

She highlighted Nepal's diverse landscape, including the Himalayas, hills, and plains, which allows for the cultivation of various crops. However, there is a lack of positive thinking among farmers, and unhealthy lifestyles prevail. Different communities have varying dietary habits, such as the oily foods consumed in Madhesh Pradesh, leading to heart diseases. As the Agriculture Minister, She pledged to change this system. She proposed that all food products be lab-tested before reaching the market and emphasized the importance of proper labeling and packaging. Research into organic farming is essential, and the use of chemical pesticides should be eliminated through strict rules and regulations and their effective implementation.

She also discussed the importance of import and export. Nepal produces churpi, coffee, and tea, which should be exported. Maintaining friendly relations with neighboring countries is vital for government-to-government business. Nepal has the potential to produce 14, 00,000 metric tons of urea if sufficient water and electricity can be managed. Focusing on specific crops, she pointed out that Nepal consumes a large quantity of onions, costing billions, and regions like Madhesh Pradesh and Koshi Pradesh are suitable for onion production but there is lack irrigation facilities. As oranges have been declared the national fruit, the focus should be on their cultivation and storage to reduce losses. Around 16,000 farmers are engaged in tea and coffee cultivation, and organizing these areas can boost production.

In conclusion, she remarked that the workshop was highly fruitful and advocated for similar programs in other locations to showcase traditional agricultural equipment. She acknowledged the numerous challenges in the agricultural sector and committed to supporting positive changes. However, she also warned that she would take punitive actions against practices she deemed incorrect.

5. Dr. Bimal Kumar Nirmal: MD, NFAC

Dr. Nirmal talked about why it's important to establish the "Academy of Agriculture Science, Nepal (AAS)." He mentioned how China, India, and Bangladesh have funded similar academies to serve as think tank for the agricultural sector. He also pointed out the potential contribution of NFAC and highlighted the interest of scientists, academics, and agriculturists from the USA, Europe, and Australia who want to join the organization and support Nepal's agricultural development.

The detail of his presentation is given in the *annex-3*.

6. Dr. Yogendra Kumar Karki: Chairman, NFAC

As the workshop came to a close, Dr. Karki wishes to express his heartfelt gratitude to all participants for their active engagement and invaluable contributions. He acknowledged that the discussions on food loss and waste management have underscored the critical need for coordinated efforts across all three tiers of government. Dr. Karki believes that local, provincial, and federal levels must work in unison to achieve the shared goals of productivity gains, food security, and climate resilience. With sustained government support and the strategic approaches deliberated upon, he is confident that substantial progress can be made towards a

sustainable future. He thanks everyone once again for their dedication and commitment, urging all to move forward together with renewed determination and a collective vision.

10. Conclusion:

The National Consultative Workshop on Food Loss and Waste Management brought together a diverse group of stakeholders, including researchers, government officials, industry leaders, and community representatives, to address the critical issue of food loss and waste. The presentations and discussions highlighted the significant impact of food loss and waste on food security, nutrition, and the environment in Nepal.

The workshop underscored the importance of a multifaceted approach to tackling food loss and waste, emphasizing the need for public awareness, robust postharvest management, and strong policy support. The role of research and innovation, public-private partnerships, and sustainable agricultural practices were also highlighted as crucial elements for success. Additionally, addressing cultural aspects of food waste and enhancing market access were recognized as vital components in the comprehensive management strategy.

Participants shared research findings and engaged in a productive dialogue to develop actionable plans for reducing food loss and waste. The workshop concluded with a commitment to collaborative efforts and the implementation of concrete initiatives to tackle this pressing issue. The proposed recommendations provide a roadmap for enhancing food security, improving agricultural productivity, and mitigating climate change impacts.

In conclusion, the workshop marked a significant step towards building a more sustainable and resilient agri-food system in Nepal. The commitment to continued collaboration, innovation, and policy development will be essential in achieving the goals set forth during this workshop. The collective efforts of all stakeholders will be crucial in transforming the challenges of food loss and waste into opportunities for growth, sustainability, and enhanced food security for all.

11. Recommendation:

Based on the detailed presentations and discussions at the National Consultative Workshop on Food Loss and Waste Management, the following recommendations are proposed:

1. Enhance Public Awareness and Education:

- Implement awareness campaigns targeting various demographics, including students, to educate them on the importance of reducing food loss and waste.
- Integrate food loss and waste topics into school curriculums and community outreach programs.

2. Strengthen Postharvest Management:

- Invest in infrastructure improvements for handling, storage, and transportation to reduce postharvest losses.
- Develop and implement training programs for farmers and supply chain stakeholders on best practices in postharvest management.

3. Promote Research and Innovation:

- Encourage research on technologies and practices that can minimize food loss and waste across the supply chain.
- Establish an "Academy of Agriculture Science, Nepal" to serve as a think tank and innovation hub for agricultural advancements.

4. Improve Policy and Regulatory Frameworks:

- Develop clear, comprehensive policies focused on food loss and waste management.
- Establish a National Centre of Excellence for Food Loss and Waste Management to coordinate efforts and drive policy implementation.
- Formulate and enforce regulations to ensure food safety, proper labeling, and organic farming practices.

5. Foster Public-Private Partnerships:

- Facilitate collaboration between the government, private sector, NGOs, and other stakeholders to address food loss and waste.
- Support initiatives like the "4F" approach used by Shreenagar Agritech Industries Ltd. and replicate successful models.

6. Enhance Market Access and Value Chain Efficiency:

- Develop market linkages to ensure that surplus produce can be sold or processed, reducing waste.
- Invest in cold storage facilities, efficient transportation systems, and value addition technologies.

7. Address Cultural Aspects of Food Waste:

- Engage with communities to understand and address cultural practices that contribute to food waste.
- Promote behavioral change through community-led initiatives and educational campaigns.

8. Mobilize Financial and Human Resources:

- Increase investment in food loss and waste management initiatives, ensuring adequate funding and resources are available.
- Strengthen institutional capacities and provide training to build a skilled workforce dedicated to this sector.

9. Promote Sustainable and Climate Resilient/Natural Farming/Carbon Neutral Farming Agricultural Practices:

- Encourage organic farming and reduce reliance on chemical pesticides through strict regulations and support for organic certification.
- Enhance research and development in sustainable and climate resilient agricultural practices to improve productivity and reduce losses.

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10. Leverage Technology and Data:

- Use modern technologies like remote sensing, and big data analytics to monitor and manage food loss and waste.
- Conduct systematic loss assessments to identify critical loss points and develop targeted interventions.

11. Encourage Farmer Participation and Empowerment:

- Involve farmers in the policy-making process to ensure that their needs and challenges are addressed.
- Provide training and support to farmer groups to improve their understanding and implementation of food loss reduction practices.

12. Promote Export and Trade:

- Develop strategies to enhance the export of Nepalese agricultural products such as churpi, coffee, and tea.
- Strengthen trade relations with neighboring countries to facilitate the export and import of agricultural goods.

13. Conduct Dedicated Studies and Workshops:

- Organize additional workshops and studies focused on specific sectors like dairy and livestock to address unique challenges and opportunities.
- Encourage continuous learning and professional development through regular workshops and seminars on food loss and waste management.
- Conduct Provincial Consultative Workshop on Food Loss and Waste Management for Productivity Gains, Food Security, Nutrition and Climate Resilient Agri-Food Value Chain in each Province of Nepal.

By implementing these recommendations, Nepal can significantly reduce food loss and waste, enhance food security, and contribute to a more sustainable and resilient agricultural system.

12. Annexes:

Annex-1: Program Schedule:

Program Schedule of Consultative Workshop

Chief Guest: **Hon. Minister Jwala Kumari Sah, MoALD, Kathmandu**

Chair: **Dr. Yogendra Kumar Karki, Chairman, NFAC, Kathmandu**

MC: **Dr. Narayan Shrestha, NFAC**

Rapporteur: **Priti Thapa/ Dr Dikshya Poudel**

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|-------------|---|
| 09:00-09:30 | Registration and tea/ coffee |
| 09:30-09:45 | Welcome and Objective of National Consultative Workshop Dr. Yogendra Kumar Karki, Chairman NFAC and President of Nepal Agri-economist society. |
| 09:45-10:05 | Introduction to CACCI Initiative: Dr. Suresh Babu, Senior Research Fellow, Head, Capacity Strengthening, IFPRI and Asia-Lead, CACCI |
| 10:05-10:20 | Food Loss and Waste Management: Government Policies and Programs: Dr. Hari Bahadur KC, DG and Dr. Arun Kafle DDG, DoA, Nepal |
| 10:20-10:35 | Role of Private Sector in Reducing Food Loss and Waste Management: Mrs. Mausami Shrestha, Senior Fellow, IIDS, Nepal and Executive Director, Shreenagar Agritech Industries Ltd. |
| 10:35-10:50 | Research and Innovation on Food Loss and Waste Management for Food System Transformation in Nepal: Dr. Devendra Gauchan, Adjunct Professor (IAAS, TU) and General Secretary, Nepal Agriculture Economic Society |
| 10:50-12:30 | Expert's and Policy Maker's Views: Focusing on Issues, Challenges and Pathways (Each 3 minutes) Mr D B Basnet, Chairman, AEC Dr. Biswas Gauchan, ED, IIDS Representative from ADBN,FAO, ADB, IFAD,USAID, and Dairy Sector Mr. Purusottam Khatiwada, Horticulture expert Dr. Vinod shah, FAOR, FAO, Nepal Ram Prasad Pulami, Agri-economist Dr. Hari Bahadur K.C, DG, DoA Dr Ram Krishna Shrestha, Joint Secretary, MoALD |
| | Open Discussion |
| 12:30-13:00 | Closing Remarks by Dr. Suresh Babu, IFPRI Special Guest: Dr Rewati Raman Paudel, Secretary, MoALD Chief Guest: Honorable Minister Jwala Kumari Sah, MoALD Vote of thanks and remarks: Dr. Bimal Kumar Nirmal, NFAC Closing: Dr. Yogendra Kumar Karki, Chairman, NFAC, |
| 13:00-14:00 | Lunch |

Date and Venue: Tuesday, 30 April 2024 at ALICE Restaurant, Pulchowk and Lalitpur, Nepal Ph: 9802322596

Annex-2: Participants:

| SN | Name | Position | Organization |
|-----|------------------------------|---|---|
| 1. | Jwala Kumari Sah | Honorable Minister | Ministry of Agriculture and Livestock Development |
| 2. | Dr. Rewati Raman Poudel | Secretary | Ministry of Agriculture and Livestock Development |
| 3. | Dr. Yogendra Kumar Karki | President | NFAC |
| 4. | Dr. Bimal Kumar Nirmal | MD | NFAC |
| 5. | Dr. Suresh Chandra Babu | Senior Research Fellow, Head, Capacity Strengthening, | IFPRI and Asia-Lead, CACCI |
| 6. | Dr. Ram Krishna Shrestha | Joint Secretary | Ministry of Agriculture and Livestock Development |
| 7. | Dr. Hari Bahadur K.C | DG | Department of Agriculture |
| 8. | Dr. Vinod Shah | FAOR | FAO |
| 9. | Dr. Biswash Gauchan | ED | IIDS |
| 10. | Dr. Devendra Gauchan | General Secretary | Nepal Agriculture Economic Society |
| 11. | Mr. Ram Prasad Pulami | Vice President | Nepal Agriculture Economic Society |
| 12. | Sharmila Banjade | Section Officer | NPC, Nepal |
| 13. | Ms Sunita Nemaphuki | Board Member | AEC |
| 14. | Dr. Nabin Ghimire | Senior Livestock Development Officer | Department of Livestock Services |
| 15. | Ms. Mausami Shrestha | Senior Fellow and Executive Director | IIDS, Nepal and Shreenagar Agritech Industries Ltd. |
| 16. | Dr. Narayan Bahadur Shrestha | Program Director | NFAC |
| 17. | Buddha Lal Shrestha | Finance Director | NFAC |
| 18. | Sagar Karki | Director | NFAC |
| 19. | Mr. Prusottam Khatiwada | Horticulturist | Kathmandu |
| 20. | Mr. Prahlad Dahal | Chairman | Nepal Dairy Association |
| 21. | Ms. Sneha Shrestha | Chairman | FAWN/Sneha's Care, Nepal |
| 22. | Mr. S.K Shrestha | Entrepreneur | Mero Agro Pvt. Ltd, Kathmandu |
| 23. | Mr. Jaganath Maharjan | Entrepreneur | Food Processing Industry |
| 24. | Pawan Shrestha | Chairman | Hamro Kishan T.V |
| 25. | Sarita Tharu | Journalist | Hamro Kishan T.V |
| 26. | Manoj Shrestha | Journalist | Halo Khabar.com |
| 27. | Mahendra Raj Pant | Senior Public Relation Officer | NFAC |
| 28. | Priti Thapa | Research and Development Officer | NFAC |
| 29. | Dr. Prajula Mulmi | Independent Consultant | IFPRI |

| SN | Name | Position | Organization |
|-----|--------------------------|-------------------------------|----------------------------------|
| 30. | Mr. Arbind Chaudhary | Independent Consultant | IFPRI |
| 31. | Mr. Samuel Pun | Director | Back to Nature |
| 32. | Dr. Amar Shah | Director | CRD, Nepal |
| 33. | Mr. Shailesh Kandel | Director | RAW, Journalist |
| 34. | Mr. Charcheet Dhungal | Manager | RAW, Journalist |
| 35. | Mr. Ganesh Shyam Bhattra | Agri-entrepreneur | Morang |
| 36. | Mr. Amit Sharan | Agri-entrepreneur | Kathmandu |
| 37. | Mr. Sanjay Dhimal | Horticulture expert | Nepal Horticulture Society |
| 38. | Dip Prasad Dhamala | Expert | NAD |
| 39. | Mritunjay Jha | Journalist | RAW |
| 40. | Srijana Marasini | Crop Development Officer | Department of Agriculture |
| 41. | Utsav Wagle | Media person | News Agency Nepal |
| 42. | Dilip Thakuri | Media person | Hamro Kishan T.V |
| 43. | Dr.Raj Bahadur Parshai | Livestock Development officer | Department of Livestock Services |
| 44. | Nirajan Joshi | Media person | Sneha's Care, Nepal |
| 45. | Amir Raj Maharjan | Agri-entrepreneur | Mero-Agro |

Annex-3 Workshop Presentation:

1. Dr. Suresh Chandra Babu:

|   | <h3>KEY AREAS OF PRESENTATION</h3> <ul style="list-style-type: none"> Introduction: CACCI-Asia Global Launch CACCI-Asia Progress so far: <ul style="list-style-type: none"> Country level progress (Synergistic Approach between PRCI and CACCI) <ul style="list-style-type: none"> South Asia: Nepal, India, Sri Lanka Central Asia: Tajikistan, Uzbekistan, Kyrgyzstan Southeast Asia: Laos, Thailand, Vietnam, Cambodia, Indonesia Pacific: Fiji Food Loss and waste as a pathway to climate action Concluding Remarks | | | | | | | | | | | |
|---|---|------------------|--|---|-------------------------------------|-------------------|--|--|---|---------------------------|--------------|---|
|  <h3>CACCI-ASIA: GLOBAL LAUNCH AT COP27</h3> | <h3>NEPAL: COLLABORATION WITH THE INSTITUTE FOR INTEGRATED DEVELOPMENT STUDIES (IIDS) NEPAL</h3>   <p>Collaborating with IIDS, a PRCI-Asia Center, on conducting climate change and agriculture transformation workshops with CACCI support</p> | | | | | | | | | | | |
|  <h3>INDIA</h3> <p>Collaboration with Tamil Nadu Agricultural University (TNAU) for a project on 'Methane Reduction And Climate Resiliency In Agriculture in Tamil Nadu', funded by Global Methane Hub, with support from CAACI-Asia</p> | <h3>SRI LANKA: COLLABORATION WITH THE INSTITUTE OF POLICY STUDIES (IPS) SRI LANKA</h3>  <p>Collaborating with IPS, a PRCI-Asia Center, on conducting climate change and agriculture transformation workshops with CACCI support. Also met the NDC coordinator, Ministry of Environment to discuss potential collaboration.</p> <table border="1"> <thead> <tr> <th>Research Studies</th> </tr> </thead> <tbody> <tr> <td>Mapping of the Policy System: partners, institutions, resources, and stakeholders involved in NDC implementation</td> </tr> <tr> <td>Historical Analysis: Pathways to Net Zero</td> </tr> <tr> <td>Political Economy of Climate Change</td> </tr> <tr> <td>Climate Financing</td> </tr> <tr> <td>Integrating Climate Change in Sectoral Plans</td> </tr> <tr> <td>Methane Emission Assessment: Sri Lanka</td> </tr> <tr> <td>Understanding Policy Process for Climate Change</td> </tr> <tr> <td>Climate Smart Agriculture</td> </tr> <tr> <td>IMPACT Model</td> </tr> <tr> <td>Fertilizer policy change analysis: Kaleidoscope model</td> </tr> </tbody> </table> | Research Studies | Mapping of the Policy System: partners, institutions, resources, and stakeholders involved in NDC implementation | Historical Analysis: Pathways to Net Zero | Political Economy of Climate Change | Climate Financing | Integrating Climate Change in Sectoral Plans | Methane Emission Assessment: Sri Lanka | Understanding Policy Process for Climate Change | Climate Smart Agriculture | IMPACT Model | Fertilizer policy change analysis: Kaleidoscope model |
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| Political Economy of Climate Change | | | | | | | | | | | | |
| Climate Financing | | | | | | | | | | | | |
| Integrating Climate Change in Sectoral Plans | | | | | | | | | | | | |
| Methane Emission Assessment: Sri Lanka | | | | | | | | | | | | |
| Understanding Policy Process for Climate Change | | | | | | | | | | | | |
| Climate Smart Agriculture | | | | | | | | | | | | |
| IMPACT Model | | | | | | | | | | | | |
| Fertilizer policy change analysis: Kaleidoscope model | | | | | | | | | | | | |



PHOTO GROUP DISCUSSION WITH FEDERAL GOVERNMENT AMBASSADORS AND AGRICULTURE EXTENSION OFFICIALS, BEIJING, 1-10/10/2022

SOUTHEAST ASIA



PACIFIC

TAJIKISTAN: METHANE ASSESSMENT AND PATHWAY TO GLOBAL METHANE PLEDGE



Meeting with Senator John Kerry at COP27 led to the Tajikistan Methane Assessment study and dialogue around global methane pledge

Tajikistan Pavilion at COP28 followed by Post-COP28 roundtable

CENTRAL ASIA: UZBEKISTAN

- Potential IFPRI support to Ministry of Ecology, Environmental Protection, and Climate Change under CACCI-Asia
- Follow up meeting in Tashkent



CENTRAL ASIA: KYRGYZSTAN

- Developed a workplan which proposes an initial set of activity-based support to the Climate Finance Center (CFC)
- CFC-IFPRI MoU currently being processed



FOOD LOSS AND WASTE PATHWAY TO GHG REDUCTION

- Food and agriculture contribute to GHG emissions – 30 - 35%
- What the various ways agriculture can reduce its foot prints
- How can we operationalize such actions and scale up?
- Crop production based – Rice farming systems and methane reduction
- Livestock production – feed management and manure management - biodigesters
- Food processing and transportation footprints – Energy and transport
- Food loss and waste management has become a serious option to reduce GHG

**FOOD LOSS AND WASTE IN SOUTH ASIA:
STARTING WITH FEED THE FUTURE COUNTRIES**

- Bangladesh And Nepal
- Experts in the field say – not much research exists in measuring FLW
- Some value chains incur more loss than others and give opportunities to quickly address the challenge
- Strategies and interventions need be multifaceted – multipurpose in the same value chain
- Extending the measurement to the GHG emissions has not begun
- This consultation is a starting point

**FOOD LOSS AND WASTE IN SOUTH ASIA:
STARTING WITH FEED THE FUTURE COUNTRIES**

- Nepal – specific realities
- Geographical conditions
- Highly traded commodities within the countries and from outside
- From mountain region to hill regions and from hill region to terai region
- Value chains are developing but still unorganized
- Role of private sector in reducing FLW is crucial

CONCLUDING REMARKS

- Consultations are just a beginning to bring people together to take stock
- Experts and field implementation must be mapped
- Role of private sector must be identified and a strategy needed
- Policy and programmatic contributions are key as we develop next round of NDCs
- Monitoring, tracking and reporting are also important

2. Dr. Hari Bahadur K.C.:

| <p>Food Loss and Waste Management: Government Policies and Programs for Climate Actions</p>  <p>Hari Bahadur K.C., PhD</p> | <p>Background</p> <ul style="list-style-type: none"> • Roughly one-third of the edible parts of food produced for human consumption, gets lost or wasted globally, which is about 1.3 billion ton per year (Gustavasson, et al. 2011). • Globally, around 13 percent of food produced is lost between harvest and retail, while an estimated 17 percent of total global food production is wasted in households, in the food service and in retail all together. • Food losses can be quantitative as measured by decreased weight or volume, or can be qualitative, such as reduced nutrient value and unwanted changes to taste, color, etc. | | | | | | | | | | | | | | | | | | | | | | |
|---|---|----------|--------------------------|---------------------|--------------------------------------|--|-------------------|----------------------------------|------------------------------|--|---------------|---|-------------------------------|---|-----------------------------------|---|--------------------------------|---|-----------------|--|------------------|-----------------------------|---|
| <p>Background</p> <ul style="list-style-type: none"> • Contribution to food and nutrition security: increasing trend of fruit and vegetables consumption • PHL reduction is cheaper than that of production increment • PHL is contributing to lower farm gate prices and higher consumer prices • Need of advancement in PH management in the context of increasing international trades • Increased purchasing capacity and health consciousness • Climate change has shown high impact in food security due to climate induced disaster | <p>Background</p> <ul style="list-style-type: none"> • Primary focus on production and productivity enhancement • Increased area and production of vegetables and fruit (38.4% of fruit and 14.4% of vegetables growing area increased in this decade) • Developing many commercial commodity specific production zones • Postharvest losses: <ul style="list-style-type: none"> • High in commercial and low in subsistence farming in the case of fresh produces • Low in commercial and high in subsistence farming in the case of durable produces : Rural Grain Save Project | | | | | | | | | | | | | | | | | | | | | | |
| <p>Important types of losses</p> <table border="1"> <thead> <tr> <th>Problems</th> <th>Examples</th> </tr> </thead> <tbody> <tr> <td>Water loss (weight loss)</td> <td>Shriveling, wilting</td> </tr> <tr> <td>Water loss (loss of texture quality)</td> <td>Softening, limpness, loss of juiciness or crispiness</td> </tr> <tr> <td>Mechanical damage</td> <td>Bruises, cuts, surface abrasions</td> </tr> <tr> <td>Physical losses due to pests</td> <td>Insect attack, fungal and bacterial diseases</td> </tr> <tr> <td>Contamination</td> <td>Dirt, soil-borne pathogens, pesticide residue</td> </tr> <tr> <td>Physiological disorder (temp)</td> <td>Chilling, freezing and heat injuries, sunburn</td> </tr> <tr> <td>Physiological disorder (nutrient)</td> <td>Ca deficiency (bitter pit), boron (pithiness)</td> </tr> <tr> <td>Physiological disorder (gases)</td> <td>Damage from C₂H₂, low O₂ and high CO₂</td> </tr> <tr> <td>Continuous grow</td> <td>Sprouting, shoot development, elongation</td> </tr> <tr> <td>Nutritional loss</td> <td>Stored carbohydrates, Vit C</td> </tr> </tbody> </table> | Problems | Examples | Water loss (weight loss) | Shriveling, wilting | Water loss (loss of texture quality) | Softening, limpness, loss of juiciness or crispiness | Mechanical damage | Bruises, cuts, surface abrasions | Physical losses due to pests | Insect attack, fungal and bacterial diseases | Contamination | Dirt, soil-borne pathogens, pesticide residue | Physiological disorder (temp) | Chilling, freezing and heat injuries, sunburn | Physiological disorder (nutrient) | Ca deficiency (bitter pit), boron (pithiness) | Physiological disorder (gases) | Damage from C ₂ H ₂ , low O ₂ and high CO ₂ | Continuous grow | Sprouting, shoot development, elongation | Nutritional loss | Stored carbohydrates, Vit C | <p>Situation of postharvest losses</p> <ul style="list-style-type: none"> • FAO reported > 50% food losses South and South-East Asia • 25% vegetables, 20% fruits and 32% for potatoes (including tuber seed) on weight basis (MHD, 1991) • 15-30% physical losses of fresh produce (Warner and Shrestha, 1992). • 25-30% postharvest losses (Shrestha, 1995) • UNCDF estimated 25% PH losses of fresh produce (Shakya, 1995) • 12-35% postharvest losses of fruits and vegetables based on crop yields (Warner and Kaini, 1997) • 25 to 50% loss (Gurung, 1998) |
| Problems | Examples | | | | | | | | | | | | | | | | | | | | | | |
| Water loss (weight loss) | Shriveling, wilting | | | | | | | | | | | | | | | | | | | | | | |
| Water loss (loss of texture quality) | Softening, limpness, loss of juiciness or crispiness | | | | | | | | | | | | | | | | | | | | | | |
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| Continuous grow | Sprouting, shoot development, elongation | | | | | | | | | | | | | | | | | | | | | | |
| Nutritional loss | Stored carbohydrates, Vit C | | | | | | | | | | | | | | | | | | | | | | |

Situation of postharvest losses

- 20-35% fruits, 15-30% vegetables and 15-20% for potatoes (Kaini, 2000)
- 20-30% loss of perishable fruit and vegetables and as high as 50% (Karki, 2002; Adhikari, 2010)
- 20-50% postharvest loss (Bhattarai, 2005; Gautam and Bhattarai, 2006)
- 20-30% postharvest loss of perishable commodities like fruit and vegetables (PHMD, 2007)
- 15-35% of fresh produce (Gautam *et al.*, 2019)

Postharvest loss situation in SA countries:

A case of citrus species

Bhutan : 20-25% India: 28%
 Pakistan: 20% Sri Lanka: 30%
 Ladaniya, 2015
 Nepal: 15-20% (Adhikari, 2010)

5-7% losses in farmers to retailers in tomatoes reported

Postharvest handling situation

Harvest time and methods:

- Convenient time : labor availability and marketing system
- No use of specific harvesting tools
- Shaking trees is common practice
- Maturity indices not cared : demand and load sufficiency

Field handling:

- Heaped -
- No specific type of containers
- field sorting and precooling not in practice
- Root crops cleaned at producer level less caring food safety

Wholesaler level:

- Wholesalers stationed in big cities
- Imported fruits are stored
- Use of cold store is negligible except potato and apple

Collection centres/assembler level:

- Bulking of fresh produce are common
- Increasing use of semi/rigid structures for delicate produce
- Increasing trend in apple, mandarin and mango

Postharvest handling situation

Transportation:

- Produce to collection points (carrying stuffs in backpack in hills) and pick-up van, rikshaw and three-wheelers in plains)
- collection points - wholesale markets: general trucks and vans
- Wholesaler - retailers: rikshaw and pickup van
- Carrying of mix-load and tightly kept trucks
- Long distance transportation during night.
- **Cold chain:lacking**

Retailer level:

- Retailing by vendors to superstores
- More cautious on physical and low in physiological losses
- Cleaning, grading, sorting, and trimming is mostly practiced
- Virtually no existence of cold chain
- Loose selling is the most common practice

Storage grain loss

- Rodents and insects caused the major portion of the storage grain losses.
- Use of improved/modern storage structures, maintaining storage hygiene, proper drying and storage pest management are the possible management options for the reduction of losses.
- The storage system is still mostly traditional. However, the use of metal bins and hermetic bags is increasing in the place of traditional containers.
- The later results show the extent of losses of food grains in storage is gradually in decreasing trend. It was around 15-20% in 70's which is decreased to 7-10% in 80's and 90's (1981-2003) and now around 2-2.5% (PHLMD, 2004-2005).
- Though many botanicals are in practice and tested, bojho (sweet flag) is proved to have effective control over storage pests of rice.

Food loss (DFTQC)

- Sixteen different restaurants were surveyed in highways at Dhading and Chitwan
- It was found that wastage from plate accounted at the range of 4 to 22% of rice, dal, vegetables and preparation loss of raw vegetables for cooking.

Range of losses from plate were as follows

Rice - 7 to 12%

Dal - 4 to 8%

Vegetable - 10 to 15%

Preparation loss - 12 to 22%

- Losses were found lower compared to other countries which accounts upto 30- 35%.
- The positive aspect was that the wasted food were mostly given to pig.

Policy interventions

- Agriculture commercialization the main thrust in:
 - National Agriculture Policy 2004,
 - Agriculture Commercialization Promotion Policy 2006,
 - Agricultural Perspective Plan (1995-2015)
- "Promotion of improved grading, packaging and collection centres" - ADS 2015-2035 under vegetable value chain
- Food Safety Policy 2076
- The Right to Food and Food Sovereignty Act, 2075 (2018)
- Food Safety Act

PHL related institutions (DoA)

- Established Department of Agriculture in 2008 BS (1951) introduction of improved seed and breeds
- Rural Save Grain Project (RSGP) started in 1980 as a TCP of FAO
- Project upgraded as programme in 1982 and launched till 1994 (FAO, 2011).
- Postharvest Loss Reduction Division (PHLRD) under the Plant Protection Division of the Department of Agriculture was in 1992 (PHLRD, 2003).
- The division was upgraded into 'Postharvest Management Directorate' in 2003 (PHMD, 2068 BS)
- Now One Section (Agri-engineering and Post harvest Management under DoA)
- Separate ENGG Centre and Post Harvest section in Commodity centres are proposed.

Historical background ...NARC

- Nepal Agricultural Research Council (NARC) was established in 1990
- The Horticulture Research Division became only functional in 1993
- Food Research initiated from 1994
- Food Research Unit (FRU) only got formal identity in 1999
- FRU was upgraded as the division in 2012
- Asia Food and Agriculture Cooperation Initiatives (AFACI) of RDA South Korea supported 'Establishment of Network and Model Manual on Postharvest Technology of Horticultural Crops' from 2012 to 2018

Investment on technology generation

Institutional:

NARC: National centres 2 types: Commodity and disciplinary

NFRC: More focused on processing – legacy+staffing

DoA: Agri-engineering and Post harvest loss management Section

DFTQC: Research more on processing + changing mandate

Academia: No dedicated department

Physical facilities:

- Insufficient equipment and staffing

Human resource:

- Extremely few technical personnels
- Challenge in retaining/restricting in postharvest research

Investment

Financial:

NARC: 4.9% on postharvest research out of total horticultural research (Paudyal and Khatiwada, 2013)

Academia: 5% and 9% of research budget burned by postharvest research of vegetables and fruit respectively (Shrestha et al., 2016)

DoA: Financial investment not available. Seems very low based on output (12.6% publications on fruit and vegetables)

PMAMP: higher investment

Development Partner funded projects:

Major Programs:

- Cold storage and cold chambers
 - Capital subsidies and subsidies in electricity bill
- Cellar storage/cold chambers
- Rustic storage
- Warehouses/silos
- Collection centers
- Post harvest centers
- Cardamom dryer
- Vehicles
- agriculture-ambulance
- Equipment and machineries support in subsidies
 - Metal bins, Grain storage bags, Plastic Crates, Cartoons, Secateurs, potato harvesters, Grading machines, packaging machines, packaging materials,
 - Equipments and machineries development (Ginger washing, carrot washing, chino Kutter, Coffee pulper etc)
- Trainings and FFS
- Demonstrations
- Exhibitions

Value Chain Development of Fruits and Vegetables in Nepal Project

- ▀ Technology development
- ▀ Trainings and awareness
 - ▀ Demonstrations
- ▀ Equipment's and machineries
 - ▀ Cold chambers
 - ▀ Collection centres

Future interventions for loss reduction

- Need of consolidated efforts from all three spars of governments for improved handling practices
- Establishment of a lead institution with resources (infrastructure, financial and human)
- Weak institutional capacities in academia, national research system and extension agencies

Nation-wide systematic postharvest loss assessment:

- Very few and localized studies made mainly relying on survey
- Systematic postharvest loss assessment not yet done
- Prioritize research and development agendas for resource use maximization

Conclusions and way forward

- Despite of huge amount of losses, post- harvest loss management has got little attention
- The extension activities of the post-harvest loss management were mainly performed by demonstrations, trainings and distribution of modern storage structures, machineries and equipments.
- The RSGP was a pioneer program that prepared the base of post-harvest loss management in Nepal. No such other programs/projects have been implemented after the phasing out of this program.
- The socio-economic aspects of the food grains loss in the storage has not been studied systematically.

Quality assurance of fresh produces:

- Quality standards not in place
- Clear policy for postharvest interventions from federal and provincial government and guidelines for local government are necessary

Thank you

3. Ms. Mausami Shrestha:

| | |
|--|---|
|  <p>HARNESSING THE PRIVATE SECTOR: REDUCING FOOD LOSS AND WASTE MANAGEMENT IN NEPAL</p> <p>MOUSHUMI SHRESTHA DIRECTOR SHREENAGAR AGRITECH INDUSTRIES SENIOR FELLOW, IIDS</p> <p>www.safnepal.com</p>  |  <h4>Introduction</h4> <ul style="list-style-type: none"> • Food loss and waste management are critical issues globally and in Nepal. • Private sector engagement is pivotal for effective solutions. • Through innovation, technology, and efficient practices, private companies contribute significantly to this global challenge.  |
| <h4>Problems and Issues in Nepal</h4>  <ul style="list-style-type: none"> • Nepal faces significant food loss and waste issues. • Supporting data: Roughly 14% of the food produced loss by inefficiencies in production, post-harvest handling practices, transportation, storage, processing and packaging whereas 17% of Food waste occurs at both the retail and consumer levels when edible food is discarded or uneaten in households and industries like hotels, grocery stores, restaurants and caterings. <p>(Source: Heifer International - September 6, 2023)</p>  |  <h4>Role of Private Sector</h4> <ul style="list-style-type: none"> • Private sector plays a crucial role in reducing food loss and waste. • Investment in technology, infrastructure, and innovation is key.  |
| <h4>About Shreenagar</h4> <p>Shreenagar Agritech Industries Ltd. is an integrated agri-business company.</p> <p>Focused on agriculture; covering four main areas: Farm, Feed, Food and Facilitation services, referred to as the "4F" approach. Goal is to become a comprehensive One-Stop-Solution for farmers by offering seeds, feeds, technical and managerial services, access to finance/insurance and markets linkages.</p>   |  <h4>Technologies being used by Agri Industries</h4> <ul style="list-style-type: none"> • Maize Dryer: Reduces fungus in maize, enhancing storage life. • Cold Storage Facility: Preserves fruits, vegetables, meat, milk, and processed food. • Egg Processing Plant: Produces powder and liquid egg to increase shelf life and reuse of breakage. • ETP Plant: Ensures environmentally friendly waste management in slaughter units.  |

Technologies being used by Agri Industries

Shreenagar
From Ideas to Impacts...

- **Segregation of Food Waste:** Diverts biodegradable waste for organic fertilizer.
- **Biogas Production:** Utilizes poultry manure and cattle dung for organic fertilizer and energy.
- **Rendering Machine:** Reuses poultry waste minimizing waste.
- **Meat and Bone Meal and Distillers Dried Grains with solubles:** used as protein for feed



Investment in Technology

Shreenagar
From Ideas to Impacts...

- Private sector investments in technology drive advancements in food preservation and waste reduction.
- Technologies such as cold storage facilities, smart packaging, and processing innovations minimize food loss along the supply chain



Supply Chain Efficiency

Shreenagar
From Ideas to Impacts...

- Private sector entities optimize supply chain processes to minimize food loss and waste.
- Implementing efficient logistics, inventory management systems, and quality control measures ensures fresher products reach consumers while reducing waste.



Collaboration and Partnerships

Shreenagar
From Ideas to Impacts...

- Collaboration between the private sector, governments, NGOs, and other stakeholders is essential for effective food loss and waste management.
- By working together, we can leverage resources, expertise, and networks to achieve meaningful reductions in food loss and waste.
- Recommendation for Joint Initiative: Public-private partnerships should be encouraged
- Policy support, incentives, and awareness campaigns are crucial.



Collaboration in Research and Development

Shreenagar
From Ideas to Impacts...

- Joint research projects for innovative solutions.
- Sharing resources and expertise for effective outcomes.



Policy Framework

Shreenagar
From Ideas to Impacts...

- Developing supportive policies for private sector engagement.
- Incentives for businesses adopting sustainable practices.
- Tax exemption packages



Awareness Campaigns

- Educating consumers and businesses about food waste.
- Promoting behavioral changes and responsible consumption.



Capacity Building

- Training programs for businesses on waste reduction techniques.
- Building technical skills for effective implementation.



Sustainable Financing

- Access to finance for private sector initiatives with incentives and subsidies
- Investment in sustainable infrastructure and technologies.



Community Engagement

- Involving local communities in waste management efforts.
- Empowering grassroots initiatives for sustainability.



Conclusion

- Private sector collaboration is essential for tackling food loss and waste.
- Together, we can achieve significant reductions through innovation and partnership.



Thank you

4. Dr. Devendra Gauchan:

Research and Innovations on Food Loss and Waste Management for Food System Transformation and Climate Action in Nepal



Devendra Gauchan, PhD

A paper presented in a Consultative Workshop in 'Food Loss and Waste Management for Productivity Gains, Food Security, Nutrition and Climate Resilient Agrifood Value Chains (in-Nepal...)' organized by NFAC/CACCINAES, Jhamsikhel, Lalitpur, Nepal, April 30, 2024

Food Loss and Waste have both Humanitarian and Environmental Concerns

- In Nepal, estimated 30-40% of food produced is either lost or wasted, thereby not only reducing food availability and nutrition but also reducing farmers' income and increasing consumers expenses in addition to exacerbating climate change
- In 2022, the world wasted 1.05 billion tonnes of food i.e. one fifth (19 per cent) of food available to consumers being wasted, at the retail, food service, and household level (UNEP, 2024)
- Food loss and Waste (FLW) generates 8-10 per cent of annual global greenhouse gas (GHG) emissions – almost 5 times that of the aviation sector.
- The toll of both food loss and waste on the global economy is estimated at roughly USD 1 trillion per year. This is both market and environmental failures.
- Research and Innovations that reduce FLW, therefore will not only improve food and nutrition security and save scarce resources but also help fight climate change



Status of Food Loss and Waste (FLW) in Supply Chain

FLW in supply chain not only reduces availability of quantity of food but also quality

Total Food Loss and Waste (FLW) in Supply Chain : 30% of the total production

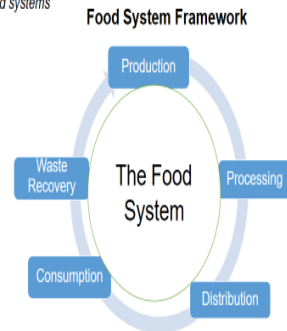


- **At consumption level, Nepal wastes 93 kg food per capita per year which accounted for 2.83 million mt per capita per year (UNEP 2024).**
- FLW in supply chain accounts for average of 30% (fruits and vegetables 20-40%; dairy & meat 30-35%, and food grains 15-30%).
- By reducing FLW by half (15%), Nepal can fully meet food and nutrition security without any need of importing food products and also reduce GHG emission.

Role of Research and Innovations in Food System Transformation & Climate Action

Research & Innovation are vital to reduce FLW and address climate action in all components of food systems

- Waste Recovery is a critical components of food systems
- **Beyond Value chain Framework** (Farm to Fork) + Waste Recovery
- Focus on quantity, quality, safety and diversity of food
- Focus on "Nature Positive" & "Nutrition sensitive"
- Focus on climate resilient transformative action



Devendra Gauchan, PhD

STATUS OF INVESTMENT IN RESEARCH AND INNOVATIONS

- Investment as % of GDP in research & Innovation is an indicator of "Development".
- Evidence shows that a BCR of 10:1 in agrifood R&D, i.e. investment of \$1 today provides \$10 in the future, a good pathway for poverty reduction (Alston et al. 2020)
- Israel and South Korea invest world's first and 2nd highest proportion of their GDP (4-5%) in research & innovations followed by Europe, Japan and USA
- Nepal invests only 0.39% of the GDP in research and innovation
- As compared to on-farm production sector, the investment in research and innovation in post-harvest and consumption level (especially reducing FLW) is very negligible in Nepal.

| Countries | Investment % of GDP |
|---------------|---------------------|
| Israel | 4.95 |
| South Korea | 4.55 |
| Sweden | 3.38 |
| Switzerland | 3.20 |
| Japan | 3.17 |
| United States | 2.83 |
| Germany | 2.63 |
| China | 2.19 |
| India | 0.60 |
| Nepal | 0.39 |

Source: UNESCO Institute of Statistics, 2019

Research & Innovations would have saved Huge Loss of Rice Harvest from Post-Monsoon (Oct) 2021 Floods in Western Nepal

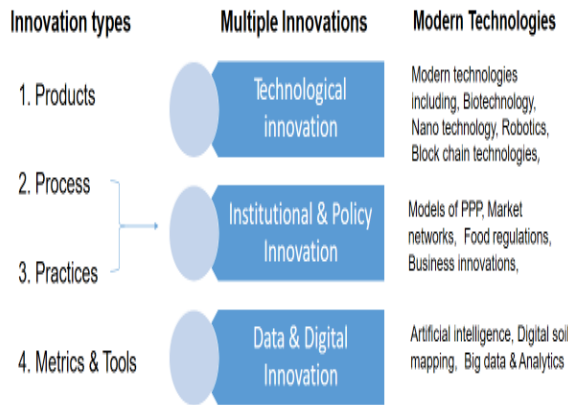
Loss of estimated 85 thousand hectare area of rice and value of ~NPR 12 billion loss from post-monsoon flood damage

Missing Innovations to Save Rice Losses

- Inadequate early warning system technologies
- Lack of drying and drainage technologies
- Lack of crop insurance programs to compensate the losses to rice farmers



Innovations for Food System Transformation and Climate Action



Technologies and Innovations for reducing FLW and Addressing Climate Action in Agrifood Value Chain

- IPM technologies to reduce pest & disease damage in production
- Precision agriculture to optimize resource & input use
- Innovations and technologies for timely and safe harvesting
- Drying technologies for grains & other foods (solar & electric dryers)
- Green and smart storage, processing and packaging technologies (e.g. cold chain, hermetic bags, electric processor)
- Low cost refrigerated technology for food preservation
- Weather forecasting technologies and early warning system
- Adoption of GAPS, GMPs and GAHVP in agrifood value chains
- Organic waste treatment & recycling for waste recovery (eg.biogas)



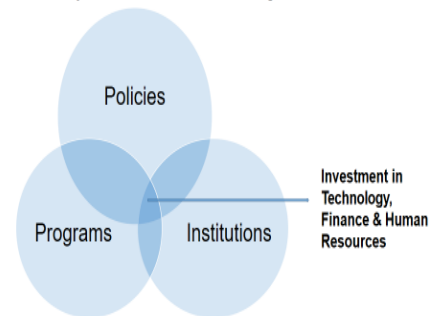
Other Innovations for FLW Management & Climate Action

- Inclusive value chain contracting and business models with quality-based contractual arrangement for premium products
- Off-grid cooling and transportation with smart packaging
- Improved information and transactions with timely market information, coordination and extension services
- Food standards, Certification and Labeling of the product (product information)
- Innovative and strategic digital tools and communication strategies to change consumers behaviors to reduce FLW
- Market incentives and policy support to reduce FLW, improve food safety and adoption of climate resilient technologies
- Index based agri insurance tied with access to finance to minimize risks and investment in risk reduction measures to reduce FLW

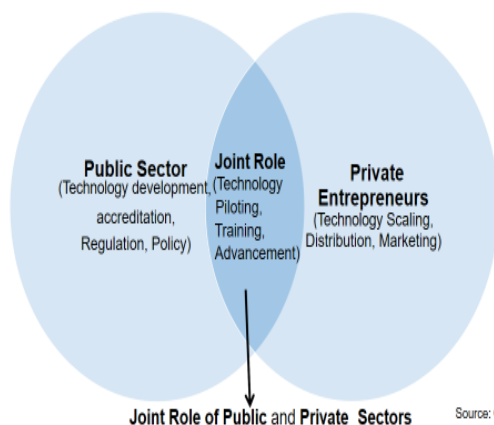


Strategies for Mainstreaming Innovations for FLW Management and Climate Action

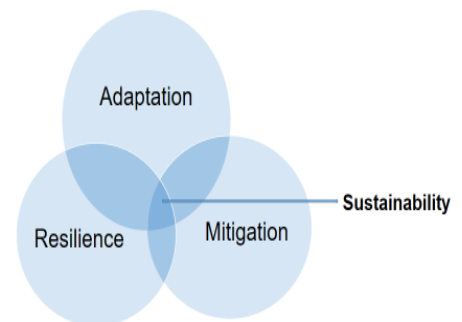
Integration of FLW management and climate action policies, programs and institutions is essential with adequate investment in technologies, financial and human resources



Public-Private-Partnership (PPP) in Research & Innovation for Food Loss and Waste Reduction & Climate Action



Transforming Food Systems for FLW Reduction and Climate Action



7/29/2024

Devendra Gauchan, PhD

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Climate Action Pathways (Adaptation, Mitigation and Resilience)

- **Develop and promote climate resilient, resource efficient and sustainable research and innovations in FLW reduction** for food systems transformation
- **Adopt agroecosystem-based resilient planning and revitalization of indigenous food systems** by conserving and utilizing biodiversity.
- **Ensure longer-term investments** on developing **regenerative agriculture, agroecological, & carbon farming** and resilient food systems & community to withstand shocks and stresses
- **Sustainable management of soil, water, land and forest** by maximizing their **synergy** and reducing **tradeoff-improving nexus** of water, energy, food & ecosystem (WEFE)
- **Integrated pest and disease management** with focus on **biological, ecological, and farmer field school** approaches in crops, livestock and fishery sub-sectors.
- **Better feeding, production management and genetic improvement** of livestock to reduce **enteric fermentation** as well as better compost and rangeland management.
- **Promote digital agriculture for weather forecasting, early warning and agro-advisory with market information systems**

4/20/2014

Deendra Gochhar-Climate Change Impact

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Suggested Actions: Research & Innovation Priorities

- **Development of policy and programmatic recommendations** to support sustainable food systems transformation and climate action
- **Increased investment in research and innovation** for reducing **food loss & waste** and address climate action
- **Identification of innovations** (product, process and policy & institutional innovations) with potential for **scaling** to support **reduction of FLW** and **climate resilient agriculture**
- **Research to develop framework and data base** for **better assessment and quantifying FLW** (aggregate and disaggregate), and recommendations for how to address key data collection gaps, including food losses and waste
- **Climate forecasting, early warning and monitoring and forecast based anticipatory action** for adaptation to climate change and reducing FLW from **climate induced disasters**
- **Strategic actions to carry out action research, awareness creation and capacity building of stakeholders** (public, private and community sectors) to **reduce FLW, improve food security, save scarce resources and reduce carbon foot prints**

5. Dr. Bimal Kumar Nirmal:

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| <p style="text-align: center;">Nepal Academy of Agricultural Sciences (NAAS)</p> | <p style="text-align: center;">National Academy of Agricultural Sciences , India</p> <ul style="list-style-type: none"> • The National Academy of Agricultural Sciences (NAAS), India established on June 5, 1990, continues to be a unique think tank and an important forum for harnessing science for enhancing the productivity, profitability, equity and sustainability of Indian agriculture. • The Academy has since emerged as a vibrant national agricultural science organization devoted to promoting agricultural research, education, knowledge pool, national and international partnerships and science-society interface towards transforming agriculture and the related policies leading to a comprehensive food nutrition livelihood-ecology-secured and climate smart India. |
| <p style="text-align: center;">What NAAS does?</p> <p>Governance</p> <ul style="list-style-type: none"> • The governance of the academy is through (a) General Body (b) Executive Council, (c) Statutory Committees, and (d) Twelve Regional Chapters. <p>Fellowship</p> <ul style="list-style-type: none"> • In recognition of the academic excellence, the Academy elects 34 Fellows every year in the following eight sections. Crop Sciences (6); Horticultural Sciences (3); Animal Sciences (4) ; Fisheries Sciences (2); Natural Resource Management Sciences (5); Plant Protection Sciences (4); Agricultural Engineering and Technology(2) and Social Sciences (3). Foreign Fellow (2); • The Academy elects two Foreign Fellows who are foreign citizens; Pravasi Fellow (3); The Academy elects three Pravasi Fellows who are Persons of Indian- Origin (PIO) or Overseas Citizens of India. • The Academy inducts young scientists below the age of 40 years as Associates of the Academy based on their scientific contributions. | <p style="text-align: center;">What NAAS does?</p> <ul style="list-style-type: none"> • The Academy has instituted various categories of Awards to recognize and encourage the meritorious and distinguished scientists for their celebrated contributions to the cause of agricultural research, education and extension. • The Academy biennially organizes the National Agricultural Science Congress. So far 14 Agricultural Science Congresses have been organized. • The publications of the Academy are (a) NAAS News; (b) Policy Papers; (c) Status / Strategy Papers; (d) Policy Briefs; (e) Study Reports; (f) Annual Reports; (g) Foundation Day Lecture; (h) Presidential Address; (i) Journal - Agricultural Research; (j) Books; (k) Year Book. • As of now, the Academy has published 88 Policy Papers, 10 Status/Strategy Papers, 3 Policy Briefs, 12 Proceedings and Books on various important issues pertaining to agriculture. • The Academy launched an International Research Journal 'Agricultural Research' in 2012 in collaboration with Springer India Pvt. Ltd. |
| <p style="text-align: center;">What NAAS does?</p> <p>The Academy organizes Brainstorming Sessions (BSS) each year on thematic areas of national importance related to Indian agriculture.</p> <p>For the year 2019, the Council has approved the following programmes:</p> <ol style="list-style-type: none"> 1. Strategy Workshop on "Uniform Policy for Fish Disease Diagnosis and Quarantine" 2. Brainstorming Session on "Enhancing Science Culture in Agriculture Institutions" 3. Brainstorming Session "Payment of Ecosystem Services" 4. Brainstorming Session "Vertical Farming" 5. Brainstorming Session "Big Data Analytics" 6. Brainstorming Session "Potential of Non-bovine Milk" 7. Brainstorming Session on Loan waiving versus Income Support Schemes : Challenges and Way forward 8. Preparation of NAAS-ICAR compendium on select agricultural technologies developed by NARS and that have made significant impact of the Indian economy. | <p style="text-align: center;">Chinese Academy of Agricultural Sciences (CAAS)</p> <ul style="list-style-type: none"> • The Chinese Academy of Agricultural Sciences (CAAS) is a national comprehensive agricultural research institution in China. • It was established in 1957, and is affiliated to the Ministry of Agriculture and Rural Affairs (MARA) of China. Headquartered in Beijing, • CAAS oversees a Graduate School, 34 affiliated research institutes located in Beijing and across China, and a Publishing House. |

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| <h3 style="text-align: center;">What CAAS does?</h3> <ul style="list-style-type: none"> • CAAS is dedicated to overcoming a broad range of science and technology challenges impacting agricultural development and supporting the modernization of agriculture and rural areas through basic, applied and high-tech research. • Research and policy work at the CAAS cover a broad range of topics that have been categorized in 11 major discipline clusters, consisting of 58 discipline fields and 283 key directions. • The 11 disciplinary clusters include Agricultural Basic and Frontier Research, Crop Science, Horticulture, Plant Protection, Agricultural Resources and Environment, Animal Science, Veterinary Medicine, Agricultural Microbiology, Agro-product Quality and Processing, Agricultural Equipment, Engineering and Information, and Agricultural Economics and Rural Development. | <h3 style="text-align: center;">What CAAS does?</h3> <ul style="list-style-type: none"> • CAAS currently has 11,171 staff members, with 6,849 permanent employees. • Among them, there are 6,167 professionals, including 1,458 professors and 2,123 associate professors, accounting for 23.6% and 34.4% of the total, respectively. • CAAS now has 16 academicians of the Chinese Academy of Sciences and the Chinese Academy of Engineering. • over 400 laureates of national and provincial high-level talent titles and 422 CAAS Outstanding Talent. • 817 postdoctoral researchers working at CAAS 11 postdoctoral mobile research stations and 10 postdoctoral research stations. |
| <h3 style="text-align: center;">What CAAS does?</h3> <ul style="list-style-type: none"> • A relatively complete research platform system, up to 550 platforms, has been established at the national, ministerial and CAAS levels. • CAAS has the world's largest single P4 animal biosafety laboratory, and Asia's largest P3 animal biosafety laboratory cluster. • There are 2 Major National Science and Technology Facilities, 15 National Key Laboratories, 1 National Center for Technology Innovation, 5 National Engineering Technology Research Centers and 7 National Engineering Laboratories and Engineering Research Centers built in CAAS. • There are 12 branches for mid-term storage and 13 National Crop Gene Repositories, with over 530,000 accessions in long-term preservation, ranking the second in the world. • National Crop Gene Bank, with the world's most extensive collection of native crop genetic resources, was newly built in 2021. • The National Agricultural Library ranks top in Asia and the third in the world in terms of its collection of agriculture books. | <h3 style="text-align: center;">What CAAS does?</h3> <ul style="list-style-type: none"> • Importantly, CAAS promotes sustainable agriculture within and outside China, taking collaborative research work and joint global actions with its partners around the world, including more than 330 foreign government departments, research institutions, nearly 50 international organizations, foundations, and multinational companies. • CAAS is committed to significantly advancing high-level agricultural science and technology innovation, in an effort to build an important world-class center for agricultural talent and innovation, and • Provide support for food security, higher agricultural production efficiency, transition towards green agriculture, and elimination of poverty and hunger in the world. |
| <h3 style="text-align: center;">Bangladesh Academy of Agriculture (BAAG)</h3> <ul style="list-style-type: none"> • Bangladesh Academy of Agriculture (BAAG) is a not-for-profit professional organization of senior agriculturists and agricultural scientists from agriculture, fisheries, livestock, and forestry. • It was established in 1993 and registered in 1994 under Joint Stock Company. • It is located at Dhaka. • The members of BAAG are called Fellows. There are 42 fellows now in BAAG. Every year new Fellows are inducted. • To be a fellow, one must be at least 45 year old with significant contribution in the respective field. BAAG has an 13-member executive council who are elected through vote by the General Members for two years. • The Executive Council has one President, one Vice-President, one General Secretary, one Treasurer and nine members. | <h3 style="text-align: center;">What BAAG does?</h3> <ul style="list-style-type: none"> • BAAG values traditional knowledge and innovations by the farmers. • The BAAG is a platform for sharing knowledge among the field practitioners, scientists, development professionals and policy makers in the field of agriculture including fisheries, forestry and livestock. • BAAG organizes seminar, workshops and round table discussions to bring all stakeholders together to discuss the critical issues. Through discussion it identifies needs for the country, traditional knowledge, advance knowledge and possible interventions for sustainable agriculture. • BAAG also helps in establishing linkages between organizations and the farmers in exchanging knowledge and technologies. • BAAG implements action research involving farmers on different technologies suitable for different agroecological zones. The lessons are shared with the scientists and development workers in the country. • BAAG undertakes research and development activities on nationally important issues either with its own fund or securing fund from development partners. |

Why NAAS in Nepal?

Mission

- To promote excellence in science, act as a credible **think tank** of the scientific community and **provide science-based inputs for policy options** for a vibrant agriculture

objectives:

- The major objectives of the Academy are to:
 - promote **ecologically and environmentally sustainable** and equitable agriculture
 - recognize and promote excellence of **scientists, researchers, development workers, academicians, entrepreneurs and other alike workers** in agriculture
 - promote interaction among **researchers, scientists, development workers, policy makers, academicians of national, foreign and international organizations**
 - organize **inter-disciplinary analysis of issues of importance to farmers** and farming, and **provide evidence-based inputs for policies** designed to advance agricultural research, education, strategic knowledge pool, and extension for development
- **Collaborate and coordinate national and international partners** for the benefit of farmers and economic growth of the country.
- carry out **activities relevant** to accomplish the above objectives.

Who are all, would be the members of NAAS?

- **Scientists, Researchers, policy makers, development workers, academicians etc having at least graduate degree of agriculture, livestock, fisheries and other recognized sectors.**
- **Honorary members will be having non agriculture degree, associated with development of agriculture having long experience.**
- **Agriculturists, Veterinarians, Livestock experts, fisheries experts and other alike experts of national and international organizations.**
- **No age limitation**

How to start to establish NAAS?

- **Nepal Farmers Advisory Council has already taken the initiation of establishing NAAS.**
- **Having dialogue and discussion with national and international partners and organizations.**
- **To be registered as Non Governmental organization(NGO/INGO), a non profit organization.**
- **General members, Life members, honorary members (criteria will be set up)**
- **Set up Ad-hoc committee**
- **Planning to have first conference during September- October, 2024**

Thank you

Annex-4: Glimpses of Workshop:



Picture with Honorable Minister Jwala Kumari Sha and NFAC Chairman Dr. Yogendra Kumar Karki



Welcoming the Honorable Minister Jwala Kumari Sha



Workshop inauguration by Honorable Minister Jwala Kumari Sha



Participants Present at Workshop



Speech Delivery by Joint Secretary Dr. Ram Krishna Shrestha (MoALD)



Participants Present at Workshop



Presentation by Dr. Hari Bahadur K.C, DG, DAO



Workshop Discussion Session, Issue Raising by Mr. Ghanshyam Bhattarai



Workshop Discussion Session, Issue Raising by Dr. Binod Shah, Assistant, FAOR, FAO



Workshop Discussion Session, Issue Raising by Mr. Ram Prasad Pulami, Vice-President, NAES



Discussion between Honorable minister Jwala Kumari Sha, MoALD, and Dr. Suresh Chandra Babu, Senior Research Fellow, IFPRI



Discussion between Honorable Minister Jwala Kumari Sha, MoALD, NFAC Chairman Dr. Yogendra Kumar Karki, Dr. Rewati Raman Poudel, Secretary, MoALD and Dr. Suresh Chandra Babu Senior Research Fellow, IFPRI