Mango Symposium 2024
Comprehensive Report

ICIMOD

R&D
strengthening agri entrepreneurs

Australian Aid

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Acknowledgment

The Mango Symposium, 2024 was successfully organized on 22 July 2024 at ICIMOD, Lalitpur with more than 160 participants which is the first of its kind event in Nepal. On behalf of the organizers (National Centre for Fruit Development (NCFD), Department of Agriculture, Ministry of Agriculture and Livestock Development, R&D Innovative Solution Pvt. Ltd, and ICIMOD), I express sincere appreciation to all participants for their valuable contributions and enthusiastic participation. We are particularly grateful to Honorable Ramnath Adhikari, Minister for Ministry of Agriculture and Livestock Development for accepting our invitation to grace the event as the Chief Guest and for his insightful remarks which motivated all the participants as he highlighted the importance of Mango in the country. We are grateful to the gracious presence and enlightening remarks from the respected Secretary Dr. Deepak Kumar Kharal and the academic institution's research work presentation from Prof. Dr. Arjun Kumar Shrestha, AFU highlighting the mango research efforts led by the academic institutions in Nepal. We greatly acknowledge the chairmanship of Dr. Narahari Prasad Ghimire, Director General, Department of Agriculture who led the sessions, facilitated the interactions and closed each session with his succinct remarks. We are very grateful to the keynote speaker M r. Ram Badal Shah, an esteemed mango expert of Nepal who is also the Past President of Nepal Horticulture Society (NHS) for a comprehensive presentation including history to the current state of mango cultivation in Nepal.

We thank all the valued speakers who presented physically or virtually for their presentations on various topics which included the journey of mango fruit crop from a historical overview to the modern times. I extend my deepest gratitude to our esteemed panelists and municipality mayors for their leadership and commitment to promote the local agricultural initiatives. We extend our heartfelt gratitude to all the local level representatives for their active engagement, keen interest and valuable discussions throughout the workshop. Special thanks to the organizing committee, including all three organizing institutions, for their hard work in planning and executing the event with effective coordination and communication throughout the process.

We are very thankful to the award sponsors with which we could recognize and award three distinguished personnel who have immensely contributed to the mango sector in Nepal through their continued hard work and dedication in their respective fields. We appreciate media personnel as well as each and every one involved directly or indirectly to make this event an impressively successful one.

The symposium showcased fruits of various mango varieties from Tropical Horticulture Centre, Sarlahi which is a Federal Government's largest resource center providing quality saplings of different varieties of mango. The symposium featured both national and international keynote and technical presentations which covered practices and technologies from production to processing as well as marketing of fresh mangoes and their processed products. Presentations from India and Thailand opened up the potential of the Nepalese mango industry for advanced manufacturing capabilities through a reliable supply chain, which will enhance food safety, reduce losses, and add value to the fresh produce. These eighteen presentations also provided future directions for sustainable development of the overall mango sector in Nepal.

We hope that the symposium was informative and beneficial for everyone who dedicated their valuable time. The symposium brought together all the stakeholders (producers, policy makers, researchers, development and extension workers, academicians, government representatives of all three tiers, retired horticultural experts, private sectors, development partners, international institutions) which helped to establish an everlasting network. Your feedback is valuable, and we encourage you to share your thoughts and exchange ideas as well as relevant information through the recently formed digital group. We look forward to your continued collaboration and participation in future events. All stakeholders' support in different forms is crucial for working together to make this sector vibrant from production to consumption.

A very special thanks to ICIMOD for the financial support and also for such a congenial venue which made this event even more effective in meeting its objectives.

Thank you.

Shanta Karki, PhD
Chief, National Centre for Fruit Development

Executive Summary:

The Mango Symposium 2024 was organized jointly by the Ministry of Agriculture and Livestock Development, ICIMOD under the HI-GRID framework and R&D Innovative Solution Pvt. Ltd., on July 22, 2024 (Shrawan 7, 2081) at the ICIMOD headquarters in Lalitpur, Nepal. This event aimed to bring together farmers, processors, marketers, researchers, policymakers, and other stakeholders to discuss the current state and future opportunities for Nepal's Mango industry.

The Mango Symposium assembled more than 100 key stakeholders from various sectors of the mango value chain in Nepal. This included mango farmers and producer groups, mango processors and exporters, marketing experts and distributors, agricultural researchers and academics, policymakers, and government officials, as well as representatives from development agencies.

Nepal produces nearly 500,000 metric tons of mangoes annually (MoALD 2021/22), with Madhesh Province playing a leading role. Despite its economic and agricultural significance, the Mango industry faces challenges such as fluctuating yields, pest and disease management, post-harvest losses, and market access constraints. The symposium seeks to foster collaboration, promote innovation and establish a roadmap for the industry's sustainable growth.

Key Highlights

- **Organized by:** Ministry of Agriculture and Livestock Development, ICIMOD, and R&D Innovative Solution
- **Supported by:** Australian Government through the HI-GRID project
- **Date & Venue:** July 22, 2024 (Shrawan 7, 2081) at ICIMOD Headquarters, Lalitpur, Nepal
- **Participants:** 100+ stakeholders, including farmers, processors, exporters, researchers, policymakers, and development agencies
- **Key Focus Areas:** Mango production, processing, marketing, value chain development, and sustainability
- **Expected Output:** Identification and promotion of mango varieties, and bringing together all stakeholders of the mango sector.

Program Declaration

The Mango Symposium 2024 is declared with the vision to strengthen the mango value chain in Nepal by addressing critical challenges and unlocking new opportunities. The event served as a collaborative platform to promote sustainable mango production, enhance market access and support resilient agribusiness models that benefit all stakeholders, especially vulnerable communities.

The symposium concluded with a joint declaration by key stakeholders, reaffirming commitments to advancing the mango industry through policy support, research initiatives, investment in processing infrastructure, and strategic partnerships.

Key Recommendations

1. **Strengthening Policy Support & Institutional Framework**
   - » Develop a comprehensive mango policy to support farmers, processors, and exporters.
   - » Encourage public-private partnerships (PPP) to boost infrastructure, research and market development.
   - » Increase production and productivity of Mango sustainably to meet the requirements of industries.
2. **Enhancing Sustainable & Climate-Resilient Mango Production**
   - » Promote Climate-Smart and Nature-Based solutions (NBS) for managing Too Much Too Little (TMTL) water challenges.
   - » Provide training and extension services for pest control, post-harvest management, and improved farming techniques.
3. **Improving Market Access & Value Addition**
   - » Strengthen domestic and international market linkages to boost mango exports.
   - » Invest in mango processing and value-added products (e.g., dried mango, pulp, juice, pickle, powder, candy).
4. **Capacity Building & Stakeholder Collaboration**
   - » Establish farmer cooperatives and producer groups to enhance bargaining power.
   - » Foster networking among farmers, processors, researchers, and investors.

Way Forward

Following the symposium, a **multi-stakeholder digital group** will be formed

This group will:

- Facilitate **policy recommendations** to the government for sectoral reforms
- Support **entrepreneurs and agribusinesses** in mango processing and marketing
- Mobilize **funding and investments** for infrastructure and value chain development
- Exchange of information and experience sharing
- Encourage to plan for other events in the future.

The Mango Symposium 2024 marks a significant milestone in positioning Nepal as a competitive player in the global mango industry while ensuring sustainability and resilience in the sector.

Mango Symposium 2024

About the Event:

The Ministry of Agriculture and Livestock Development (MoALD), ICIMOD within the framework of HI-GRID and R&D Innovative Solution Pvt. Ltd. jointly organized a Mango Symposium on July 22, 2024 (Shrawan 7, 2081) at the ICIMOD headquarters in Lalitpur, Nepal. HI-GRID, supported by the Australian Government and implemented by ICIMOD, local government organizations, and project partners, aimed to enhance resilience towards Too Much or Too Little water in the Lower Koshi River Basin (LKRB) in Nepal.

This one-day event aimed to bring together a diverse group of stakeholders, including farmers, processors, marketers, researchers, academicians and policymakers, to discuss the current state and future potential of the mango industry based on diverse activities done by stakeholders across Nepal. The symposium will serve as a vital platform for these stakeholders to explore various aspects of mango production, harvesting, processing, marketing, and value addition.

Our goal was to scale up and strengthen the Nepalese mango industry by fostering networks and collaboration among stakeholders. Through discussions and interactions, we aim to support value chain actors for the industry's growth, sustainability, and competitiveness, as well as promote entrepreneurship within each node of the mango value chain in Nepal. This dynamic platform will enable stakeholders and policymakers to share insights, address pressing issues, and explore innovative solutions for the development of the mango industry, for the development of a five year action plan. Following the completion of this symposium, the mid-term and long-term action plan will be developed together with government and development partners.

Objectives:

The objectives of this symposium were:

1. Identify key challenges and opportunities in the mango value chain to scale up the mango industry across Nepal.
2. Explore and promote sustainable practices and innovative solutions to enhance the mango industry's resilience.
3. Foster linkages between mango value chain actors and stakeholders to enhance the enabling environment for the mango industry.

Organizers of Mango Symposium, 2024

Ministry of Agriculture and Livestock Development:

The Ministry of Agriculture and Livestock Development (MoALD) is the government agency in Nepal responsible for overseeing the growth and development of the country's agricultural and livestock sectors. MoALD develops and implements policies for agricultural development, aims to increase agricultural production and productivity, promotes commercialization of agriculture to enhance competitiveness in regional and international markets, works to improve livelihoods through sustainable agricultural practices, and supports the development of the livestock sector.

ICIMOD:

The International Centre for Integrated Mountain Development (ICIMOD), established in 1983, is an intergovernmental knowledge and learning center serving the Hindu Kush Himalaya (HKH) region, which includes Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. ICIMOD's mission is to build and share knowledge that influences regional policy and action, aiming for greener, more inclusive, and climate-resilient development. It envisions a future where HKH residents thrive in a healthy mountain environment. To achieve this, ICIMOD conducts research on climate change, water resources, disaster risk reduction, and sustainable livelihoods; provides training and knowledge-sharing programs; fosters regional cooperation; and disseminates research findings to inform decision-making.

R&D Innovative Solution Pvt. Ltd.

R&D Innovative Solution, operational since 2012, addresses challenges faced by Nepalese farming communities through a soil-to-sale model, tackling issues throughout the agricultural value chain. The company's vision is to create economic opportunities for these communities by transforming traditional, low-profit agriculture into sustainable, interconnected entrepreneurial ventures. Its mission is to empower both existing farmers and new entrants in the farming industry, enabling them to turn their ventures into successful enterprises.

Mango Symposium 2024

Opening Session

The program was divided into three main parts: Opening Session, Technical and Panel discussions and followed by the closing ceremony.

Several International and National representatives shared their insights. Mr. Ram Badal Shah, Senior Horticulturist, NHS emphasized the Status of Mango Research, Extension, Production and Future Pathways. Keynote speech on Experience of Trust Transfer from Farm to Fork was shared by Dr. Umed Pun Dr. K. Wongruira (Virtual), Mr. Amit Sharma, A post-harvest specialist of DECCO India, shared experiences from neighboring country India (Virtual) and way forward.

The inaugural session was chaired by Dr. Narahari P. Ghimire, Director General, DoA, highlighting the commitment to fostering innovation and collaboration in the mango industry.

Welcome Remarks

Ms. Izabella Koziell, Deputy Director General, ICIMOD

Honorable Minister, Secretary and Joint secretary of Agriculture and Livestock Development, esteemed representatives from DFAT, distinguished colleagues from R&D Innovative Solution Pvt. Ltd., valued stakeholders, and dear participants,

Good morning and a warm welcome to the Mango Symposium.

We are gathered here today at ICIMOD in Lalitpur, Nepal, to embark on a significant journey toward enhancing the resilience and sustainability of the mango industry in the Lower Koshi River Basin. This symposium, organized under the HI-GRID initiative, is a collaborative effort supported by the Australian Government, and we are deeply grateful for their continued support.

The Hindu Kush Himalaya (HKH) region, spanning 3,500 kilometers across eight countries, is a vital zone that supports food, water, and energy security for up to two billion people. However, this region is also fragile and vulnerable to climate change, pollution, and biodiversity loss. Since 1983, ICIMOD has been dedicated to making this critical region greener, more inclusive, and climate resilient. Through our research, training, knowledge-sharing programs, and regional cooperation efforts, we aim to address the pressing challenges facing the HKH region and inform decision-making processes.

In the Lower Koshi River Basin, the HI-GRID project focuses on addressing the issues of 'Too Much and Too Little Water.' We aim to build resilience among smallholder farmers in collaboration with local institutions, the private sector, and local governments. Our efforts include developing sustainable livelihoods through value chain and enterprise development, with a particular emphasis on the mango industry in Province 2.

Since 2022, ICIMOD has been working on developing the mango value chain, with a long-term vision to promote key products from each province. Today's symposium is a testament to our commitment to this vision. By bringing together farmers, processors, marketers, researchers, and policymakers, we are creating a dynamic platform to explore various aspects of mango production, harvesting, processing, marketing, and value addition.

Our goal is to scale up and strengthen the Nepalese mango industry by fostering networks and collaboration among stakeholders. Through discussions and interactions, we aim to support value chain actors for the industry's growth, sustainability, and competitiveness. This symposium will enable us to share insights, address pressing issues, and explore innovative solutions for the development of the mango industry.

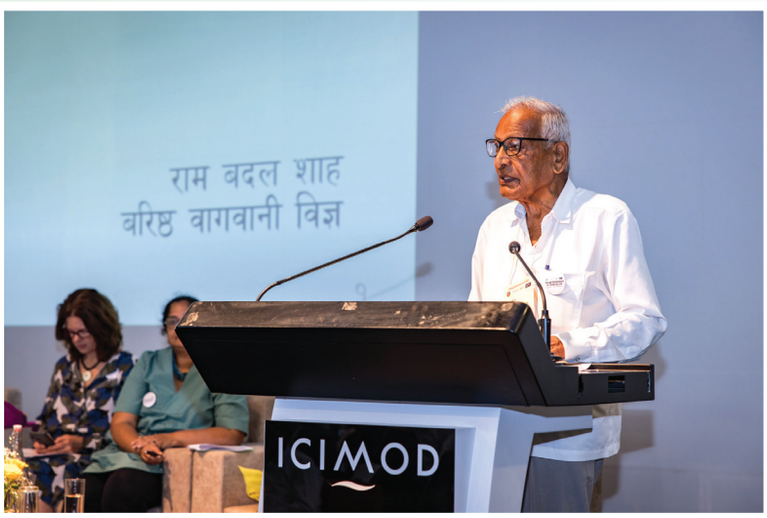
As we move forward, the development of mid-term and long-term action plans, in collaboration with government and development partners, will be crucial. Together, we can foster an environment that promotes entrepreneurship and enhances the livelihoods of those who depend on this valuable crop.

On behalf of ICIMOD, I would like to extend my sincere thanks to all our partners, stakeholders, and participants for your dedication and commitment to this cause. Let us seize this opportunity to learn, share, and collaborate towards a resilient and prosperous future for the mango industry in Nepal.

Thank you.

Keynote Speech

Mr. Ram Badal Shah, Senior Horticulturist, NHS



The history of gardening in Nepal dates back to the reign of King Rana Bahadur Shah, who was the first to establish a garden in the country. During the European visit of Rana Prime Minister during 1850 to 1851 he brought some seeds of vegetables and later imported the exotic fruit saplings. Over the years, various generals and prime ministers have contributed to the expansion and development of gardens in Nepal. The country's orchards commonly cultivate fruits such as mango, litchi, pineapple, banana, jackfruit, guava, and oranges. Scientifically, the process of fruit cultivation begins with selecting suitable land, and the first organized fruit cultivation in Nepal was carried out by Shree 6 Gururaj Hemraj Pandit and K.P. Shree Kishor Narshingh Rana in Kapan.

Between 1995 AD and 2009 AD, Nepal imported various fruit saplings, including apple, peach, plum, pear, persimmon, cherry, and mausami orange; from countries like Europe and Japan. The first individual to show interest in bringing foreign fruits to Nepal was the Late Divya Bahadur Basnet. Later, in 1999 B.S., Late Dr. K.S. Bilgrami, a renowned fruit expert, initiated commercial fruit cultivation in Nepal, with the assistance of Satyalal Ranjitkar, who held a B.Sc. in Agriculture. To support the growing interest in horticulture, fruit nurseries were established in different locations, including the Godavari Durbar Garden, Chauni Experimental Farm, and Balaju Fruit Nursery. The Balaju Fruit Nursery, in particular, cultivated various fruit varieties such as plums, Kashmiri pears, and Japanese persimmons.

In 2020 B.S., the Agriculture Development Plan was introduced as a 20-year agricultural development initiative. Later, in 2050 B.S., nurseries were established in Parwanipur, Kakani, and Godavari to enhance fruit saplings. After the conclusion of the Gram Development Program in 2017 B.S., India began assisting Nepal in developing horticulture farms. Under the Horticulture Development Plan, farms for potatoes, tea, coffee, and spices were set up in Jogbani, and horticulture farms were established in remote areas like Humla and Jumla. Key development plans in Nepal's history include the First Development Plan (2013-2018 B.S.), the Second Three-Year Development Plan (2019-2022 B.S.), which facilitated the establishment of an additional government across Nepal, and the establishment of the Solukhumbu Horticulture Farm in 2029 B.S. Mr. Ram Badal Shah personally traveled to almost all districts of Nepal for the development of horticulture farms, with the exception of eight districts out of the total 75.

Mango, known as the "King of Fruits" in Nepal, holds significant cultural and economic importance. Mango branches are used in pujas and ceremonies, and the fruit has been cultivated for over 4,000 years. The mango, scientifically known as Mangifera indica, originated in South Asia, including India and Burma, and belongs to the Anacardiaceae family. India alone has around 1,000 varieties of mangoes, with the southern region accounting for more than 300 varieties. In Nepal, popular mango varieties include Gulab Khas, Sukutara (which has a high sugar content of 70%), Bombay Yellow (with 21% total soluble solids and a weight of 200-250g), Dasheri (introduced in 2034-2035 B.S.), Langra (which fruits in alternate years), Neelam & Dasheri hybrids (such as Amrapali & Mallika), and Maldah.

Mango is cultivated in 66 out of 77 districts in Nepal. Under the Prime Minister Agriculture Modernization Project (PMAMP), mango farming programs have been implemented in districts such as Dhanusha, Saptari, Siraha, and Syangja. Although only three out of the 28 Terai districts were included in the plan, experts suggest that expanding mango cultivation to all Terai districts would be highly beneficial. In Nepal, 466,266 metric tons of mangoes are produced annually. In fiscal year 2022/23 the production of mango reached 498,859 metric tons.

Despite its potential, mango cultivation in Nepal faces several challenges. One major issue is the lack of industrialization and modernization, as scientific methods are not widely used, and mango farming is not given due priority. Additionally, there are no widespread awareness programs for farmers to acquaint with improved cultivation techniques of mango. Another challenge is the long-term gestation period nature of mango trees, which take several years to bear fruit, discouraging foreign investment in mango farming. Political instability further hampers the growth of mango farming, as the absence of consistent policies and long-term planning prevents effective implementation of government programs. Moreover, many people prefer consuming mangoes but show little interest in farming, with a significant portion of the workforce migrating abroad for job opportunities. Furthermore, many farmers lack proper knowledge about mango cultivation techniques.

To address these challenges, several solutions have been proposed. First, industrialization and modern farming techniques should be promoted by introducing scientific methods and technologies in mango farming. Awareness programs should be conducted to train farmers, and large-scale mango farms should be encouraged. Second, the government should provide financial support and subsidies to mango farmers while introducing policies to attract investors. Third, stable policies and long-term planning are essential for ensuring continuous funding and support for mango-related programs. Fourth, youth participation in farming should be encouraged by offering incentives, training programs, and financial aid to attract young people to the agricultural sector. Finally, farmer education should be improved by organizing training sessions on modern mango cultivation techniques and establishing agricultural research centers to guide farmers on best practices.

In conclusion, Nepal has a rich history of horticulture, with significant contributions from various individuals and institutions. Mango, as an essential fruit crop, plays a vital role in Nepal's economy and culture. However, several challenges hinder the full potential of mango farming. By adopting industrialization, modern techniques, and government-backed initiatives, Nepal can significantly enhance production and marketing of mango.

Remarks

1.Kavitha Kasynathan, Australian Embassy

Mango is a vital crop with the potential to enhance lives and livelihoods, particularly in this region. The global mango industry has been experiencing steady growth, expanding at an annual rate of approximately 6%. The market value increased from $63 billion in 2023 to $69 billion in 2024, highlighting its economic significance.

In Australia, the mango industry has witnessed significant expansion over the past 16 years, both domestically and internationally. This progress has been largely driven by research, innovation, and improved farming practices. As a result, Australian mangoes have become more resistant to diseases, contain less fiber, and exhibit larger sizes with improved peel coloration.

Several advanced farming techniques have contributed to this success. Drip irrigation system has been applied to conserve water and enhance efficiency, while shed netting is used to protect trees from extreme weather conditions. Additionally, specialized mobile applications assist farmers in determining the optimal time for harvesting, and sorting technology has enabled the efficient

classification of mangoes based on size, color and quality.

Although Australia is not a leading mango producer on a global scale, it maintains a strong export presence in key markets such as the United States and China. To further elaborate the mango industry, Australia hosts an annual Summer Mango Festival in December, featuring engaging activities such as mango-eating contests and relay races.

The sustainability and success of the mango industry depend on close collaboration among farmers, researchers, policymakers, marketers, and stakeholders. This symposium presents an excellent platform to exchange knowledge and explore opportunities for the development of Nepal's mango industry, which holds immense potential. The discussions held today will help identify key challenges and strategies to strengthen the mango value chain. By embracing sustainable practices and innovative solutions, long-term growth and resilience in mango production can be ensured.

On behalf of the Australian Government and the Department of Foreign Affairs, I extend my heartfelt congratulations to the organizers of this event and look forward to productive discussions that will benefit all stakeholders involved in the mango industry.

2. Dr. Surendra Lal Shrestha, Executive Director, NARC

Mango is a widely cultivated fruit globally and is often referred to as the "King of Fruits." It is primarily propagated through grafting, a common method of asexual reproduction that ensures quality and consistency in mango production.

In Nepal, the Terai region has historically been home to many mango orchards. However, in recent years, there has been a decline in the establishment of new orchards. Rather than solely focusing on planting new mango trees, efforts should be directed toward the improvement and development of existing mango gardens to enhance productivity and quality.

Under Nepal Agriculture Research Council (NARC), mango research farms are limited, underscoring the need for expanded research in this field. One of the major challenges faced by mango farmers is the issue of alternate bearing, where trees produce fruit only every other year. Although technological solutions exist to address this problem, they have yet to be widely implemented among Nepalese farmers.

Additionally, there is ongoing research on various mango varieties, particularly in the area of off-season mango production. Expanding these efforts will contribute to greater market stability and higher income for farmers. Furthermore, special attention must be given to the challenges faced by mango farmers in Nepal's mid-hill regions, where cultivation conditions differ from those of the Terai.

Moving forward, the key priorities for Nepal's mango industry should include:

- Revitalizing and enhancing existing mango orchards.
- Providing farmers with access to improved technologies.
- Expanding research initiatives focused on off-yearmango production.

With the right strategies and collaborative efforts, mango farming in Nepal can be significantly boosted, leading to increased economic benefits for farmers and contributing to the country's overall agricultural growth. Let us work together to achieve this vision.

3. Mr. Umesh Shrestha, Chairman UB Holdings Pvt. Ltd.

It is a pleasure to be here today to discuss the challenges and opportunities in the agriculture sector. Over the past two years, I have personally been involved in the fields, working with farmers, demonstrating farming techniques, and exploring new agricultural possibilities.

One major issue we have observed is the financial crisis among farmers. In Jumla, the shift towards high-density plantation crops has led to economic difficulties for farmers. Similarly, in Dolkha, Kiwi farming has faced challenges and has not been as successful as anticipated. After thorough study, we have concluded that apple farming should be focused in regions such as Mustang and Humla, to prevent financial struggles in other areas.

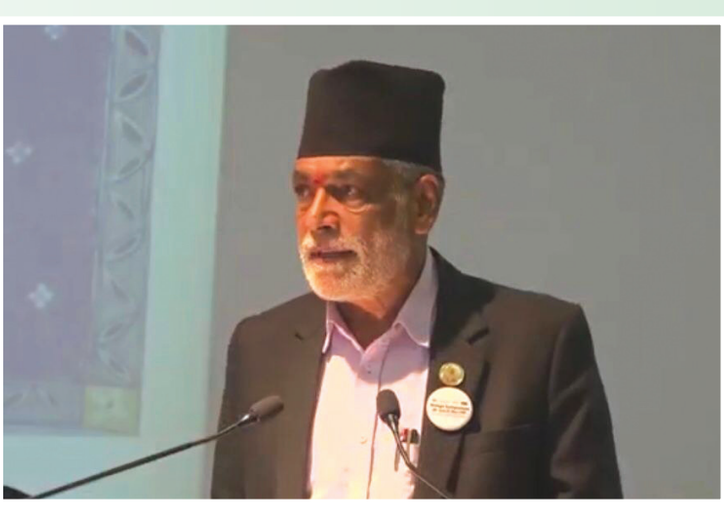
Another significant issue is the lack of proper production and storage facilities in Nepal, which results in wastage and financial losses. The government must prioritize the development of a well-planned supply chain to ensure farmers can store and sell their products efficiently.

To improve the agriculture sector, we must focus on:

- **Adopting modern technology** to increase crop production.
- **Growing high-value crops** that offer greater profitability for farmers.
- **Using high-tech farming systems** to improve efficiency and sustainability.

We are actively working on enhancing the supply chain for agricultural products, but there is still more to be done. I sincerely hope this symposium will foster valuable discussions on these issues and lead to solutions for a brighter future for agriculture.

Honorable Minister Ramnath Adhikari, Ministry of Agriculture and Livestock Development



Hon. Ramnath Adhikari, the Minister of the MoALD, expressed his honor in being part of the discussion on the importance of mango cultivation and its impact on Nepal's agricultural sector. Mango, being a commercially significant crop, especially in the Terai region, holds immense potential to boost the nation's economy. However, its cultivation faces certain environmental and climatic challenges, which require immediate attention.

The Government of Nepal has been actively working on enhancing mango cultivation through various programs aimed at supporting farmers and increasing productivity. Some of the key initiatives include:

- **Establishing Mango Farms**: Mango farms are being established in districts such as Dhanusha, Saptari, Siraha, and Syangja to promote large-scale mango cultivation.
- **Improving Existing Orchards**: Efforts are being made to improve the productivity of existing mango orchards, ensuring they are more efficient and yield higher outputs.
- **Budget Allocation**: A dedicated budget has been allocated for mango cultivation every year to support the

sector's growth through PMAMP, NCFD, Provincial and local government.

Moving forward, the government aims to focus on the following goals:

- **Addressing the Cost of Production**: Discussions will be held to understand and address the cost of production and other challenges farmers are facing in mango cultivation.
- **Interaction Programs**: Regular discussion programs will be organized to develop new strategies, plans, and solutions for improving mango farming practices.
- **Encouraging Government Participation**: The government at the local, provincial and federal level will be encouraged to actively participate in the development of mango production, ensuring its growth across the suitable parts of the country.

The role of farmers is crucial in enhancing mango production. By improving mango farming practices and supporting farmers, Nepal can significantly increase mango exports and reduce imports. This would contribute to strengthening Nepal's economy and ensuring the sustainable growth of the agricultural sector.

The honorable minister emphasized that developing the mango industry requires a collaborative approach involving farmers, government agencies, researchers, and marketers. Through improved farming practices, increased government support and strategic partnerships, the mango sector can achieve its full potential.

In conclusion, Hon. Ramnath Adhikari expressed his hope for productive discussions in the coming days and reiterated the government's commitment to working together for the growth and development of Nepal's agricultural sector.

Vote of Thanks

Ms. Sunita Nhemaphuki, CEO/Founder, R&D Innovative Solution Pvt. Ltd

Distinguished guests, esteemed dignitaries and respected participants,

I would like to express my heartfelt gratitude to each and every one of you for your valuable time and contribution to the success of the Mango Symposium. It has been an honor to have all of you with us today.

Special thanks to Dr. Narahari Prasad Ghimire, Director General of Department of Agriculture, for his leadership and commitment to advancing agricultural practices in Nepal. We are also deeply grateful to our Chief Guest, Hon. Minister Ramnath Adhikari, for your inspiring words and continuous support for the Ministry of Agriculture and Livestock Development. Your presence today signifies your strong dedication to the future of our agriculture sector.

We are privileged to have had such distinguished Special Guests: Mr. Umesh Shrestha, former Minister and Founder Chairman of UB Agro, Dr. Deepak Kumar Kharal, Secretary of MoALD, and Ms. Izabella Koziell, Deputy Director General of ICIMOD. Your expertise and contributions to the field of agriculture have provided invaluable insights into our discussions.

Heartfelt thanks to our Guests of Honor: Prof. Arjun Kumar Shrestha, Dean of the Faculty of Agriculture at AFU, Ms. Kavitha Kasynathan from the Australian Embassy, and Dr. Surendra Lal Shrestha, Executive Director of the Nepal Agriculture Research Council. Your commitment to agricultural innovation and research is evident and truly appreciated.

I would also like to express my gratitude to the Mayors of Janakpur sub metropolitan city, Rajbiraj Municipality, Dhangadhimai Municipality and Hariwon Municipality for your presence today and your commitment to local agricultural development. Our appreciation extends to the representatives from the Nepal Farmers' Commission and all other esteemed guests who joined us to make this symposium a success.

Your collective efforts in shaping the future of mango cultivation and agriculture in Nepal are invaluable. Your

contributions today have been pivotal in advancing this important cause, and I am optimistic that, through continued collaboration, we will drive meaningful progress in the days ahead.

Once again, thank you for your presence, participation, and unwavering dedication to improving the agriculture sector. Together, we will ensure a brighter and more sustainable future for mango cultivation in Nepal.

Thank you!

Closing remarks of the opening session

Dr. Narahari P. Ghimire, Director General (DG), Department of Agriculture

It is truly a pleasure to be here today as we gather to discuss the immense importance of mango cultivation in Nepal. Mango, often hailed as the "King of Fruits," holds a special place not only because of its delectable taste but also because of its rich nutritional value. The enzymes found in mangoes, especially protease, assist in the digestion of proteins, making it a fruit that is both delicious and beneficial to health.

One of the standout qualities of mango is its remarkable adaptability. It thrives in a variety of climates and soil conditions, which makes it suitable for diverse regions. In Nepal, the Terai and Inner Terai region is the heart of commercial mango production and this area plays an indispensable role in the country's agricultural landscape and economy.

With the application of improved farming techniques and the continued support of the government, I am confident that we can not only increase the production of mangoes but also enhance their quality, thereby making a significant contribution to Nepal's economy.

I am eager to hear the discussions today and look forward to working together in the future to further strengthen and expand the mango industry in Nepal.

Thank you.

Award Ceremony

Mr. Surya Prasad Baral, Senior Horticulture Development Officer, announced the awardees for their outstanding contributions to horticulture. The prestigious title of **Mango Expert 2081** was awarded to **Mr. Ram Badal Shah**, with sponsorship support from **SKT Nepal Pvt. Ltd.** Similarly, the title of **Best Mango Production 2081** was presented to **Mr. Nuruddin Shah**, sponsored by **Shalom Agricultural Pvt. Ltd.** In the category of nursery development, **Ms. Shanna Karki** was recognized with the title of **Best Mango Nursery 2081**, proudly sponsored by **G-Seven Agriculture Pvt. Ltd.**

The award was jointly handed over by the concerned sponsor and Hon. Minister Ramnath Adhikari, MoALD

TECHNICAL SESSION I

Trust Transfer from Farm to Fork: An experience of mango orchard from Thailand.

Dr. Krit Wongrujira, Ms. Chalisa Chookaew, Dr. Umed Kumar Pun and Dr. Pimpen Pornchaloempong, Factory Classroom, Department of Food Engineering, King Mongkut's Institute of Technology, Ladkrabang, Bangkok, Thailand

The session titled "Trust Transfer from Farm to Fork," presented by the Factory Classroom, KMITL, Bangkok Thailand focused on monitoring/recording farm operations and food supply chain to ensure food safety, quality, and transparency from the farm to the consumer. The presentation discussed how mango cultivation requires a systematic approach to ensure both quality and efficiency and real time remote monitoring of the mango trees was done by using sensors and Internet of Things (IoT). Central to their presentation were the key motivations driving mango management, which include *Taste, Trust, and Trace*.

The speakers outlined essential practices for the successful care and management of mango cultivation, particularly focusing on the concept of "Mango Baby Care." These methods were designed to optimize the growth and health of mango trees throughout the year. The care schedule includes several stages: from pruning, weeding, mulching, and fertilizing between May and June, to spraying antifungal agents and applying non-fertilizer treatments from July to September. In October, potassium nitrate fertilization is applied, followed by bagging after 40-50 days. November sees additional antifungal treatments and the application of mango wraps, while January and March-April are dedicated to the first and second harvests, respectively. Farmers update the status of their mango farm operations information to the database every three months to ensure continuous monitoring and care.

An essential component of ensuring the mangoes' growth conditions is by precision monitoring of the environment around the tree and the soil region of the tree. To this end, four types of sensor-based monitoring systems were utilized in mango orchards. These systems include weather stations that track critical environmental parameters like air temperature, humidity, wind speed/direction, rainfall intensity, light intensity, UV index, and barometric pressure. Soil sensors monitor for soil conditions, including temperature, moisture, and field capacity, while air sensors track factors such as CO_2 levels, temperature, and humidity. Light sensors were also employed to ensure that light intensity remains ideal for plant growth.

This research was done at Kiat Amporn Mango Orchard, where monitoring systems were installed in two main practices: *A3 (Best Practice)*, which incorporates pruning and proper nutrition management techniques, and *A5 (Normal Practice)*, which follows standard agricultural practices (no pruning and less application of nutrition). To ensure traceability, each mango is tagged with a QR code that provides consumers with detailed data on the agricultural practices, environmental conditions, and the mango's origin. This traceability system ensures that customers can verify the mango's quality and cultivation methods.

Finally, the quality control of mangoes is maintained through cold chain management and careful temperature distribution during logistics. A standardized air transportation system is employed to maintain the premium quality of the mangoes throughout the entire supply chain. Through these meticulous practices, the session highlighted the importance of building trust with consumers by ensuring that every mango reaching the market is of the highest possible quality, safe, and traceable from farm to fork.

The chemical properties of Nam Dok Mai Si Thong mangoes were assessed after being stored for 7 days under two different farming practices: *Normal Practice (A5 Zone)* and *Good Practice (A3 Zone)*. These practices differed primarily in the approach to pruning, with the A5 zone involving no pruning and the A3 zone incorporating pruning as part of the cultivation process.

Results:

The chemical analysis of Nam Dok Mai Si Thong mangoes stored for 7 days under two farming practices, *Normal Practice (A5 Zone)* and *Good Practice (A3 Zone)*, revealed significant differences in key quality parameters

01

Trust transfer from farm to fork
By Factory Classroom KMITL

-Dr. Krit Wongrujira
-Ms. Chalisa Chookaew
-Dr. Umed Pun
-Dr. Pimpen Pornchaloempong

PARIS 2024

02

Motivation

- Taste
- Trust
- Trace

03

Overview

Baby Care

Identify

Quality control

04

MONITOR FARMING OPERATIONS

Baby Care

Control the environment

Plant the mango trees according to the best practice such as fertilizer, pruning, spraying, etc.

Monitoring the environment

Tracking the environmental sensors
- air temperature
- air humidity,
- soil temperature
- soil humidity,
- soil EC, etc.,

data to cloud

05

MONITOR FARMING OPERATIONS

Mango Baby Care

May-Jun
- Pruning
- Weeding
- Mulching
- Fertilizing (NPK)

Jul-Sep
- Spraying antifungal
- Non-fertilize

Oct
- Fertilizing (KNO3)

Nov
- Spraying antifungal 2 times before mango wrap
- Mango wrap

Jan
- 1st harvesting

Mar-Apr
- 2nd harvesting

06

MONITORING THE ENVIRONMENT

Sensors

Weather station
- Air temperature
- Air humidity
- Wind speed/direction
- Rainfall Intensity
- Light intensity
- UV index
- Barometric pressure

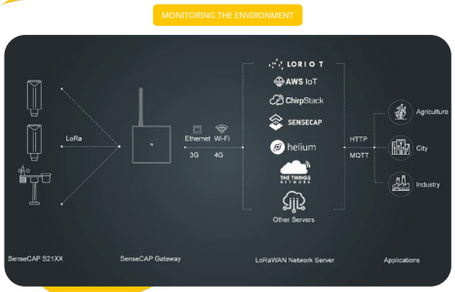
Air sensor
- CO2
- Air temperature
- Air humidity

Soil sensor
- Soil temperature
- Soil moisture
- Soil EC

Light intensity

07

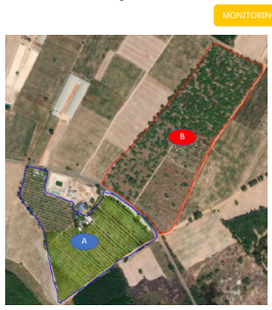
MONITORING THE ENVIRONMENT



08

Kiat Amporn Mango Orchard

MONITORING THE ENVIRONMENT



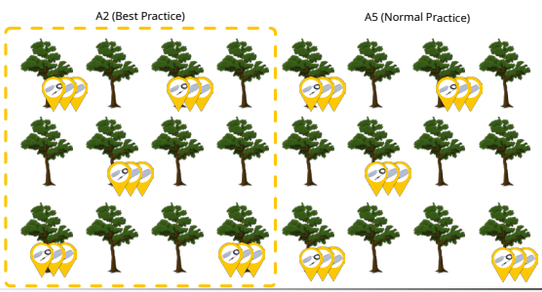
09

Kiat Amporn Mango Orchard

MONITORING THE ENVIRONMENT

A2 (Best Practice)

A5 (Normal Practice)



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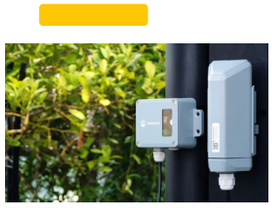
Baby Care



10

Identify

Tracking the mango

Identify the mango by QR code for agriculture product test back. The user can see the data by scanning the QR code.

11

TRACKING THE MANGO

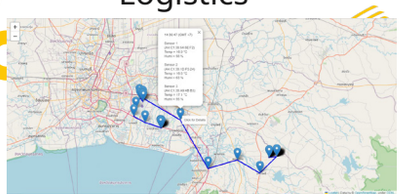
Tracking

Aagriculture product

Packaging

12

Logistics



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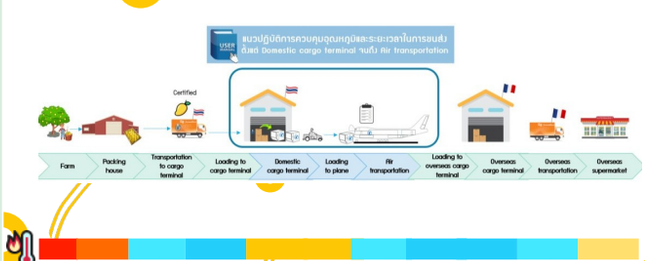
Logistics

14

Logistics



15

Quality Control

Description

Quality control by cold chain management and temperature distribution in logistics to establish standards for air transportation of premium agricultural produce.

15

Chemical Properties

The chemical properties of Nam Dok Mai Si Thong after being stored for 7 days.

Treatment	TSS	Acidity	pH	TSS/Acidity ratio
Normal practice (A 5 zone)	20.5^{a}±1.6	0.79^{a}±0.14	4.58^{a}±0.39	26.92^{b}±5.79
Good practice (A 3 zone)	19.6^{b}±1.4	0.68^{b}±0.16	4.40^{b}±0.44	30.44^{a}±7.36

Values given as mean ± standard deviation (N = 300)
Analysis by t-test ($p<0.05$)

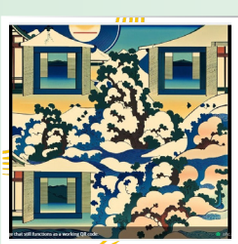
15

Physical Properties

The physical properties of Nam Dok Mai Si Thong after being stored for 7 days.

Treatment	Peel color			Flesh color		
	L*	a*	b*	L*	a*	b*
Normal practice (A 5 zone)	74.05^{b}±3.68	10.14^{b}±1.67	40.22^{b}±2.94	62.80^{b}±3.65	10.81^{a}±2.17	66.96^{b}±2.30
Good practice (A 3 zone)	77.99^{a}±1.90	10.49^{a}±1.85	42.89^{a}±2.86	64.05^{a}±3.27	10.12^{b}±2.69	68.86^{a}±2.88

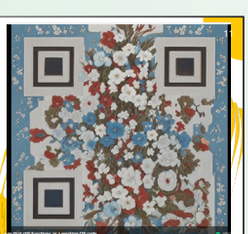
Values given as mean ± standard deviation (N = 300)
Analysis by t-test ($p<0.05$)



Orchard product

TRACE THE MANGO

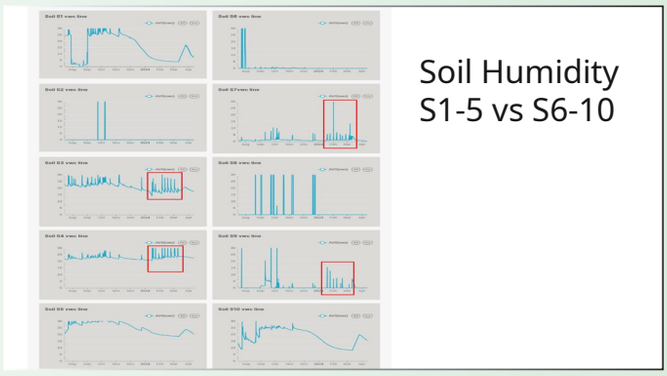
Trace

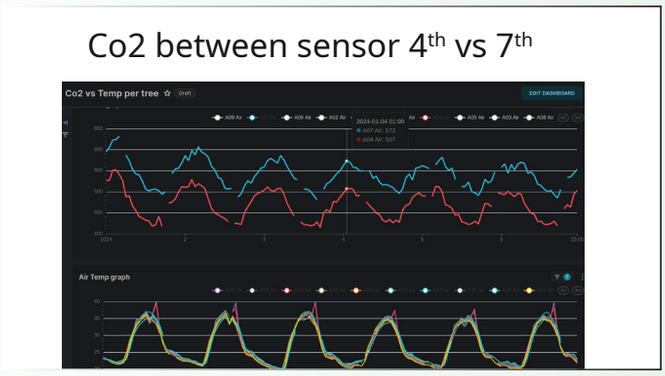


Packaging

Try -->>

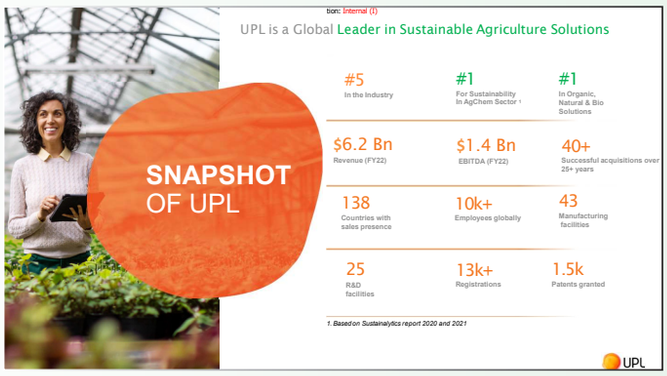
Lat/Lon GPS info of sensors and GW

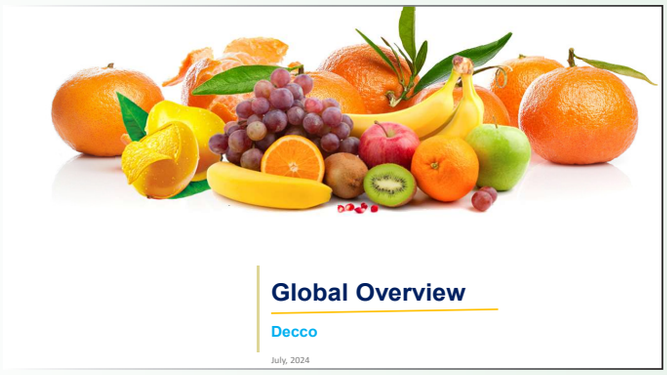


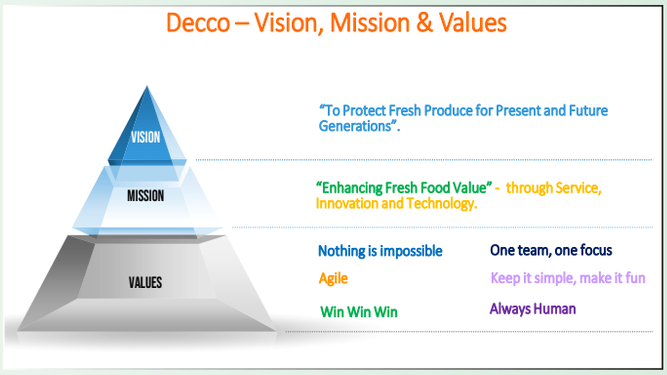


Post-Harvest Loss Management, Technology and Services
Mr. Amit Kumar Sharma, DECCO

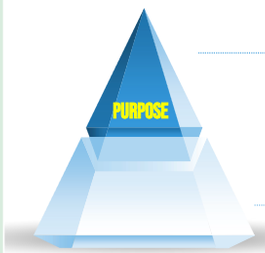
Mr. Amit Sharma, a Post-Harvest Specialist from DECCO (a UPL company), focused on the importance of post-harvest loss management and sustainable agriculture practices to help farmers reduce crop losses and increase their income. UPL provides comprehensive solutions that support every stage of the food value chain, from harvest to consumer.







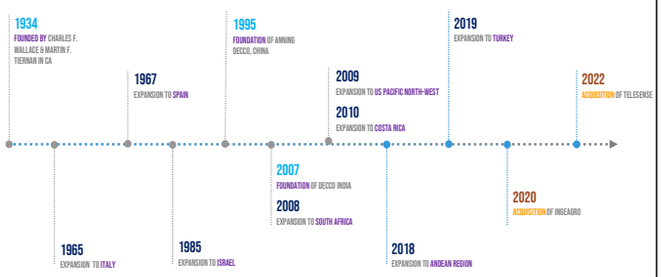
Purpose



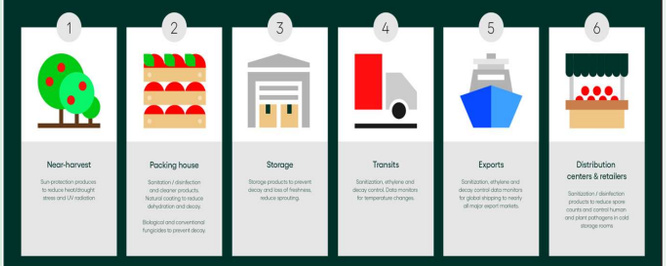
"Enable More and Better Fresh Food for the World".

Decco History.....

Geographic Expansion, Products Launches, Acquisition



Post-harvest Value Chain Presence.....



UPL Ecosystem

DECCO, a UPL company, part of the OpenAg Network

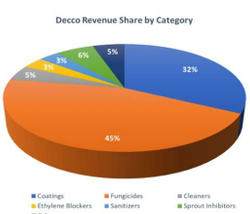
Offering solutions globally to growers, packers, distributors and retailers.

How we do it.....

Through	With	For
Our people	**Our partners**	**Our customers**
Our people are DECCO. • Deep insight in post harvest • Close collaboration with industry and customers • Continuous drive for new or improved solutions	Increase speed of innovation. • We are a gateway for start-ups, universities and pioneering players • Connecting innovative solutions with new customer needs	Strong customer intimacy. • We provide service and resolve pain points, every day • Co-create to increase food safety, minimise loss and expand value of fresh for all

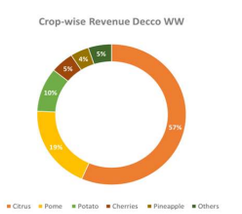
Why we do it: More and better fresh food for the world.

Business Overview – Decco



OVERVIEW:

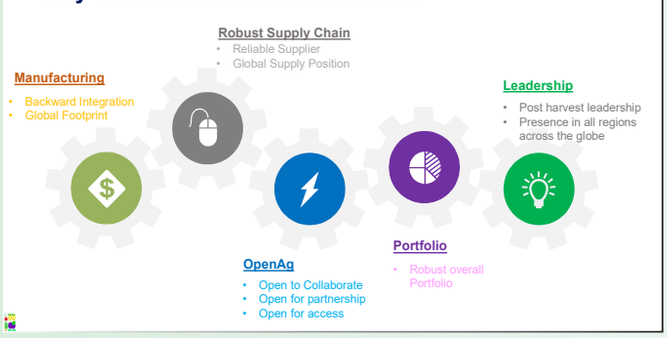
1. Coatings & Fungicides represents 77% of
2. Ethylene Blockers include 1-MCP
3. Others include application equipment's & near-harvest products



OVERVIEW:

1. Citrus is #1 crop for Decco WW
2. Citrus & Pome represents 76% revenue share
3. Top-3 crops contributes to 86% of revenue
4. Other crops includes blueberries, tomatoes, table grapes, banana, etc.

Why Decco as a Preferred Partner?

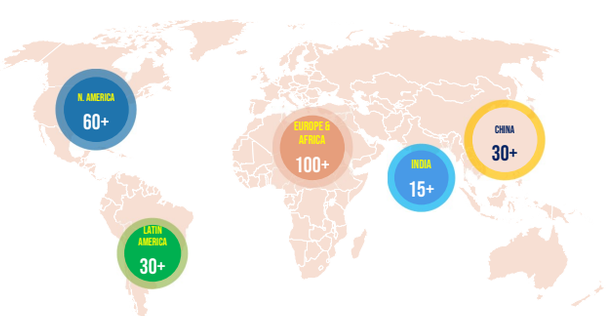


Vertical Integration: Backward Integration

- Shellac is one of the main components of fruits coatings. It is refined from the secretion of the lac bug, a tiny insect that lives in South-East Asia. It is a worldwide recognized and certified food additive.
- Anning Decco is a Joint-Venture controlled by Decco. Established in 1995, it is the largest producer of bleached shellac in Asia.
- Anning Decco manufactures bleached shellac for fruits coatings as well as for other applications (confectionery, paints, pharma...).
- We also supply other lac products including shellac wax, shellac flakes, seedlac and aleuritic acid.

Shellac – Anning Decco

Employees Footprint – Decco



Formulation Plants Footprint – Decco

Mango Research Experience

Prof. Dr. Arjun Kumar Shrestha, Dean, Agriculture and Forestry University (AFU), Rampur

Prof. Dr. Arjun Kumar Shrestha, shared insights into the status of mango research in Nepalese academic institutions. Agriculture and Forestry University (AFU), along with other institutions like Tribhuvan University, Pokhara University, and Kathmandu University, play a significant role in the advancement of agricultural education and research in Nepal. AFU has been focusing on mango research through various studies aimed at improving mango production, quality, and post-harvest management.

Long-Term Mango Research at AFU (From 2023) – Led by Prof. Dr. Arjun Kumar Shrestha

A notable long-term mango research project led by Prof. Dr. Arjun Kumar Shrestha at AFU began in 2023, which examines a high-density mango orchard at the university.

One of the key findings of the study showed that pre-harvest nutrient and growth substance applications help reduce physiological weight loss in mango fruits. A significant challenge in mango farming, particularly fruit drop, is being addressed with an effective solution: spraying a 0.4% borax solution twice, with the first spray 30 days after fruit formation and the second spray 30 days after the first application. This approach has been shown to improve mango fruit quality (Shrestha, 2002, #).

Research on Post-Harvest Treatment and Management Practices for Mango Production

Mango production in Nepal has garnered considerable attention due to its economic importance and the challenges faced in ensuring quality and post-harvest management. Several research studies have examined the effects of various post-harvest treatments and tree management practices aimed at improving the shelf life, quality, and productivity of mangoes, particularly in the Lower Koshi River Basin (LKRB) region.

A study conducted in 2015 focused on the effects of physical and chemical treatments on the post-harvest quality of Amrapali mangoes. The research found that hot water treatment at 50°C for 10 minutes significantly extended the shelf life of mangoes by reducing spoilage and maintaining their overall quality. Similarly, a study conducted in 2018 investigated the efficacy of hot water treatments at various temperatures, concluding that a 55°C for 10 minutes' treatment was most effective in minimizing spoilage and extending shelf life, even when compared to chemical treatments like sodium hypochlorite @100 ppm for 2 minutes and Carbendazim solution @0.1% for 10 minutes. These findings underscore the importance of temperature control in post-harvest handling to improve mango shelf life (Pandey & Shrestha, 2018, #).

Furthermore, a 2023 study explored the use of salicylic acid as a post-harvest treatment for enhancing mango quality. It was observed that a 200 ppm concentration of salicylic acid effectively reduced weight loss and maintained fruit firmness, extending the mango's shelf life by up to 15.71 days. Additionally, research on gibberellic acid (GA) treatments demonstrated that 100 ppm GA delayed the ripening process by reducing weight loss and increasing fruit acidity and firmness, thus contributing to an enhanced quality of mangoes. These chemical treatments offer promising solutions for reducing post-harvest losses and improving the marketability of mangoes in Nepal.

An experiment was carried out to investigate the efficacy of plant leaf extracts on elongation of shelf life and maintenance of quality of harvested mangoes. Freshly harvested mature green mangoes cv. '*Calcuttia Maldah'* of uniform size and weight were dipped in 50% concentration of different plant leaf extracts and stored in ambient condition (32±2ºC and 65±5 % RH). The treatments were leaf extracts from five different plants viz. neem (*Azadirachta indica*), chinaberry (*Melia azadirach*), lantana (*Lantana camara*), ashok (*Polyalthea longifolia)* and cinnamon *(Cinnamomum zeylanicum*) while control was the other treatment. In addition, carbendazim (fungicide) was also kept as a benchmark treatment. Each treatment was composed of 5 mangoes and replicated thrice. For each replication destructive sample was also kept. The treatment with neem leaf extract gave the most promising result as there was minimum physiological weight loss, maximum ascorbic acid content, maximum acidity and minimum pH. Similarly, shelf life, total soluble solids, freshness and firmness were highest in neem leaf extract treated fruits next to the carbendazim treated fruits. This method outperformed chemical treatments, offering a more sustainable and eco-friendly alternative for mango post-harvest management (Shrestha & Pandey, 2018, #).

Beyond post-harvest treatments, tree management practices play a significant role in enhancing mango production in Nepal.

Research has shown that paclobutrazol, a growth regulator, can effectively induce flowering in mango trees during off-seasons. A dosage of 1.8 grams per tree was identified as optimal for promoting flowering and improving fruit yield.

Genetic studies using microsatellite markers revealed significant genetic variation within Nepal's mango varieties, indicating the potential for genetic conservation and breeding programs aimed at improving local mango cultivars. 34 mango genotypes(33 local genotypes and 1 hybrid as test genotype) were selected for morphological study.

Despite these advances, the research also identified several challenges in mango production, particularly in the Saptari district. Issues such as pest and disease management, irrigation constraints, labor shortages, and post-harvest losses were found to be major barriers to improving productivity. A value chain analysis emphasized the need for targeted interventions, such as training programs for farmers, improved pest control measures, and enhanced irrigation practices, to address these constraints and enhance the sustainability and profitability of mango farming in the region.

In conclusion, the research on post-harvest treatments, tree management, and grafting practices provides valuable insights into improving mango quality, extending shelf life, and increasing productivity in Nepal. By focusing on both the management of the mango trees and the implementation of effective post-harvest treatments, these studies contribute to the development of sustainable practices for enhancing the mango value chain in the LKRB region and beyond.

Analysis of Mango Marketing Channels in Siraha

In Siraha district, Nepal, mango production is abundant during the harvesting season. However, poor marketing systems and practices result in substantial waste or the sale of mangoes at very low prices. A study conducted by (Yadav et al., 2022, #) aimed to analyze mango marketing channels, post-harvest handling, challenges, marketing margins, market shares, and consumer buying behavior in Siraha. The survey included 30 farmers, 5 wholesalers, 32 retailers, and 25 consumers from Golbazaar and Dhangadimai municipalities.

The study revealed that the majority of mango traders in Siraha were male, and 91.49% of mangoes sold in the district were produced locally. Wholesalers supplied 30.66% of mangoes to retailers, while 14.73% were sold directly to consumers. Notably, varieties like Gulab Khas and Banaganapalli were imported from India, but the Maldah variety held the highest market share, as it was the most commonly grown by local farmers. The Bombay green variety offered a slightly higher profit margin than other varieties, indicating the economic importance of certain cultivars in the market.

Mango marketing in Siraha was found to be influenced by various factors such as mango variety, the timing of harvest, market proximity, and farming practices. It was revealed that the market demand for mango in Siraha was produced in Siraha itself (91.49%). The wholesalers supplied 30.66% of their mango to retailers, and 14.73% to consumers. Gulab Khas and Banaganapalli were the most imported varieties from India. Each variety of mango provided an almost equal margin, although Bombay was slightly higher than others.

The study suggested that Nepal focus on enhancing commercial mango production, better storage facilities, and improved post-harvest management techniques. Moreover, government support, including subsidies and the establishment of a stronger marketing system, could help farmers obtain better prices for their mangoes while reducing post-harvest waste.

The study concluded that a collaborative effort from all stakeholders, including farmers, wholesalers, retailers, and government bodies, is essential to making mango farming in Siraha a profitable and sustainable business. The findings underline the importance of improving the marketing system and addressing the challenges faced by mango farmers in the district. By implementing these recommendations, Nepal can strengthen its mango value chain, reduce reliance on imported mangoes, and contribute to the economic development of the region.

Conclusion and Way Forward:

Research on mango farming in Nepal has made significant strides in improving the production, quality, and market efficiency of mangoes. Academic institutions have focused on various critical aspects, such as post-harvest management, varietal characterization, off-season production, use of plant growth regulators (PGRs), quality improvement, propagation techniques, and socioeconomic analysis of the mango market. Each of these areas has contributed to enhancing the mango farming industry by addressing challenges like waste reduction, inconsistent fruiting, and low market competitiveness.

Key findings and research directions suggest that improvements in post-harvest management are essential to reduce waste and increase shelf life. Understanding mango varieties and their regional suitability is crucial for optimizing production. Exploring off-season production and regularity of bearing can help ensure a consistent supply, while research on PGRs promises to enhance flowering and fruit set. Furthermore, quality improvements in fruit size, taste, and appearance will increase competitiveness in domestic and international markets. Propagation techniques also play a vital role in producing healthy, high-yielding mango plants, and socioeconomic research aids in developing sustainable marketing strategies that improve farmer profits.

To advance mango research in Nepal, several strategic steps need to be taken to build upon existing findings and enhance the industry's overall growth. These strategies include setting clear research priorities, such as developing high-yielding, disease-resistant, and regular-bearing mango varieties, conducting studies on mango nutrition, storage, and preservation, and focusing on eco-friendly pest and disease management solutions.

In addition to technical and scientific advancements, financial and institutional support will be crucial in pushing research forward. Government support through funding and resources for research projects is essential, alongside collaboration with national and international bodies to secure grants. Furthermore, fostering public-private partnerships will help provide the necessary resources and technology for further research and development.

By focusing on these key areas and ensuring collaboration among researchers, farmers, and government bodies, Nepal can develop a more sustainable, efficient, and profitable mango industry, benefiting both local communities and the economy at large.

Government Farm's Experience, Tropical Horticulture Center (THC), Sarlahi

The Government Farm's experience, shared by Mr. Ram Kumar Yadav, Acting Chief of the Horticulture Development Center, offers a comprehensive overview of the horticultural activities carried out in Madhesh Province, Sarlahi District, Lalbandi Municipality, and Ward No. 1. The farm, established in 2029 B.S., covers an area of 185.54 hectares where fruit production is underway on 51% of the land, of which mangoes occupy 80% and rest are other fruits. The farm also grows vegetables, ornamental flowers, and various other crops. The primary objectives of the farm are the production and distribution of tropical fruits saplings, vegetables seeds/seedings, and ornamental seeds/saplings, conservation of native fruits and vegetables, and the production of True Potato Seed (TPS). Additionally, the farm serves as a service center for farmers and nursery owners, supporting them in improving horticultural-technologies .

One of the key activities at the farm is the production of quality mango saplings. This process involves preparing high-quality rootstocks, utilizing grafting techniques to ensure strong and productive trees, and ensuring proper packaging and transportation of mango plants. In terms of mango orchard management, the farm emphasizes on maintaining a healthy environment through care, management and timely fertilization. High-pressure sprayers are used for effective pest and disease control, while efficient irrigation systems, such as ring and drip methods, are implemented to ensure proper water supply to the mango trees. In addition to mango cultivation, the farm also focuses on the production and distribution of other crops, including jackfruit, jamun, ornamental flowers and TPS.

Through its extensive operations, the Government Farm has learned several valuable lessons that contribute to improved farming practices. One of the most crucial lessons is the importance of using quality mango saplings that are true to type, which ensures consistency in fruit quality and productivity. The farm has also realized the need to focus on high-density mango varieties that offer higher yields and more consistent fruiting. Furthermore, the farm recommends using veneer and side grafting techniques instead of inarching as these methods are more reliable in producing healthy trees. A key takeaway is the importance of plant quarantine measures when importing plants to avoid the introduction of pests and diseases that could affect local crops. Additionally, the farm has recognized the need for more research on mango cultivation, especially in addressing issues such as pest management, fruit cracking and fruit drop. To further enhance mango farming, the farm suggests conducting on-site training programs for farmers, nurseryman and orchard owners, frontline technicians, and launching a community campaign to manage the Red Banded Caterpillar.

Looking to the future, the farm has outlined several strategies to further improve mango production and promote sustainable agricultural practices. These strategies include prioritizing the development of new and regular-bearing mango varieties, establishing proper processing industries for mango-based products like pickles, juices, and dried mango powder, and implementing advanced technologies such as fruit harvesters, pre-cooling systems, and packaging and transportation methods to reduce post-harvest losses. The farm also proposes developing the existing training into an international-level where farmers can gain valuable knowledge and skills. Additionally, the establishment of a Business Incubation Center for mango value chain management is recommended to enhance the commercialization and profitability of mango production.

The farm cultivates several popular mango varieties, each known for its distinct flavor, size and quality. These varieties include Bombay Green, Bombay Yellow, Gulabkhas, Dasheri, Maldah, Langra, Alfonso, Amrapali (Dasheri × Neelam) and Mallika (Neelam × Dasheri). These mango varieties are cultivated with great care, and their production contributes to the farm's reputation for producing high-quality mangoes that are well-regarded both local and in international markets.

Experience of Prime Minister Agriculture Modernization Project (PMAMP)

Dr. Jeet Bahadur Chand, Senior Agricultural Engineer at PMAMP, shared insights into the experiences and challenges of mango farming under the Prime Minister Agriculture Modernization Project (PMAMP). PMAMP was introduced with the aim of transforming Nepal's agriculture-based economy into a modern, professional, and self-sufficient agro-based industry. The project, spanning from 2073 Shrawan to 2083 Ashar (a period of 10 years), was identified as a transformative initiative in the 15th development plan of Nepal.

Objectives and Scope of PMAMP

The overarching goals of PMAMP are:

1. **Development of a sustainable and self-reliant agricultural sector**, transitioning from subsistence farming to modern, commercial agriculture.

2. **Enhancing competitiveness** by increasing the value of exportable agricultural commodities, including mangoes.
3. **Promoting agriculture as a profitable business**, thereby creating employment opportunities and improving the livelihoods of farmers.
4. **Ensuring effective service delivery** through coordination between various stakeholders such as government agencies, private sector actors, and local communities.

Mangoes: Issues & Experience of PMAMP

Mango Symposium 2024, ICIMOD

Dr Jeet B Chand
Senior Agricultural Engineer
Prime Minister Agriculture Modernization Project
22 July, 2024

Brief Description-PMAMP

कृषिमा आधारित अर्थतन्त्रबाट कृषिजन्य उद्योगमा रुपान्तरित आधुनिक, व्यावसायिक, दिगो एवं आत्मनिर्भर कृषि क्षेत्रको विकास गर्ने सोच ।

परियोजना अवधि: २०७३ श्रावण - २०८३ असार (१० वर्ष)

पन्ध्रौं योजनामा रुपान्तरणकारी आयोजनाको रुपमा पहिचान गरिएको

परियोजनाको लक्ष्य एवं उद्देश्य:

१. प्रमुख कृषि उपजहरुको विशिष्टीकृत क्षेत्रहरु निर्माण गर्ने,
२. निर्यातयोग्य कृषि वस्तुहरुको मूल्य अभिवृद्धि गर्दै प्रतिस्पर्धात्मक क्षमता अभिवृद्धि गर्ने,
३. कृषिलाई सम्मानजनक नाफामुखी व्यावसायका रुपमा विकास गर्दै रोजगारीका अवसरहरु सृजना गर्ने र
४. बहुसरोकारवाला निकायहरु बीचको कार्यमूलक समन्वय मार्फत प्रभावकारी सेवा प्रवाहको सुनिश्चितता गर्ने।

Crop & Livestock under PMAMP

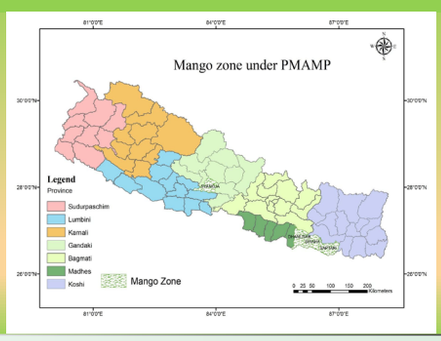
१। धान
२। मकै
३। गहुँ
४। तरकारी
५। आलु
६। दलहन/तेलहन वाली (सिमी, भटमास, मुसुरो, तोरी)
७। सुन्तलाजात फलफूल (सुन्तला, जुनार, कागती)
८। स्याउ/ओखर
९। आँप
१०। केरा
११। दुध (गाई, भैंसी)
१२। माछा
१३। मासु (बाख्रा, बंगुर)
१४। निर्यात प्रवर्द्धन वाली (कफी, अलैची, अदुवा/बेसार)
१५। मौरी

खाद्य तथा पोषण सुरक्षाका लागि आधारभूत वाली

आयात प्रतिस्थापन

निर्यात प्रवर्द्धन

Mango Zones in PMAMP



Major facts about Mangoes

परियोजना क्षेत्रफल (Zone Area): 2985 ha

राष्ट्रिय क्षेत्रफल (Zone Area): 53458 ha

परियोजनको उत्पादन (Production): 43,120 MT

राष्ट्रिय उत्पादन (Production): 498,859 MT

परियोजना उत्पादकत्व (Productivity): 19.3 MT/ha

राष्ट्रिय उत्पादकत्व (Productivity): 12.3 MT/ha

जोनको हिस्सा (क्षेत्रफल): 5.6%

जोनको हिस्सा (उत्पादन): 8.6%

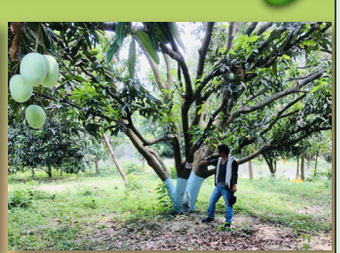
Major issues in Mango Zones

१. आँप बगैंचा व्यवस्थापन
२. रोग किरा व्यवस्थापन
३. सिंचाई
४. आँपको हार्भेष्ट (30% loss due to improper harvesting)
५. आँपको प्रशोधन
६. आँप बगैंचा ठेकेदारको कब्जामा
७. अस्वस्थ बगैंचा
८. ब्राण्डिङ्ग
९. गुणस्तर नियन्त्रण

Recommended Solutions

१. कृषकहरुलाई आँप बगैंचा व्यवस्थापन तथा रोग किरा सम्बन्धि तालिम
२. सिंचाईको व्यवस्था (Drip irrigation, Solar irrigation etc…)
३. आँपको हार्भेष्टको लागि कृषि यन्त्र उपकरणहरुको विकास तथा प्रयोग
४. आँपको प्रशोधन उद्योग स्थापना (अमपुर, अमोठ, अचार, Brandy, Jam, Candy, Squash, Pulp)
५. ब्राण्डिङ्ग,लेवलिङ्ग तथा प्याकेजिङ्ग (Organic production)
६. उचित बजारीकरण
७. Mixed cropping in Mangoes Orchard

Some photos



PMAMP, PIU, Dhansuha, Saptari (Mango zone)

Local level Experience, Lahan Municipality

Brief Introduction of Lahan Municipality:

Lahan Municipality, established in 2032 B.S, is located in the southeastern region of Nepal. It comprises 24 wards and has a population of 102,031 people, covering an area of 167.17 square kilometers. The municipality is well-known for its significant contribution to mango cultivation, with around 500 hectares of land used for mango farming. The production ranges between 4,500 to 5,000 metric tons, where Maldah variety itself contributes around 1,500 metric tons. The area is native to several popular mango varieties, including Bombay, Dasheri, Maldah, Amrapali, and Calcuttia.

Plans, Prospects, and Programs for Mango in Lahan Municipality:

The municipality has focused on four key areas to enhance mango farming: branding, establishment of modern farms, promoting women entrepreneurship, and improving the management of farms and gardens. These initiatives aim to boost production, improve market access, and increase the economic returns for farmers.

Local Mango promotion through branding:

In 2079-2080, Lahan Municipality, in partnership with Saraswati Agricultural Farm (Lahan-24), launched a program aimed to promote mangoes in both local and national markets. This initiative marked the first time that "Lahan Mango" was branded and marketed in Lahan and Kathmandu. The primary objective of this partnership was to improve mango collection, grading, packaging, and overall marketing. Notably, the famous Maldah mango was officially registered, marking a significant achievement for the region.

During the fiscal year 2079/80, the program successfully marketed 30 metric tons of mangoes in Lahan and Kathmandu markets, where 50 metric tons was collected in total. In the following fiscal year (2080/81), the program further succeeded with the collection of 50 metric tons' mangoes of which 30 metric tons were successfully sold. The municipality aims to increase production and improve mango processing and marketing strategies in the coming years.

Achievements:

1. **Quality fruits:** Consumers received high-quality mangoes that are genetically pure and free from pesticide residues.
2. **Increased Productivity:** By adopting improved farming techniques, mango production in Lahan Municipality has significantly increased, benefiting local farmers.
3. **Recognition:** Mango branding brought recognition to Lahan, securing its place in the competitive market.
4. **Better Harvesting and Processing**: The introduction of proper grading and processing methods has led to improve yield quality and greater harvesting efficiency.
5. **Market Expansion**: Efforts to connect farmers with new and better markets have stabilized mango prices, benefiting the community.
6. **Financial Support**: The program has provided financial assistance, offering farmers Rs. 20 to 30 per kg for mango production and sales, supporting their economic growth.
7. **Sustainable Development**: The initiative has contributed to long-term agricultural growth, fostering sustainable economic benefits for the local community.

Future Action Plan:

The municipality has outlined a comprehensive action plan for the

continued growth and success of mango farming. Key elements of the plan include:

1. **Capacity Building**: Training farmers in modern farming and harvesting techniques to improve efficiency and production quality.
2. **Support for Production & Marketing**: Providing necessary resources to enhance mango yield and expand market reach.
3. **Implementation & Coordination**: Executing planned activities effectively, with active collaboration among local authorities and stakeholders.
4. **Policy and Financial Support**: Developing sustainable policies and financial programs to strengthen mango farming in the long term.

Challenges:

Despite the successes of the program, there are several challenges that need to be addressed:

1. **Timely Execution of Agricultural Programs**: Ensuring that policies and programs are implemented effectively and in a timely manner remains a significant hurdle.
2. **Sustainable Resource Management**: Efficiently managing resources to ensure long-term benefits from mango farming is crucial for sustainability.
3. **Improving Productivity**: Continuous efforts are needed to enhance farming techniques, improve yield, and maintain high-quality mango production.
4. **Post-Harvest Management**: Addressing issues related to storage, processing, marketing, and transportation will be critical to minimize losses and maximize profits.
5. **Market Stability**: Strengthening supply chains and creating stable pricing mechanisms will help ensure better returns for farmers.
6. **Financial and Technical Support**: Providing ongoing financial assistance, technical training, and policy support will be necessary to boost the overall mango farming industry.

In conclusion, Lahan Municipality has made significant strides in promoting mango farming, and its branding program has laid a strong foundation for sustainable growth. However, overcoming the challenges outlined will be essential for continued success and long-term agricultural development in the region.

Wholesale and Retailer's Experience:
Binod Raj Pandey, General Secretary, Fruit and Vegetable Trade Federation.

Nepal Fruits and Vegetables Trade Federation serves as the umbrella organization for fruit and vegetable businesses across the country. Established in 2066 B.S., the federation represents district-level trade federations from 26 districts. The federation plays a crucial role in connecting producers with markets, addressing trade challenges, and promoting agricultural commerce in Nepal**.**

Introduction to Mango

Mango is one of the most widely consumed and cherished fruits globally. India holds the title of the world's largest mango-producing country, with several varieties in high demand. Nepal cultivates different types of mangoes, which are an integral part of the fruit market. Some of the most popular mango varieties include:

1. Bombay Green
2. Bombay Yellow

3. Gulabkhas
4. Dasheri
5. Maldah
6. Langra
7. Alfonso
8. Amrapali
9. Mallika

Marketing Experience in Wholesale & Retail Market

The wholesale and retail markets operate differently, but both play essential roles in the supply chain. Several factors influence the effectiveness and challenges of mango marketing in these sectors:

1. **State of Production:** Ensuring that mangoes are available at the right time is crucial in both wholesale and retail markets. Proper production planning helps maintain a steady supply.
2. **Equilibrium of Production and Demand:** Balancing supply and demand is vital. Wholesalers focus on meeting bulk demand from businesses, while retailers cater to the needs of individual consumers.
3. **Marketing Difficulties:** Wholesalers face challenges such as supply chain management and bulk logistics, whereas retailers deal with customer preferences, competition, and inventory control.
4. **Market Demand:** Wholesale markets depend on business buyers and industry demand trends, while retailers focus on consumer buying behavior and seasonal preferences.
5. **Packaging and Grading:** Product presentation is important in both markets. Wholesalers emphasize bulk packaging and quality grading, while retailers focus on attractive and consumer-friendly packaging to enhance sales.
6. **Cost and Value Consideration:** While both wholesale and retail markets consider costs, wholesalers operate on volume-based pricing, whereas retailers deal with higher unit prices to account for operational costs and profit margins.

Conclusion

The commercialization of mango production involves a strategic shift from traditional farming to a business-oriented approach. This requires a strong focus on producing high-quality mangoes, setting competitive prices, and adopting effective sales strategies to reach target customers. To support this transition, farmers, wholesalers, and retailers must be equipped with proper training on quality management, modern marketing techniques, and efficient operations. Additionally, the use of high-quality saplings and fertilizers plays a vital role in boosting production, enhancing fruit quality, and ensuring a reliable and sustainable supply chain. Well-designed marketing strategies are equally important, as they help connect mango producers with the right customers, thereby increasing demand and expanding market reach. Ultimately, the growth of the mango sector significantly contributes to the local economy by generating income, creating employment opportunities, and improving the livelihoods of farmers, traders, and the broader community.

The wholesale and retail mango trade in Nepal has great potential for growth. By addressing production challenges, improving market linkages, and adopting modern marketing strategies, the mango industry can become a sustainable and profitable sector that benefits all stakeholders.

TECHNICAL SESSION II

1. Ms. Anu Joshi Shrestha, Value-Chain Specialist, ICIMOD
2. Mr. Nagdev Yadav , Community Development and Advocacy Forum, Nepal
3. Mr. Bobin Thapa, Pathways Technologies Pvt. Ltd.
4. Mr. Damber Khanal, R&D Innovative Solution Pvt. Ltd.

Ms. Anu Joshi Shrestha, Value-chain specialist ICIMOD

Hi-GRID Enterprise Component: Strengthening Mango Value Chains

The **Hi-GRID Enterprise** initiative aims to enhance the livelihoods of both farming and non-farming communities by building resilience in local economies. The program focuses on strengthening value chains, particularly those that incorporate nature-based solutions, ensuring they can withstand climate and economic challenges. By integrating best practices, inclusive strategies, and value chain principles, Hi-GRID creates a holistic approach that benefits not only farmers but also various sectors, fostering long-term sustainability and stability.

One of the key outcomes of the initiative is the empowerment of organizations to develop scalable and accessible value chains that support marginalized and vulnerable communities. Through partnerships, sustainable business models and market opportunities have been promoted, with active engagement from government entities, organizations and municipalities. The initiative has also focused on digital transformation in agriculture by collaborating with platforms such as GeoKrishi and working with Community Development Advocacy Forum Nepal (CDAFN) and R&D Innovative Solution Pvt. Ltd to strengthen market linkages. Key sectors targeted under the initiative include mango production, vegetable farming, and Mithila art and handicrafts, with a strong emphasis on training and value addition.

Despite these efforts, several challenges remain. Water shortages due to climate change impact agricultural productivity, while limited market access makes it difficult for farmers to reach reliable buyers. Financial constraints, including lack of credit facilities, hinder investment in improved farming techniques. Additionally, farmers often have limited knowledge of market chains and how to optimize them for better distribution and profits. Insufficient processing and storage facilities further contribute to post-harvest losses, reducing product value and income potential.

To address these challenges, the initiative promotes climate-resilient enterprises that adapt to environmental variability and introduces technological innovations to enhance efficiency in production, processing, and marketing. The establishment of water management systems, such as efficient irrigation and rainwater harvesting, helps mitigate water scarcity. Strengthening market linkages is another crucial aspect, ensuring farmers can connect with local, national, and international buyers. Access to credit is being facilitated through partnerships with financial institutions, enabling farmers to invest in better resources. Additionally, capacity-building programs provide training on value addition, market strategies, and post-harvest management to ensure long-term sustainability.

The **Lower Koshi River Basin (LKRB)** region, particularly **Saptari, Sarlahi, and Mahottari Districts**, serves as a key hub for mango production. This region benefits from a favorable climate and fertile soil, which contribute to high-quality mangoes that are naturally sweet and juicy. However, to further strengthen the mango value chain, a structured intervention approach is necessary. The first step involves data collection and research to analyze production trends, market demands, and environmental conditions. This is followed by capacity-building efforts, where farmers receive training on best agricultural practices and post-harvest handling. Investment in infrastructure,

such as cold storage and irrigation systems, is crucial for reducing post-harvest losses and improving productivity.

A key strategy within the intervention framework is the promotion of climate-resilient farming practices, such as water-efficient irrigation and the introduction of drought-resistant mango varieties. Establishing strong market linkages is equally important, ensuring that farmers gain access to a wider range of buyers. Value addition in mango processing, including products like dried mango and mango juice, creates new income opportunities and minimizes waste. Digital tools such as the **GeoKrishi App** provide farmers with real-time crop management insights, weather updates, and expert guidance, while platforms like ***Krishi Doot*** directly connect farmers with wholesalers and retailers, reducing dependency on middlemen. Access to finance is being improved through initiatives like the ***Kishan Credit Card***, enabling small-scale farmers to secure loans for business expansion. Additionally, green enterprises are being encouraged to create jobs and boost the local economy by developing mango-based products.

In conclusion, the Hi-GRID Enterprise initiative presents a transformative approach to strengthening the mango value chain in Nepal's LKRB region. By addressing key challenges such as water scarcity, market access, and financial limitations, the program ensures climate resilience, economic stability, and enhanced livelihoods. Through digital innovations, sustainable practices, and capacity building, Hi-GRID is paving the way for a more resilient and profitable agricultural sector.

Community Developmemnt and Advocacy Forum

Mr. Nagdev Yadav, President

Over the past six years, efforts have been underway to implement **River System** and**Water Resource Management** to enhance environmental and water management practices in the region. As part of this initiative, **181 dams** have been constructed, playing a crucial role in managing water resources and preventing soil erosion. These developments aim to restore land productivity and improve agricultural sustainability in the area.

A major challenge facing the region is **land degradation**, with approximately **47,000 bighas of land currently unusable due to soil deterioration**. Despite this, sustainable land use strategies have been implemented, with **1380 hectares dedicated to general cultivation** and **3120 hectares allocated for mango cultivation**. These efforts have contributed to an overall improvement in biodiversity, as sustainable farming and environmental practices are helping restore ecological balance.

In addition to enhancing biodiversity, **water management systems have been significantly improved** to support agricultural activities and ensure efficient resource utilization. As a result, the economic conditions of the **Terai region** have improved, with better land use leading to increased agricultural productivity and income generation. Farmers are benefiting from more reliable water sources, allowing for more consistent and productive harvests.

To further support environmental and economic sustainability, **high-tech projects** have been introduced in the region. These projects focus on modern agricultural techniques, advanced irrigation systems, and innovative approaches to land restoration. By integrating technology with traditional farming practices, these initiatives ensure long-term environmental conservation while boosting the region's agricultural sector.

The implementation of **River System Management** has demonstrated that targeted interventions in water management, land restoration, and sustainable agriculture can lead to significant economic and ecological benefits. Moving forward, continued investment in **modern technology, infrastructure, and capacity-building programs** will be essential to maximizing the potential of the region's agricultural resources while ensuring environmental sustainability.

R&D Innovative Solution Pvt. Ltd:
Damber Khanal, Co-Founder

R & D Innovative Solution Pvt. Ltd. is actively working to strengthen mango value chains in the **Lower Koshi River Basin (LKRB) region** by focusing on **capacity building, access to finance, product innovation, and market resilience**. The goal is to create a sustainable mango ecosystem that benefits farmers, businesses, and the overall economy.

Capacity Building

A key aspect of value chain development is **empowering farmers and entrepreneurs** through training programs in **business and financial literacy**. These initiatives help them understand financial management, cost-effective production, and sustainable business strategies. By equipping farmers with the right knowledge and skills, they can make informed decisions to improve productivity and profitability.

Access to Finance

Financial support is crucial for farmers to **invest in better farming techniques and infrastructure**. To address this, R & D Innovative Solution collaborates with **financial institutions and local governments** to introduce **smallholder financing programs**. The **Kishan Card program** provides small loans to farmers, enabling them to invest in quality inputs and technology. Additionally, **partnerships with six major commercial banks i.e.** Nabil Bank Limited, Global IME Bank Limited, Nepal Investment Mega Bank Limited (NIMB), Siddartha Bank , NMB Bank , Prabhu Bank Limited have been established to offer **tailored financial solutions**, ensuring accessibility to affordable credit. Financial literacy training is also integrated into these programs to help farmers manage their loans efficiently and sustain long-term investments.

Product & Service Innovation

To **enhance the profitability and sustainability of mango farming**, R & D Innovative Solution is driving innovation in **value-added mango products**. Efforts are being made to develop **dried mango slices, mango puree, and mango candies**, which increase the shelf life of mangoes and create new revenue opportunities. Furthermore, advancements in **post-harvest processing techniques** and the establishment of **rural enterprises** are bridging the gap between raw mango production and the processing industry.

Building a Resilient Supply Chain

A strong supply chain is essential for ensuring that farmers get the best value for their produce. The **Krishi-Doot program** is designed to **empower local entrepreneurs** to act as intermediaries between farmers and markets, helping streamline the supply chain. Additionally, **post-harvest management solutions** such as **Cold Chain and Dry Chain technologies** are being implemented to minimize post-harvest losses and maintain product quality. **Collaborations with global post-harvest management companies like** DECCO further enhance efficiency in **storage, transportation, and market access** for fresh produce.

By focusing on these key areas, **R & D Innovative Solution Pvt. Ltd.** is playing a pivotal role in **creating a sustainable and resilient mango value chain** in the LKRB region. Through continued investment in capacity building, financing, innovation, and market stability, the initiative aims to **increase farmer incomes, reduce post-harvest losses, and expand the market for value-added mango products**.

Pathways Technology Pvt. Ltd. (GeoKrishi)

Bobin Thapa, Program Coordinator

GeoKrishi is a comprehensive digital platform designed to support farmers and stakeholders across the agriculture value chain. It provides real-time advisory services and modern farming solutions, particularly for mango producers. By integrating technology, market linkages, and expert guidance, GeoKrishi aims to enhance agricultural productivity and promote sustainable farming practices. Through its various services, the platform ensures that farmers have access to essential tools, expert advice, and direct market connections, ultimately improving their livelihoods.

The platform offers multiple services tailored to different aspects of agriculture. GeoKrishi Agro Vet provides agro-veterinary services to enhance crop and livestock health, while GeoKrishi Farm supports farm management with tools and guidance. GeoKrishi extension focuses on improving agricultural productivity through extension services, and GeoKrishi Enterprise helps agribusinesses manage their operations more efficiently. Additionally, the e-Marketplace connects farmers directly with buyers, reducing reliance on middlemen and ensuring better pricing for their produce.

Under the Hi-GRID initiative, GeoKrishi is actively supporting mango farmers by providing targeted advisories and training through various digital channels. The platform curates relevant and practical mango farming content, ensuring that farmers receive accurate information on cultivation, pest management, harvesting, and post-harvest handling. A structured advisory methodology is followed to deliver practical and actionable guidance, helping farmers adopt better techniques and improve productivity.

GeoKrishi employs multiple communication channels to reach farmers effectively. The GeoKrishi Farm App offers in-depth training on best farming practices, while push notifications provide real-time alerts and advisories directly to farmers. Social media platforms like Facebook share educational content and expert insights, and the E-chautari webinar program allows farmers to engage with specialists for further learning. Additionally, SMS and broadcasting calls ensure direct communication, enabling farmers in remote areas to stay informed about crucial updates.

By leveraging digital technology and multi-channel advisory services, GeoKrishi is transforming mango farming by empowering farmers, enhancing productivity, and strengthening market linkages. The initiative bridges the gap between traditional agriculture and modern digital solutions, ensuring long-term benefits for farmers, agribusinesses and the agricultural economy.

Community Mango Orchard Management Experience

Binaya Adhikari, KrishiDoot, Vinay Agriculture Farm, Bhangha, Mahottari

In Mahottori and Dhanusha a total of 3,500 hectares of degraded land have been brought into productive use, directly benefiting over 19,500 individuals from approximately 3,400 households in the LKRB region. This initiative has contributed to improve livelihoods and enhanced land utilization in the targeted communities.

In Bhanga a total of **173 ha of land** were brought under fruit cultivation, directly benefiting **155 households**. As part of the initiative, **42,000 saplings** of various fruit species were planted, of

which approximately **33% were mango saplings**, reflecting a strong focus on promoting mango production in the region, in which 3.35 hectare land belongs to Binaya Adhikari.

Managing a community mango orchard involves overseeing all aspects of production to ensure high-quality mangoes while fostering local community participation. The process begins with careful planning and planting, where decisions are made about which mango varieties to grow based on their suitability for fresh consumption or processing into products like juices and jams. The orchard is then established in an area with fertile soil and ample sunlight to support optimal tree growth.

Once the trees are planted, regular maintenance is crucial to ensure their health and productivity. Mango trees require proper watering, fertilization, and pruning to promote strong growth and high fruit yields. Farmers use compost and fertilizers to nourish the trees, while pruning helps in shaping the canopy and enhancing air flow, reducing the risk of diseases.

Pest and disease management is another key aspect of orchard care. Mango trees can be affected by various pests and diseases, requiring constant monitoring. Farmers implement safe and sustainable treatments, such as organic pesticides or natural control methods, to protect the trees while minimizing environmental impact.

The harvesting process is carefully managed to ensure that mangoes are picked at the right stage of ripeness without damage. Depending on the variety, harvesting may be done in phases to ensure optimal fruit quality. After harvesting, marketing and selling become the focus. Mangoes can be sold in local markets; grocery stores or even sold to other regions. Community involvement plays a crucial role in marketing efforts such as setting up local stalls or promoting the orchard through social initiatives.

A community mango orchard thrives when local people actively participate in its operations. From planting to harvesting, community members contribute labor, gain employment opportunities and develop agricultural skills. Additionally, the orchard may offer educational programs to teach sustainable farming practices and mango production techniques, benefiting the broader community.

Sustainability is a fundamental principle in managing a community orchard. Implementing environmentally friendly practices, such as soil conservation, efficient water use, and organic farming techniques, helps ensure that the orchard remains productive for generations. By maintaining a balance between economic growth and environmental responsibility, a well-managed community mango orchard supports local livelihoods while preserving natural resources for the future.

Experience of Cottage Industry
Ms. Prakriti Gautam, CEO, Khetipati Organics, Dhankuta

Mango value addition through the cottage industry plays a significant role in extending the shelf life of mangoes and increasing their market potential. Khetipati Organics has been actively involved in processing mangoes using drying and freezing techniques, allowing fresh mangoes to be preserved for longer periods. This initiative ensures that mango products remain available even beyond the harvesting season, making them suitable for both domestic consumption and export.

Khetipati Organics exports mango products to both domestic and international markets, helping expand the reach of Nepalese mangoes to foreign buyers. By incorporating frozen mango storage techniques, they have introduced new methods to retain mango freshness and quality for extended periods. The freezing process is a recent addition to their value chain, complementing the drying techniques that have been in place.

Despite these advancements, several challenges persist in the mango value addition process. Harvesting and transportation remain critical issues, as improper harvesting techniques and inefficient transportation systems can

lead to damaged mangoes, affecting their quality. Establishing a reliable transport system is essential to maintain mango freshness, especially when delivering products to distant markets. Additionally, the lack of adequate knowledge in packaging, handling, and logistics poses difficulties in ensuring that mango products are stored and delivered efficiently.

Pricing and processing techniques also present challenges as expertise in these areas is crucial for making mango products competitive in the market. Without proper pricing strategies and efficient processing methods, it becomes difficult to optimize profits and scale production.

Overall, Khetipati Organics is making significant strides in mango value addition through its drying and freezing techniques. While challenges in harvesting, transportation, packaging, and pricing persist, the organization is actively working on developing better systems to improve operations. By overcoming these hurdles, they aim to enhance the availability and marketability of mango products, contributing to the growth of Nepal's mango industry.

Industry Sector's Experience

Araniko Rajbhandari, Director, Nepal Dairy Pvt. Ltd

The dairy and fruit industries in Nepal have significant potential for growth but are facing several challenges that need to be addressed. While the dairy sector is expanding, farmers struggle to sell their milk due to a lack of sufficient market outlets. Without proper selling opportunities, farmers cannot sustain their livelihoods, highlighting the need for improved market access and support mechanisms.

In the fruit sector, many products available in the market are not made from pure fruits, raising health concerns due to the presence of artificial ingredients. This calls for strict regulations and better quality control to ensure consumers have access to healthier, natural fruit products. One way to address this issue is through value addition, where fruits such as mangoes are processed into pulp, jam, and juice. These processed products can serve as raw materials for various industries, creating additional business opportunities.

Nepal currently imports mango pulp from India for use in products like natural ice cream. However, by developing its own mango processing industry, Nepal could reduce reliance on imports, strengthen local businesses, and create jobs. Despite the potential for a thriving cottage industry, small-scale producers are not well connected with consumers, making it difficult for them to sell their products. Establishing better market linkages would benefit both producers and consumers, ensuring access to quality products while supporting small businesses.

A major obstacle for Nepal's industries is the high cost of production compared to neighboring countries. This makes Nepali products less competitive in both domestic and international markets. Additionally, farmers do not receive fair prices for their crops due to inadequate government pricing policies. This discourages them from farming and threatens agricultural sustainability. The government must implement better pricing strategies to ensure farmers are fairly compensated and motivated to continue production.

To enhance industry growth, Nepal needs modern technology, improved farming methods, and better transportation infrastructure. Advanced machinery and efficient logistics can help reduce costs and increase productivity, making local products more competitive. Strengthening market connections between farmers, producers, and buyers is also crucial for business success.

Nepal Dairy Pvt. Ltd. is actively promoting the mango value chain by introducing mango-based products such as mango yogurt, mango-flavored ice cream and mango cubes thereby adding value to local mango production and expanding market opportunities.

In summary, while Nepal's dairy and fruit industries have great potential, they face significant challenges, including market access issues, high production costs, and weak connections between producers and consumers. To overcome

these hurdles, the country must focus on developing local processing industries, improving market linkages, adopting modern technology, and ensuring fair pricing policies for farmers. These improvements will help create a more sustainable and competitive agricultural sector.

Experience, Mechanization in Mango Orchard

Krishna Sharma, President, Nepal Agricultural Machinery Entrepreneurs' Association (NAMEA)

Introduction:

Mango is a major fruit in Nepal, mainly grown in the Terai region due to its favorable climate. Popular varieties such as Maldah, Dasheri and Amrapali are widely cultivated, contributing to the local economy and providing livelihoods for many farmers. Despite its importance, mango farming in Nepal largely relies on traditional farming practices, which can be labor-intensive and inefficient, hindering large-scale production. This report explores the role of mechanization in improving the efficiency of mango production in Nepal.

Current State of Mango Farming in Nepal:

Mango farming in Nepal covers a total area of 42,196 hectares, yielding approximately 443,416 tons of mangoes annually Madhesh Province is the leading region in mango production, with 30,089 hectares dedicated to mango farming, contributing 73% of Nepal's total mango production, which amounts to 344,140 tons. Saptari district within Madhesh is the highest mango-producing area, contributing 110,095 tons annually (National Agriculture Census, 2078). Despite the substantial production, the sector faces several challenges.

Challenges in Mango Farming:

1. **Labor Intensive**: Mango farming requires significant manual labor for planting, irrigation, and harvesting.
2. **Inefficiencies**: Traditional methods reduce farm productivity, making it difficult to meet growing demand.
3. **Pests**: Mangoes are prone to pest damage, which affects the yield and quality.
4. **Irrigation Problems**: Inconsistent water supply during dry seasons affects mango tree growth and fruit production.
5. **Post-Harvest Losses**: Mangoes are often damaged or spoiled during handling and storage, leading to significant losses.

Benefits of Mechanization:

Mechanization can address these challenges and offer numerous benefits to mango farming:

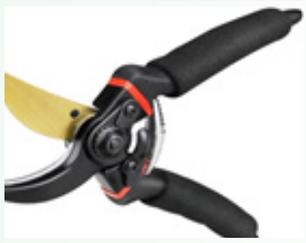
1. **Efficiency**: Tasks such as planting, pruning, and harvesting become faster and more precise with mechanized systems, reducing labor hours and streamlining workflows.
2. **Productivity**: Mechanized systems enhance the yield and quality of mangoes by ensuring consistent care, minimizing human error, and providing more uniform results.
3. **Cost-Effectiveness**: Although mechanization involves initial investment, it reduces long-term labor costs, increasing overall farm efficiency.
4. **Consistency**: Mechanization ensures uniform application of fertilizers, pesticides, and irrigation, leading to consistent fruit growth and quality, which is crucial for meeting market standards.
5. **Labor Management**: Reducing manual labor allows workers to focus on other important tasks such as farm management, improving overall productivity.
6. **Time-Saving**: Mechanized operations complete tasks like harvesting or irrigation faster, increasing the production cycle and handling capacity.
7. **Environmental Impact**: Mechanization optimizes resource use, reducing waste and promoting sustainable practices, which helps maintain soil health and minimizes environmental damage.

8. **Health and Safety**: Mechanized tools alleviate physical strain on workers, reducing the risk of injuries from repetitive tasks and heavy lifting, while enhancing overall working conditions.

Mechanization Solutions for Mango Farming: To fully benefit from mechanization, various tools and technologies can be integrated into mango farming:

1. **Planting and Pruning Machines**:

   - » *Planting Machines*: Automated machines ensure mango trees are planted at the correct depth and spacing, optimizing growth.



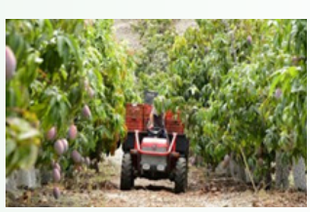
   - » *Pruning Tools*: Electric and air-powered pruners make trimming branches faster and safer, promoting healthier tree development.

2. **Irrigation Systems**:

   - » *Drip Irrigation*: Efficiently delivers water directly to the tree roots, reducing water waste and enhancing growth.

   - » *Sprinkler Systems*: Suitable for diverse land types, sprinklers evenly distribute water across the orchard, promoting healthy mango growth.

3. **Harvesting Tools**:

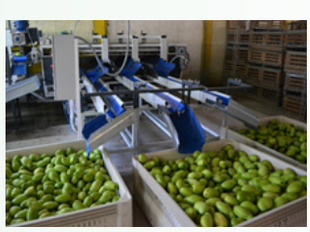


   - » *Mechanical Harvesters*: Fruit pickers and shakers help harvest mangoes quickly with minimal damage.
   - » *Fruit Picking Poles*: Long poles with clips and baskets enable workers to pick mangoes from tall trees, reducing the need for ladders.

4. **Pest Management Equipment**:

   - » *Sprayers*: Mechanized sprayers apply pesticides and nutrients efficiently to protect mango trees.
   - » *Insect Traps*: Reduce pest populations, ensuring healthier mango crops.
   - » *Drones*: Drones can quickly cover large areas and apply pesticides or fertilizers, improving pest control efficiency.

5. **Post-Harvest Equipment**:



   - » *Sorting and Grading Machines*: These machines organize mangoes based on size, weight, and ripeness, ensuring high-quality products for sale.
   - » *Packaging Machines*: Automatic machines clean, package, and label mangoes for market distribution.
   - » *Cold Storage*: Cold storage facilities keep mangoes fresh for longer periods, allowing them to be sold during off-seasons

Role of NAMEA in Promoting Mechanization in Agriculture

NAMEA plays a key role in promoting mechanization in farming to improve efficiency and productivity. Their main goal is to support the use of modern machinery in agriculture. NAMEA organizes training sessions, workshops, and exhibitions to help farmers learn how to use agricultural machines effectively. They also collaborate with government bodies, NGOs, and private companies to encourage mechanization and ensure its widespread adoption.

NAMEA's vision is to improve farming practices across Nepal by promoting the use of machines, particularly in crops like mangoes. They seek opportunities to bring more technology into agriculture and aim to help farmers become more productive, efficient, and sustainable. By reducing labor costs and enhancing crop yields, mechanization is transforming farming practices. NAMEA's efforts are crucial for achieving these goals, and their work is paving the way for a more productive and sustainable future in agriculture.

Marketing Experience in Kathmandu and Major Cities

Bhuwan K.C, Kathmandu Organics, Bansbari

Nepal Mango Fest 2024

The Nepal Mango Fest; organized by Farmers Venture and Kathmandu Organics, took place from June 21-23, 2024, to promote Nepali mangoes and improve their value chain. The three-day event featured a variety of mangoes from Southern Nepal, offered a platform for learning about the mango industry and engaging stakeholders, including farmers, food experts, and businesses.

Mango Varieties on Display

The festival showcased several popular varieties of mangoes, including Bombay Green, Gulabkhas, Dasheri, Sipiya, Fazli, Nazarana Bombay, Dudhiya Maldah, Krishanbhog, Jarda, and Chapra Maldah.

Knowledge Sessions

Attendees were engaged in informative sessions, such as:

- Understanding the current state of mango production and its value chain
- Discussing post-harvest processes with industry experts and chefs
- Participating in a mango pickle-making session at Utpala Cafe

Market Sessions and Promotions

The festival offered exclusive pricing, marketing strategies, and collaborations with restaurants, featuring mango-themed menus. Locations for the event include:

- All-day: Kathmandu Organic, Bansbari
- Day 1: Walnut Bistro, Panipokhari
- Day 2: Le Sherpa Farmer's Market, Utpala Cafe & Boudha Farmer's Market
- Day 3: The Gardens, Jhamsikhel

Key Data and Highlights

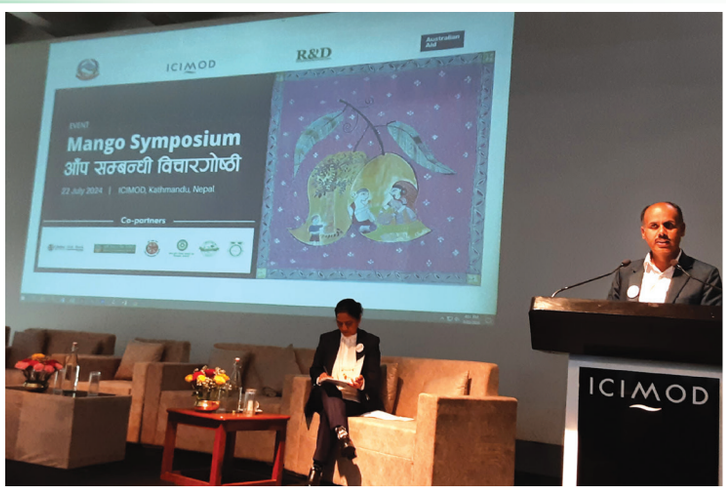
- 15,000+ kgs of mangoes sold
- 10,000+ attendees
- 10+ event partners
- 60+ mango farmers
- 30+ media coverage
- 20+ mango-based recipes shared

Learning Outcomes

The event helped raise awareness, build the mango brand, and boost sales. It highlighted the diversity of mango varieties, beyond just Maldah and Dasheri, and emphasized the importance of mango tasting. Additionally, incorporating mangoes in food events and competitions increased sales. The festival also suggested focusing research and investment on adding value to mangoes and improving storage to enable farmers to secure better prices.

Experience: Nepal Insurance Authority (NIA)

Sushil Dev Subedi, Director



Recently, insurance policies have become more accessible to mango farmers in Nepal, offering them protection from risks such as natural disasters, pests and diseases, two major causes of crop damage. Previously, insurance was not widely available to farmers, but now several insurance companies provide tailored policies for the agricultural sector.

Seven insurance companies (Nepal Micro Insurance Co. Ltd., Guardian Micro Life Insurance Ltd., Crest Micro Life Insurance Ltd., Protective Micro Insurance Ltd., Liberty Micro Life Insurance Ltd., Star Micro Insurance Company Ltd., and Trust Micro Insurance Company Ltd.), offering "micro-insurance" services, have entered the market, with four of them providing life insurance. The "micro insurance policy" is specifically designed for mango farmers, making it simple and accessible. The process is straightforward, and farmers can purchase the insurance directly through their mobile phones, ensuring ease of access and efficiency.

This initiative aims to help mango farmers manage risks, improve their financial security, and encourage more people to invest in mango farming with confidence. It ensures that farmers are better prepared for potential losses, allowing them to continue their agricultural practices with greater peace of mind.

PANEL DISCUSSION- POLICY AND PRACTICES IN MANGO

The panel discussion of the Mango Symposium commenced with the theme "Policy and Practices in Mango."

Moderator:

- **Ms. Sunita Nhemaphuki**, R&D Innovative Solution Pvt. Ltd.

Panelists:

1. **Ms. Sabnam Shivakoti**
   Joint Secretary, Ministry of Agriculture & Livestock Development
2. **Mr. Tika R. Chapagain**
   Chief, National Horticulture Research Center (NHRC)
3. **Mr. Rajendra Koirala**
   DDG, Department of Agriculture
4. **Dr. Babukaji Thapa**
   DGM, Agricultural Development Bank Ltd. (ADBL)
5. **Mr. D.B. Basnet**
   Chairperson, Federation of Nepalese Chambers of Commerce and Industry (FNCCI)
6. **Municipality Mayors:**
   - » Ramesh Budhathoki, Mayor of Hariwon Municipality
   - » Shiva Shanker Mahato, Mayor of Dhangadimai Municipality
   - » Manoj Kumar Shah, Mayor, Janakpurdham Sub metropolitan city
   - » Sunita Singh Budhathoki, Deputy Mayor, Mithila Municipality

Panel Discussions

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

The moderator asked the panelists several key questions during the discussion. First, they inquired about the policies needed to support mango farming in Nepal, asking what the government can do to help farmers by offering subsidies, providing training, ensuring fair pricing, controlling pests and diseases, and promoting the use of modern farming tools. Next, the moderator sought to understand what actions have already been taken to support the mango industry and what steps need to be taken next to address remaining challenges and improve the industry overall. Finally, the moderator asked the panelists about the role of the Ministry of Agriculture in supporting mango farmers, exploring how the Ministry could provide support through new programs, financial assistance, and overall efforts to strengthen the mango farming sector in Nepal.

Ms. Sabnam Shivakoti, Joint Secretary, MoALD

Ms. Sabnam Shivakoti, the Joint Secretary of the Ministry of Agriculture and Livestock Development (MoALD), emphasized the need for policy interventions to enhance the sector's sustainability and profitability.

Key Points by Ms. Shivakoti:

1. **Funding for Research and Development:** More budget is needed for research on mango farming, especially for improving storage, processing and to minimize post-harvest loss.
2. **Bridging the gap between Research and Farmers:** Research needs to be made more practical for farmers, so new farming methods and innovations can be easily used in real life.
3. **Training for Farmers on Storage and Processing:** Farmers need better training on how to store and process mangoes properly to minimize post-harvest loss and improve quality.
4. **Focus on Better Storage, Processing, and Value Addition:** We need to build better storage facilities and explore ways to add value, like making dried mango or mango juice, to increase profits.
5. **Post-Harvest Policy Focus:** Current policies do not focus enough on what happens after the mangoes are harvested. New policies should help farmers adopt better post-harvest practices.
6. **Tools and Mechanization in Mango Farming:** Modern tools and machines are needed to make farming more efficient. Policies should make it easier for small farmers to access these tools.
7. **Technological Integration:** Farmers should be encouraged to use technology, like apps for crop management, to improve farming practices.
8. **Tax Policies to Support Mechanization:** Tax breaks or subsidies for farming equipment could make it more affordable for farmers to use modern tools and increase productivity.
9. **Investment Focus:** Investments should focus on improving storage, mechanization, and research to get the best returns for the mango industry.
10. **Prioritizing Post-Harvest Management, Mechanization, and Research:** It's important to prioritize better post-harvest management, mechanization, and research to help the mango industry grow.

Conclusion:

The panel discussion highlighted critical areas that need attention to enhance the mango farming sector in Nepal. There is a clear need for increased research funding, stronger linkages between research and farmers, and significant policy focus on post-harvest management and mechanization.

To ensure that these areas are adequately addressed, the Ministry of Agriculture and Livestock Development (MoALD) should prioritize creating policies that support better storage solutions, introduce advanced farming tools, and promote technology use. Additionally, tax incentives for mechanization and a focus on value addition will help improve both productivity and market access.

By investing in these areas, Nepal can significantly reduce loss, improve quality and increase overall production, thereby boosting the economic stability of the sector.

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

Sunita Nhemaphuki posed important questions about how private sector efforts can contribute to the growth and development of different mango varieties. She explored the role that the private sector can play in research and innovation, particularly in improving mango varieties. By fostering partnerships between private companies and farmers, the sector can help expand the variety of mangoes produced, ensuring that farmers have access to diverse, high-quality cultivars. She also emphasized how private sector investments can facilitate the introduction of new mango varieties to the market, supporting both the quality and yield of these crops.

Mr. D.B. Basnet, Chairperson, Nepalese Chambers of Commerce and Industry (FNCCI)/ Agro Enterprise Center (AEC)

D.B. Basnet, a representative from the FNCCI/AEC, shared concerns about the lack of government support and policies for mango farming in Nepal. He discussed the challenges faced by the sector, including the need for better insurance, clear policies, and timely implementation of government programs.

Key Points

No Insurance Support for Mango Farming: Basnet pointed out that the government has not provided any insurance for mango farmers, leaving them vulnerable to risks like bad weather, diseases, and market fluctuations.

1. **Unclear Government Focus on Agriculture:** The government has not made agriculture, especially mango farming, a clear priority. This lack of focus means the sector doesn't get enough resources or planning.
2. **Unused Land Not Being Used for Farming:** Many areas of fertile land remain unused, and there are no policies to encourage farming, including mango cultivation, on these lands.
3. **Delayed Government Action on Agricultural Projects:** While the government has allocated a budget for farming projects in all provinces, changes in policies and proper implementation have been delayed, hindering the sector's growth.

Conclusion:

Mango farming in Nepal faces several challenges, mainly due to the lack of government support, policies, and timely action. To improve the sector, the government needs to provide insurance for farmers, create clear policies for managing mango farming, prioritize agriculture, and ensure that fallow land is used for farming. Timely action and proper implementation are essential for the growth of mango farming in Nepal.

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

What policies exist for taking loans in rural areas, and how do government schemes help farmers access financial support? How do microfinance institutions assist rural populations with limited banking access? What agricultural loans are available for purchasing seeds, fertilizers, or equipment? How do cooperatives help farmers access loans?

What is the loan application process, and what are the eligibility criteria and required documents? Are collateral-free loans available for small farmers under government schemes? How are loans assessed, approved, and disbursed? What are the repayment terms, especially for agricultural loans with flexible schedules?

Babu Kaji Thapa, DGM, Agricultural Development Bank Ltd. (ADBL):

Babu Kaji Thapa discussed the importance of addressing the factors that lead to ailments in agriculture and emphasized the need for comprehensive agricultural development. He highlighted that improving technical knowledge, educating farmers, and securing financial support are key elements for sustainable growth. Thapa also pointed out the role of policies in driving agricultural development, emphasizing the importance of cooperation and open dialogue for successful outcomes.

Key Points:

1. **Understanding Disease and Pest:** Thapa explained that diseases in agriculture are often caused by a combination of factors, including the host (the crop), the environment (weather, soil conditions), and the organism (pests, pathogens). Understanding this triad is essential for effectively managing diseases and preventing crop losses.
2. **Improving Technical Knowledge:** He stressed the importance of enhancing technical knowledge in agriculture, including disease management techniques, pest control, and modern farming practices. This knowledge will help farmers better understand and address challenges in farming.
3. **Farmer Education:** Educating farmers is crucial for ensuring that they have the skills and understanding to tackle agricultural issues, including pest and disease control. Training programs, workshops, and extension services should be focused on improving farmers' practical knowledge.
4. **Securing Financial Support:** For agricultural development to be successful, securing financial support is key. This includes both government funding and access to loans or financial assistance to implement modern farming practices, purchase inputs, and invest in necessary infrastructure.
5. **Policy Development and Cooperation:** Thapa emphasized the need for well-designed policies to support agricultural growth. While different stakeholders may have different views on policies, cooperation, collaboration, and open discussions are essential for creating effective and actionable strategies.

Conclusion:

For agricultural development to thrive, a comprehensive approach is needed that includes improving technical knowledge, educating farmers, and ensuring financial support. Disease management in agriculture must focus on understanding the combination of factors that lead to outbreaks. Policies should be designed to support these efforts,

with cooperation among stakeholders being critical to success. With proper education, resources, and collaboration, agricultural development can be achieved, leading to a more sustainable and resilient farming sector

Moderator:Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

Nepal Agriculture Research Council (NARC) conducts research, but the results of the research are with you here. When you test it, you will have a connection with it. If so, is it possible to collaborate with another organization so they can provide the results at the right time? What policy is needed for this?

Dr. Tika R. Chapagain, Chief, National Horticulture Research Center (NHRC)

Dr. Tika R. Chapagain discussed the extensive research conducted by NARC in various areas of agriculture, particularly focusing on mango management. He highlighted NARC's work in developing different varieties of crops and technologies, including a mango variety. However, he pointed out the challenges in delivering these technologies to farmers due to the lack of an effective extension system and called for stronger government support to ensure that research outputs reach the farming community.

Key Points:

1. **NARC's Research and Development:** NARC has been involved in the development of various agricultural technologies and crop varieties, including advancements in mango management. The council has also focused on preserving different varieties to ensure sustainable agriculture.
2. **Development of Mango Variety:** NARC is working on developing a mango variety that can be produced annually which would provide farmers with more consistent income and reduce seasonal production gaps.
3. **Challenges in Technology Extension:** Despite the significant technological advancements made by NARC, there is a gap in the effective extension system to farmers leading to hinders the widespread adoption of research outcomes.
4. **Need for Policy Development:** Chapagain emphasized that the government must ensure to deliver NARC's research and technologies to farmers.

Conclusion:

NARC has made significant strides in agricultural research and the development of new crop varieties and technologies, including mango variety. However, the effectiveness of these innovations is limited due to insufficient extension services to the farming community. Strengthening agricultural extension systems will be key to the successful implementation of these advancements.

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

As new technologies are being developed in mango cultivation, do you think NARC will invest in them?

Tika R. Chapagain, Chief, NHRC:

Yes, NARC can invest in the development of new technologies for mango cultivation. After any technology is developed and verified through research and field trials, NARC ensures its proper dissemination to farmers. This process includes testing the effectiveness of the technology, assessing its adaptability to different regions, and ensuring it meets the needs of mango growers. NARC also works closely with policymakers, industry stakeholders, and research institutions to ensure that farmers receive updated and efficient farming solutions. By doing so, NARC aims to enhance productivity, sustainability, and resilience in mango farming.

Moderator:Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

What policies are currently in place for cost benefit analysis, pricing and the distribution of mango varieties to relevant organizations? Additionally, what kind of policy should be introduced to improve efficiency and accessibility in this process?

Rajendra Koirala, Deputy Director General (DDG), Department of Agriculture (DoA)

In the past, DoA had a designated institution responsible for calculating the cost of cultivation for different crops. This system has been standardized and implemented across various regions. Based on these calculations, insurance policies are also developed to cover the cost of cultivation. Despite this, there remains a challenge with meeting the demand for agricultural products.

Key Points:

1. **Farmer-initiated Cost Calculation:** Farmers have taken on the responsibility of calculating the cost of cultivation for their crops. This includes considering factors such as input costs, production costs, and potential benefits. This shift has empowered farmers to take a more active role in understanding the financial aspects of their farming activities.
2. **Standardization of the Process:** The system of calculating the cost and value of crops has been standardized across various regions. This consistency allows for a more uniform approach to managing agricultural costs, which is beneficial for both farmers and the broader agricultural sector.
3. **Development of Insurance Policies:** Based on the cost calculations, insurance policies have been developed to cover the cost of cultivation. These policies aim to protect farmers from potential financial losses due to crop failure, ensuring that their investment in agriculture is safeguarded.
4. **Challenge of Meeting Product Demand:** Despite the improvements in cost calculations and the introduction of insurance policies, he acknowledged that there is still a significant challenge in meeting the demand for agricultural products. This issue highlights a gap in the supply chain, which needs to be addressed to ensure that the agricultural sector can fully meet market needs.

Conclusion:

The cost benefit analysis of crops has brought about a more standardized and region-wide approach. This has been crucial in developing insurance policies that help protect farmers. However, the challenge of meeting the demand for agricultural products persists, which indicates a need for improvements in supply chain management and production capacity. To address these challenges, further policy development and infrastructural support are necessary to bridge the gap between supply and demand in agriculture.

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd

As a business owner, looking to farm mango varieties and secure insurance, who will be responsible for providing the cost structure of the farm? Should it be the government, financial institutions, or agricultural experts?

Dr. Tika R. Chapagain , Chief, NHRC:

According to NARC's research conditions, any developed and verified technology will be provided to farmers under improved conditions. This means that before dissemination, the technology undergoes rigorous testing to ensure its effectiveness, adaptability, and sustainability in real farming environments. NARC ensures that the technology is optimized for local conditions, considering factors such as climate, soil health, and pest resistance. By delivering technologies under these improved conditions, NARC aims to enhance mango productivity, reduce risks for farmers, and promote sustainable agricultural practices.

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

Since mango trees take 5-6 years to bear fruit, banks may be hesitant to invest. What policies should the Ministry or Industry Association introduce to encourage investment in this sector? Should there be special loan schemes, subsidies, or risk-sharing mechanisms to support mango farmers?

Babu Kaji Thapa, DGM, ADBL:

Babu Kaji Thapa, DGM of ADBL, discussed the approach of banks toward providing loans for mango farming. He explained that banks are cautious when investing in agriculture, especially mango farming, and typically offer loans only after the crops have matured and are ready to be sold. Thapa emphasized the importance of farmers building trust with banks by demonstrating strong crop production and market potential. He also highlighted the need to consider tax-based repayment structures when investing in long-term technologies.

Key Points:

1. **Cautious Bank Investment in Mango Farming:** Banks are hesitant to invest in mango farming until the fruits have ripened and can be sold, as they do not trust that farmers will make a profit before that point. This creates a challenge for mango farmers in securing early-stage financing.

2. **Building Trust with Banks:** For farmers to gain access to loans, they need to demonstrate strong and consistent crop production. By proving the market potential of their crops, farmers can build trust with banks, which is essential for securing financing in the future.
3. **Repayment of Long-Term Investments:** In the case of long-term technology investments, banks typically require repayment based on taxes. Thapa advised that this repayment structure should be carefully considered, as it may impact the overall profitability and financial stability of both the bank and the farmer.
4. **Loan Accessibility After Trust Is Established:** Once farmers establish trust with the bank, obtaining loans becomes easier. A proven track record of successful production and market sales is building this trust and ensuring future access to financial support.

Conclusion:

Banks are cautious about providing loans for mango farming, primarily due to the uncertainty around crop profitability before harvest. However, farmers who can demonstrate strong production and market potential are more likely to gain access to financing. Additionally, when it comes to long-term technology investments, the tax-based repayment system should be carefully evaluated to ensure it is beneficial for both parties. By focusing on building trust and proving market potential, farmers can improve their chances of securing loans from banks.

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd.

How can the municipality provide investment assurance? What can be done to support the farmers who have secured land ownership and are cultivating good commercial mango varieties?

What developments can be introduced in the mango sector in the next five years in Municipality?

Manoj Kumar Shah, Mayor, Janakpurdham Sub Metropolitan): (Review Whole part)

In Lalitpur Municipality is it right, under the policy of Bagmati Province, fallow leased land can be provided to the provincial government after coordination with local authorities. This policy allows for the leasing of land at a rate of NPR 20,000 per hectare. The initiative has contributed to an increase in banana productivity, which has seen a significant rise from 600 to 1,100 units per hectare. Local governments are encouraged to introduce similar policies to utilize vacant land effectively.

Key Points:

1. **Land Leasing Policy in Lalitpur Municipality:** The policy in Lalitpur Municipality allows for the leasing of fallow/unused land to the provincial government, which can then be utilized for agricultural purposes. This policy supports land development and encourages productive use of fallowland.
2. **Increased Banana Productivity:** As a result of this leasing initiative, banana productivity in the area has increased substantially, from 600 to 1,100 units per hectare. This improvement demonstrates the positive impact of effective land utilization on agricultural productivity.
3. **Leasing Rate:** The provincial government leases the land at a rate of NPR 20,000 per hectare, making it an affordable and viable option for agricultural development. This financial aspect supports farmers and local authorities in accessing land for cultivation.
4. **Role of Local Governments:** Local governments can play a crucial role in utilizing barren land by introducing similar policies to lease land for agricultural purposes. This can help increase agricultural production and improve the local economy.

Conclusion:

The land leasing initiative in Lalitpur Municipality, supported by the Bagmati Province policy, has proven to be successful in increasing agricultural productivity, particularly in banana cultivation. The affordable leasing rate has encouraged the productive use of fallow land, leading to significant improvements in yield. Local governments can replicate this model by introducing policies to lease vacant land effectively, contributing to overall agricultural growth and economic development in the region.

Ramesh Budhathoki, Mayor, Hariwon Municipality:

Mango is one of the most important commercial fruits, often referred to as the "king of fruits." Despite its economic potential, mango varieties are not officially registered, and challenges such as middlemen dominance and lack of proper storage persist. However, local governments like Hariwon Municipality are actively investing in mango

farming through subsidies, equipment support, and plantation programs.

Key Points

1. **Municipal Investment in Mango Farming**
   - » Securing federal government funds for mango harvesting initiatives.
   - » Providing subsidies for harvesting equipment, pesticides, tarpaulins, and mini-tillers.
   - » Expansion into packaging and grading for better market value.
2. **Encouraging Mango Plantation**
   - » Distribution of 3,000 high-quality saplings to farmers.
   - » Plantation of over 60 ha of mango trees in fertile riverbank areas.
   - » Ensuring saplings meet healthy and quality standards.
3. **Enhancing Farmer Income & Reducing Middlemen Influence**
   - » Exploring ways to ensure fair pricing for farmers.
   - » Utilizing damaged mangoes for processed products like pickles, amchur powder, snacks, jam, and juice.
   - » Training programs to teach farmers how to produce and market value added products.
4. **Infrastructure & Policy Development**
   - » Establishing cold storage to preserve mangoes for better market timing.
   - » Encouraging national policies to promote local mango production over imports.
   - » Advocating for sustainable farming by reducing harmful pesticide use.

Conclusion

Mango farming holds immense potential for economic growth, but challenges such as market access, post-harvest losses, and middlemen exploitation need to be addressed. By continuing municipal investments, improving storage facilities, and supporting value-added products, farmers can increase their earnings. Developing national policies and encouraging sustainable farming practices will further strengthen the mango sector, ensuring long-term benefits for both farmers and consumers.

Shiv Shanker Mahato, Mayor, Dhangadimai Municipality:

Dhangadimai Municipality, a major hub for mango farming in the region, dedicates around 60-70% of its land to mango cultivation. Mango farming is crucial for the local economy, with many traders, vendors, and farmers relying on it for their livelihoods. To promote and develop mango farming, the municipality has made significant investments in the production process, including providing mango saplings at subsidized rates. Despite these efforts, several challenges hinder the growth and sustainability of mango farming, including irrigation issues, weather conditions, pest and disease outbreaks, and the need for diversified farming practices.

Key Points:

1. **Significant Investment in Mango Farming:** Dhangadimai Municipality has made considerable investments to promote mango farming, including allocating a budget every year to provide mango saplings at a 50-75% subsidy. PMAMP also supports the distribution of saplings with partial subsidies.
2. **Irrigation Challenges:** A major challenge in mango farming, particularly in the southern region of Dhangadhi, especially the Chure area, is the lack of adequate irrigation. Setting up boring, which costs around 10-15 lakh rupees, is a significant financial burden for individual farmers. The municipality also faces difficulties in providing boring for every farm, making it essential for the government and Ministry of Agriculture to focus on improving irrigation facilities in these areas.
3. **Impact of Weather Conditions:** The period between Baisakh and Jestha (April-May) is particularly difficult for mango farmers due to strong winds in the Terai region, which cause premature mango fruit drop. This results in a significant reduction in production. Weather-related challenges, like these, need to be addressed to protect mango crops and minimize yield loss.

4. **Pest and Disease Management:** Pests and diseases remain a significant threat to mango production in the region. These issues further reduce yields, highlighting the need for regular training and awareness programs for farmers. These programs should focus on effective pest and disease management practices to improve crop health and overall yield.
5. **Diversified Farming for Additional Income:** Encouraging farmers to cultivate other crops alongside mango trees can provide additional sources of income, diversify farm output, and improve productivity. This practice also helps maintain soil health, which can benefit long-term mango production by ensuring better growth conditions for the mango trees.

Conclusion:

Mango farming in Dhangadimai is vital to the local economy, but challenges such as inadequate irrigation, adverse weather conditions, pests and diseases threaten its sustainability. The municipality's efforts to provide subsidized mango saplings are commendable, but further support from the government is necessary, especially in improving irrigation infrastructure and addressing weather-related challenges. Additionally, promoting diversified farming and regular farmer training programs will help address these issues and improve mango production. By investing in these areas, Dhangadimai municipality can ensure the long-term success and growth of its mango farming sector.

Sunita Singh Budhathoki Deputy Mayor, Mithila Municipality, Dhanusha

Today's program has provided valuable insights into the opportunities and challenges of mango farming. To maximize its potential, raising awareness among farmers about investment opportunities is crucial. Educating them about the benefits of mango farming and providing financial support will encourage wider adoption.

Key Points

1. **Farmer Awareness & Investment Opportunities**
   - » Informing farmers about subsidies and financial support available for mango farming.
   - » Encouraging group-based financial support for larger investments.
   - » Providing motivation and technical knowledge to enhance productivity.
2. **Municipal Support for Mango Farming**
   - » Mithila Municipality has a high mango production, with major markets in Kathmandu and western regions.
   - » The municipality has allocated a dedicated budget for mango farming promotion and training programs.
   - » Farmers receive a 50% subsidy on pesticides, fertilizers, and essential tools.
3. **Infrastructure & Market Accessibility**
   - » Well-connected transportation routes allow easy mango distribution.
   - » Dhanusha district’s tourism boost increases mango sales potential.
   - » Ongoing investments in irrigation and fencing for mango orchards covering 12 bighas (1.6 ha) of land.
4. **Collaboration with Provincial & Federal Governments**
   - » Local governments directly interact with farmers and understand their challenges.
   - » Stronger policies at the provincial and federal levels are needed to enhance implementation.
   - » Encouraging the use of barren land for mango cultivation to boost production.

Conclusion

Mango farming has significant economic potential, and local governments are taking proactive steps to support it. By raising farmer awareness, ensuring financial support, and improving infrastructure, we can enhance production and market accessibility. However, collaboration with higher levels of government is necessary to develop policies that facilitate long-term growth and sustainability in the mango sector.

Moderator: Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd..

After all these discussions, what I want to emphasize is that ICIMOD is a knowledge-generating organization. Today, valuable knowledge has been shared and as mentioned, NCFD has already taken note of these key points. We will work on integrating them into a structured plan.

The municipality will take the lead in implementation, and as stakeholders, we now have a better understanding of the process. However, financial aspects still require further work, and we will continue discussions on that. We also hope that NARC will develop policies that include proper cost calculations to support this initiative.

We trust that all of you, in your respective capacities, will take necessary actions to move this forward.

Ms. Sabnam Shivakoti, Joint Secretary, MoALD

Agriculture in our country involves multiple ministries, making it challenging for us to respond solely on behalf of the federal government. As highlighted by Babukaji, it's difficult to provide full assurances in farming due to factors like climate and temperature variations, which can lead to crop failure. However, focusing on proper knowledge and the adoption of the appropriate technologies and practices can significantly improve the profitability of crops, making them more viable and bankable.

Key Points

Challenges in Farming & Climate Factors

- Climate change effects make farming uncertain, leading to potential crop failure.
- Farmers may struggle to repay loans before their fruit trees start bearing fruit, which typically takes 4–5 years and more than 7-8 years for commercial production.

1. **Role of Technology & Knowledge in Agriculture**
   - If farmers adopt appropriate technologies and practices with the right knowledge, crops can become more profitable and sustainable.
   - Focusing on this approach can make certain crops bankable, helping farmers secure loans and improve yields.
2. **Plantation Insurance & Loan Repayment Issues**
   - Under the leadership of the National Bank, work is underway to introduce a complete plantation insurance system within communities to address crop failure risks.
   - This system will also help review existing loans and ensure appropriate repayment structures/models are in place based on the type of crop.
   - A policy framework will be presented by financial institutes to the ministry to ensure that loan structures align with crop growth timelines and farmers' financial needs.
3. **Role of Industries & Research Innovation**
   - Industries play a crucial role in connecting farmers to markets, creating opportunities for growth and sales.
   - Research and innovation must be conducted with consideration of the entire agricultural ecosystem, ensuring that necessary inputs are available and affordable for farmers.
   - Many technologies fail to succeed because of limited market availability or affordability constraints, highlighting the need for comprehensive research to overcome these challenges.

Conclusion

While the challenges in agriculture, particularly regarding crop insurance and loan repayment for long gestation crops, are significant, a comprehensive approach involving appropriate technology adoption, insurance systems, and market connections can help farmers overcome these hurdles. It's essential that policies are tailored to specific crops, ensuring fair loan structures and proper repayment timelines. With continued focus on research, innovation, and collaboration with industries, we can help make agriculture more sustainable and profitable for farmers.

Audience 1 Questions:

1. Regarding land leasing, will the government lease land from other government entities and provide it, or will it lease out fallow land to farmers?
2. In terms of mango cultivation, which variety is being used?

Audience 2 Question:

1. Nursery registration is required at the local government level. However, just registration is not enough—there are technical criteria that must be met. Previously, Cottage and Small Industries Office (Gharelu tatha Sana Udhyog) used to register, inform the District Agriculture Development Office, and then technicians would ensure technical aspects of nursery establishment. Currently, this mechanism is lacking. How can this mechanism be

enforced? Since registration is handled by the local government, but they lack technical manpower, how will quality control be ensured?

Session Takeaway and Recommendation

1. Invest in mango research, train farmers better, improve storage and tools, and create supportive policies to reduce waste and increase productivity.
2. Provide insurance for mango farmers, create a clear policy for mango farming, prioritize agriculture, utilize unused land, and speed up government action on farming projects.
3. Educate farmers, improve technical knowledge, secure financial support, and develop cooperative policies for agricultural growth.
4. Enhance farmer education on cost calculation, adapt regional standards, expand insurance coverage, and improve supply chain infrastructure to meet demand.
5. Mitigate climate risks, promote tech adoption, implement flexible loans and insurance, and enhance industry-farmer connections with research support

Vote of thanks by Dr. Shanta Karki:

Good afternoon, esteemed panelists, distinguished guests, and participants,

I would like to extend my heartfelt gratitude to all those who contributed to the success of this symposium. First and foremost, I want to express my sincere thanks to our 18 distinguished speakers for their valuable insights and in-depth discussions on crucial topics related to the agricultural sector. Your expertise and perspectives have given us a broader understanding of the challenges and opportunities facing our farming communities.

A special thank you goes to our esteemed panelists: Ms. Sabnam Shivakoti, Joint Secretary at the Ministry of Agriculture and Livestock Development, for sharing valuable policy perspectives; Dr. Tika R. Chapagain, Chief of the National Horticulture Research Center (NHRC), for shedding light on the role of research and innovation in transforming agriculture; Mr. Rajendra Koirala, DDG from the Department of Agriculture, for offering practical insights into agricultural development strategies; Dr. Babukaji Thapa, DGM of Agricultural Development Bank Ltd. (ADBL), for discussing the financial mechanisms and support systems available for farmers; and Mr. D.B. Basnet, Chairperson of the Federation of Nepalese Chambers of Commerce and Industry (FNCCI), for emphasizing the importance of industry-farmer collaboration to boost agricultural productivity.

I would also like to express my sincere appreciation to the Municipality Mayors: Ramesh Budhathoki, Mayor of Hariwon Municipality, Shiva Shanker Mahato, Mayor of Dhangadimai Municipality, Manoj Kumar Shah, Mayor of Janakpurdham Municipality and Sunita Budhathoki, Deputy Mayor of Mithila Municipality, for their leadership and support in enhancing local agricultural initiatives and fostering community involvement.

As discussed, the insights shared today will be compiled into a comprehensive report and forwarded to the ministry through the Department of Agriculture. We are committed to addressing any clarifications that may arise and encourage you to send your suggestions and feedback via email.

Once again, I thank all of you for your time, effort, and valuable contributions. Together, we can continue working towards the sustainable development of agriculture in our region. Thank you, and have a wonderful day ahead.

Closing Session of the Mango Symposium, 2024

The Mango Symposium, 2024 concluded with insightful discussion, key recommendations and a collective commitment to strengthening Nepal's Mango industry. The closing session featured valuable remarks from distinguished speakers, highlighting the potential challenging and future direction of Nepal's Mango sector.

Requesting Dignitaries on Dias

Chair: Dr. Narahari P. Ghimire, DG, DoA

Chief Guests: Dr. Rajendra Prasad Mishra, Secretary MoALD

Special Guests:

- Prof. Arjun Kumar Shrestha, PhD (Dean) Faculty of agriculture, AFU
- Prof. Kishor Dahal, PhD (Assistant Dean) IAAS/TU

Guests:

- Mayors
- Shanta Karki, Chief, NCFD
- Mr. Rajendra Koirala, Deputy Director General, DoA
- Mr. Gopal Prasad Shrestha, President, NHS
- Dr. Neera Shrestha Pradhan, ICIMOD

Presentation on Synopsis of the symposium

Mr. Surya Baral, Senior Horticulture Development Officer, NCFD

The symposium, consisting of three sessions- Opening, Technical, and Closing- served as a platform to discuss various aspects of mango farming, including policies, practices, and challenges in the sector. A key feature of the event was the panel discussion on "Policy and Practices in Mango," which involved representatives from the Ministry of Agriculture and Livestock Development (MoALD), Nepal Agricultural Research Council (NARC), Department of Agriculture (DoA), the Insurance Authority, Agricultural Development Bank Ltd. (ADBL), and mayors from Janakpurdham Sub-Metropolitan City, Dhangadimai Municipality, Mithila Municipality, and Hariwon Municipality.

The symposium saw active participation from 120 individuals, with 102 male and 18 female participants, and three awards were presented, two to farmers and one them an expert in the field. In total, 15 presentations were delivered across various themes, including a keynote speech on the status of mango farming, international perspectives on trust and traceability, post-harvest loss management practices from India and the latest research activities from Agriculture and Forestry University (AFU). Presentations also covered topics such as government farm status, the PMAMP component focusing on mango zones, local-level experiences, orchard management in Mahottari, and market trends in wholesale and retail, particularly in organic farming. Notably, there were discussions on the value chain by ICIMOD and HI-GRID, and insights from the industry sector, particularly in cottage industries and national development. Additionally, mechanization in mango orchards was explored as a key area for development.

The symposium also included a forward-looking discussion on scaling up the mango value chain, particularly in the HI-GRID area, covering Janakpurdham Sub-Metropolitan City, Bardibas Municipality, Bhangaha Municipality, and Rajbiraj Municipality. Challenges identified during the discussions included political instability, the need for modernization and mechanization, the importance of prioritizing research due to the long gestation period of mango crops, issues related to farming culture, orchard management, post-harvest management, and marketing—especially

with regard to buy-back guarantees and investment from both private and public sectors.

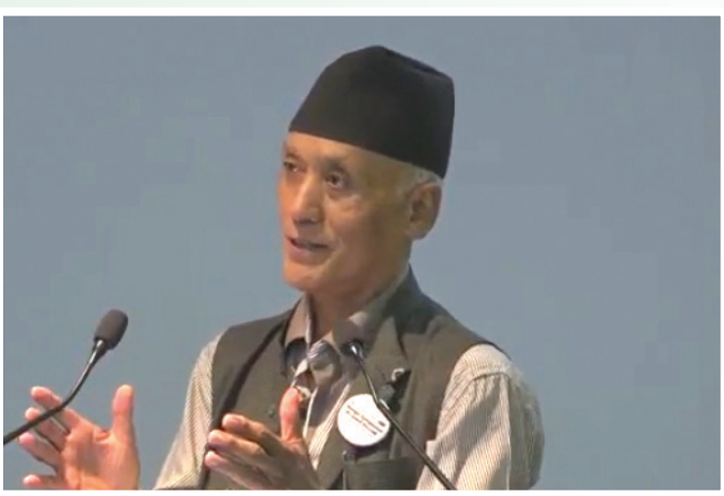
Moving forward, several recommendations were put forward. The symposium report will be compiled and forwarded to the concerned agencies. It was proposed to establish Mango Excellence Centers in Sarlahi and Janakpur to promote best practices. There is also a need for developing new mango varieties that are regular-bearing and early, medium, and late season . The symposium stressed the importance of quality planting material production in government farms, which should then be supplied to private nurseries. Furthermore, phonological characterization of germplasm collected in government farms is necessary for better variety development. Pruning practices and Good Agricultural Practices (GAP) must be emphasized, alongside strengthening post-harvest handling and storage practices.

A collaborative approach on research and development is crucial for advancing the sector, with a focus on utilizing fallow land with innovative technologies led by local levels. A mission on program on mango orchard establishment was suggested, along with clear Terms of Reference (ToR) for roles and responsibilities to different institutions. Financial support, including provisions for soft loans, was recommended to support farmers and facilitate the growth of the sector.

In summary, the symposium provided a comprehensive platform for stakeholders to discuss key challenges and opportunities in the mango sector. The recommendations laid the foundation for future initiatives to improve productivity, sustainability, and profitability within the mango value chain.

Technical Remarks

Gopal Prasad Shrestha, President, NHS



Mr. Gopal Prasad Shrestha, President of NHS presented the key recommendations from the program .The Mango Symposium provided a comprehensive platform for discussing the future of mango farming, focusing on improving productivity, sustainability, and market accessibility. Based on the discussions and insights from the symposium, the following key recommendations have been put forward:

1. **Research & Development**: Focus on conducting extensive research to move beyond relying on old mango varieties and explore new, more resilient and productive varieties suitable for diverse climatic conditions.
2. **Technology Transfer**: Ensure effective transfer of technology by making agricultural knowledge accessible to farmers at all levels, enabling them to adopt modern farming practices and improve productivity.
3. **Policy Support**: Advocate for strong policy commitment from the 3-tier of government to provide consistent support for mango farming, including financial incentives, subsidies, and infrastructure development.
4. **Stakeholder Collaboration**: Promote collaboration among all stakeholders, including government agencies, farmers, private sector, and research institutions, to create a unified approach for mango farming advancement.
5. **Improvement of Sapling Quality**: Develop and implement strategies for producing high-quality mango saplings, ensuring the availability of healthy planting material that meets agricultural standards.
6. **Strengthen Food Security**: Focus on sustainable mango production to strengthen food security, ensuring a stable supply of mangoes both local and national market, while also exploring export opportunities.

These recommendations aim to guide future actions and policies that will drive growth and sustainability in the mango sector.

Special Remarks
Dr. Neera Shrestha Pradhan, ICIMOD

ICIMOD is committed to advancing hi-grid mango cultivation, and we are ready to support and collaborate in this effort. We can contribute by sharing knowledge, expertise, and resources to promote hybrid mango farming.

Our Hi-GRID project is not only being implemented in Nepal but also scaled across eight other countries. We can help drive impactful initiatives by sharing best practices and experiences from different regions.

Our focus areas include addressing challenges related to too much or too little water, tackling climate change impacts, and supporting vulnerable communities. The project, with support from the Australian government, also emphasizes empowering people with disabilities. Additionally, we work on strengthening science-policy integration to create sustainable and inclusive solutions.

Special Remarks
Kishor Dahal, PhD (Assistant Dean) IAAS/TU

Firstly I will talk about my own case, Mango prices fluctuate significantly within a short period. For example the price dropped from Rs 130 to Rs 68 and then raised to Rs 102 within one month. This price variation highlights market instability and the need for better storage and market management.

Key Solutions:

1. **Technology Adaptation:** Implement advanced storage methods like controlled atmosphere (CA) storage and ethylene management to extend mango shelf life.
2. **Market Improvement:** Develop a structured supply chain, promote contract farming, and establish a transparent pricing system to reduce middlemen's influence.
3. **Cold Storage Maintenance:** Maintain optimal temperature (10-13°C for mangoes), ensure proper post-harvest handling and monitoring systems.
4. **Research & Trust Building:** Decisions should be made based on scientific research, and reliable technologies must be tested and implemented effectively.

Closing of the Symposium
Dr. Narahari P. Ghimire, DG, DoA

The program was concluded by Dr. Narahari P. Ghimire, DG, DoA. We have already started discussions on agricultural investment, and it is important to determine how much investment is required for mango farming at the local level and private sector. Local governments should plan accordingly, and the provincial government should be informed. If we receive feedback on how the federal government can coordinate and support all stakeholders, it will help us move forward more effectively.

If anyone has suggestions, please share them with us, and we will ensure they reach the government. We also need to strategize on how to promote and implement mango investment plans. A framework should be established to ensure coordination between federal, provincial, and local governments.

Additionally, having food technology specialists involved would make the discussions even more effective. Thank you everyone for your participation!

List of Participants and Attendees
(Including Organizing Team)

S.N	Name	Designation	Organization
1	Hon.Ramnath Adhikari	Hon. Minister	Ministry of Agriculture and Livestock Development (MoALD)
2	Dr. Deepak Kharal	Secretary	MoALD
3	Dr. Surendra Lal Shrestha	Executive Director	Nepal Agriculture Research Council (NARC)
4	Umesh Shrestha	Ex. Minister, Chairman	UB Holdings
5	Prof. Dr. Arjun Kumar Shrestha (PhD)	Dean	Faculty of Agriculture, AFU
6	Sabnam Shivakoti	Joint Secretary	MoALD
7	Shiv Shankar Mahato	Mayor	Dhangadimai Municipality
8	Ramesh Budhathoki	Mayor	Hariwon Sarlahi
9	Manoj Kumar Shah	Mayor	Janakpurdham Municipality
10	Dr. Narahari P. Ghimire	Director General	Department of Agriculture (DoA)
11	Ms. Izabella Koziell	Deputy Director General	ICIMOD
12	Dr. Shanta Karki	Chief	National Center for Fruit Development (NCFD)
13	Rajendra Koirala	Deputy Director General	DoA
14	Tika Ram Chapagain	Chief	National Horticulture Research Center (NHRC)
15	Kishor Dahal	Assistant Dean	IAAS, TU
16	Sunita Singh Budhathoki	Deputy Mayor	Mithila Municipality
17	Badri Narayan Chaudhary	Ag. Coordinator	Lahan Municipality
18	Umesh Kumar Mahato		Mithila Municipality
19	Ram Baral Chaudhary		Dhangadimai municipality
20	Nagdev Yadav	President	Community Development & Advocacy Forum Nepal (CDAFN)
21	Gopal Prasad Shrestha	President	NHS
22	Mohan Bahadur Thapa	Past President	NHS
23	Indra Raj Pandey	Past President	Nepal Horticulture Society (NHS)
24	Dr. Umed Kumar Pun	Past President	NHS
25	Dr. Umesh Acharya	Chief	NARC
26	Ram Bahadur K.C	Hort. Expert	NHS
27	Shiva Bahadur Nepali Pradhan	Former Executive Director	Nepal Agriculture Research Center (NARC)
28	Dal Prasad Pudasaini	Senior Agriculture Economist	MoALD
29	Binod Ghawali		MoALD
30	Binod Raj Pandey		MoALD
31	Tilak Raj Chaulagain	Sr. Agri-Economist	DoA
32.	Kalash Ram Chaudhary	Sr. Agri-Economist	DoA
33	Reetu Singh	Senior Hort. Dev Officer	DoA
34	Dr. Jeet Chand	Senior Engineer	PMAMP
35	Santosh Bhandari	AEO	MoALD
36	Lalan K. Singh	Sr. Ag Officer	PMAMP
27	Ram Kumar Yadav	Chief	Tropical Horticulture Center (THC), Sarlahi
38	Ranju Maharjan	Horticulture Development Officer	DoA
39	Ram Badal Shah	Retired Horticulturist	Dhanusha
40	Sunil Kumar Chaudhary	Plant Protection Officer	THC, Sarlahi
41	Surya Prasad Baral	Senior Agriculture Department Officer	NCFD
42	Yam K. Shrestha	Senior Horticulturist Department Officer	NCFD/NAFHA
43	Samyan Pandit	AEO	NCFD
44	Santosh Paudel	Agri-Economist	NCFD
45	Shree Krishna Neupane	Plant Protection Officer	NCFD
46	Dr. Surendra Yadav	Livestock Expert	PMAMP
47	Sameer Shrestha	Agricultural Engineer	PMAMP
48	Kaushal Kumar Paudel	Life Member	NHS
49	Sanjay Dhimal	Executive Member	NHS
50	Shital K.C		THC, Sarlahi
51	D.B. Basnet	Chairperson	FNCCI/AEC
52	Ms. Kavitha Kasynathan	Development Head	Australian Embassy
53	Krishna Sharma	President	Nepal Agricultural Machinery Entrepreneurs' Association (**NAMEA**)
54	Shrikunj Adhikari	Treasurer	**NAMEA**
55	Sakkal Thapa	Member	**NAMEA**
56	Kushal Shrestha	Member	**NAMEA**
57	Ms. Sunita Nhemaphuki	CEO/Founder	R&D Innovative Solution Pvt. Ltd.
58	Manoj Dhital	Director	Kalimati Fruits & Vegetables Market
59	Binay Adhikari	Farmer	Binay Krishi Farm

S.N	Name	Designation	Organization
60	Manohar Neupane	Cameraman	Agriculture Information and Training Center (AITC)
61	Radha Krishna Bhandari	M.Sc. Ag Student	Institute of Agriculture and Animal Science (IAAS), TU
62	Sujan Bhandari	Student	IAAS, T.U
63	Padam Pd. Adhikari	Chief	Warm Temperate Horticulture Center(WTHC), Kritipur
64	Gauri Khatiwada	Researcher	Ecosphere
65	Nuteuddin Shah	Farmer	Shah Krishi
66	Sarita Koirala		Krishi Firm
67	Roshan Adhikari	Personal Secretary	MoALD
68	Simon Paudel	Consultant	CR &CC
69	Durga Dahal	MD	Nepal China Agriculture Centre
70	Sikha Jha	Consultant	
71	Sichan Shrestha	Consultant	ICIMOD
72	Bhawana Paudel	Horticulture Development Officer	AITC
73	Sajan Dahal	JTA	Bardibas Municipality
74	Suman Paudel	Businessman	Khetipati
75	Shilpa Subedi	Agri-consultant	Nabil Bank
76	Keshab Khati	Head-Micro Banking	Siddhartha Bank
77	Pratima Koirala	Entrepreneur	Agro
78	Sujan Bhandari	Student	IAAS, TU
79	Bhubani Shree Panta		
80	Krishna Sapkota	Regional Hub Manager	Forward Nepal
81	S.R Pandey	SRP Partner	S. R Pandey and Company
82	Sujan Neupane	Student	SchEMS
83	Pramod Thapa	Staff	Nepal China Agriculture Centre
84	Arniko Rajbhandari	Director	Nepal Dairy
85	Arjun Prasad Luitel	Owner	G-Seven Agriculture Pvt. Ltd.
86	Sunil Pokhrel	Agri-Analyst	Global IME Bank
87	Pawan Shrestha		Hamro Kishan TV
88	Gopal Ale Magar	Chairman	Krishi Patrika
89	Manoj Shrestha		Halokhabar.com
90	Karna Dimdung	Live team	Krishi Patrika
91	Anil Shrestha	Live team	Krishi Patrika
92	Niraj Ranabhat	Live team	Krishi Patrika
93	Dilip Thakuri		Kishan TV
94	Sarita Tharu	Reporter	Ratopati
95	Bishnu Shrestha		Bhotekoshi Group
96	Nitesh Kumar Paudel	Sr. Technical Head	R&D Innovative Solution Pvt. Ltd.
97	Samjhana Dhakal	Chairperson	Janamukhi
98	Prajjwal Dhungana	RA	ICIMOD
99	Basanta Pathak		Chautari News
100	Neera S. Pradhan		ICIMOD
101	Bhuwan K.C.	Founder	Kathmandu Organics
102	Sushil Dev Subedi	Director	Nepal Insurance Authority
103	Antara Khadka	Communication	R&D Innovative Solution Pvt. Ltd.
104	Deepesh Dubey	Credit Officer	Agriculture Development Bank Limited (ADBL)
105	Chhaya Sharma	Chair/ WLF	CNI
106	Hirchi	Director	Carbonx
107	Rameshwor Raj	M.D	Sahara Khabar
108	Bhawani Deuja	Driver	ADBL
109	Kharendra Awalto	MdE Expert	URDSC
110	Shanna Karki	Proprietor	Shanna Bryhat Nursery
111	Ranjit Kumar Das	Proprietor	Das Bryhat Nursery
112	Ambhesh Kumar Yadav	Driver	PMAMP
113	Bipin Thapa	Program Coordinator	Geokrishi
114	Dipak Prasad Khanal	Chairman	
115	Prakriti Gautam	CEO	Khetipati Organics
117	Achinta Kumar Singh	Proprietor	Achital Agriculture
118	Bimal Shrestha	Proprietor	Krishi Bagan
119	Mr. Damber Khanal	Co-Founder	R&D Innovative Solution
120	Namrata Basnet	Project Coordinator	R&D Innovative Solution
121	Sushil Nhemaphuki	Program Manager	R&D Innovative Solution

ANNEX

Date: July 22, 2024 (Shrawan 7, 2081)
Day: Monday
Venue: Kailash Hall, ICIMOD

PROGRAM FLOW SHEET

Time	Program Descript	Responsibility
Opening Session		
9:00- 9:15	Registration	Ms. Namrata Basnet and Ms. Kaweri Bhandari
09:00-09:25	Dignitaries Taking Seat on the Dias	**Chair**: Dr. Narahari P. Ghimire, Director General, Department of Agriculture (DoADoA) **Chief Guest**: Hon. Minister Ramnath Adhikari, Ministry of Agriculture and Livestock Development (MoALD) **Special Guests:** ● Mr. Umesh Shrestha, Ex- Minister/ UB Agro, Founder Chairman ● Dr. Deepak Kumar Kharal, Secretary, MoALD ● Ms. Izabella Koziell, Deputy Director General, ICIMOD (On behalf of DG) **Guest of Honor**: ● Prof. Arjun Kumar Shrestha, PhD (Dean) Faculty of Agriculture, AFU ● Ms. Kavitha Kasynathan- Australian Embassy ● Dr. Surendra Lal Shrestha, Executive Director, Nepal Agriculture Research Council (NARC)
	Guests at Front Row	**Guests:** Mayors: Janakpur Sub metropolitan city Rajbiraj Municipality Harion Municipality Dhangadimai Municipality Mithila Municipality ● Representative, National Farmer's Commission (NFC) ● Ms. Sabnam Shivakoti, Joint Secretary, MoALD ● Mr. Rajendra Koirala, Deputy Director General, DoA ● Dr. Shanta Karki, Chief, National Center for Fruit Development (NCFD) ● Ms. Sunita Nhemaphuki, Founder, R&D Innovative Solution Pvt. Ltd
09:25-09:35	National Anthem	All
09:30-09:35	Welcome Speech	Ms. Izabella Koziell, Deputy Director General, ICIMOD
09:35-09:40	Inauguration of the Symposium	Chief Guest: Hon. Minister Ramnath Adhikari, MoALD
09:40-09:45	Objective and Overview of the Symposium	Dr. Shanta Karki, Chief, NCFD
09:45-10:00	Keynote Speech: Status of Mango Research, Extension, Production and Future Pathways	Mr. Ram Badal Shah, Nepal Horticulture Society (NHS)
10:00-10:05	Remarks	Ms. Kavitha Kasynathan- Australian Embassy
10:10-10:15	Remarks	Dr. Surendra Lal Shrestha, Executive Director, NARC
10:15-10:20	Remarks	Special Guest: Dr. Deepak Kumar Kharal, Secretary, MoALD
10:20-10:25	Remarks	Special Guest: Mr. Umesh Shrestha, Ex Minister/ UB Agro, Founder Chairman
10:20-10:35	Special Remarks and Directives	Chief Guest: Hon. Minister Ramnath Adhikari, MoALD
10:35-10:40	Vote of Thanks	Ms. Sunita Nhemaphuki, R&D Innovative Solution Pvt. Ltd
10:40-10:50	Special Remarks and Closing of the Opening Session	Chair: Dr. Narahari P. Ghimire, Director General, DoA
10:50-11:10	--- Tea Break---	All
Technical session		

Time	Program Descript	Responsibility
11:10-11:25	Mango Value Chain Experience Sharing from Thailand (Virtual)	Dr. Umed Pun & Dr. K. Wongruira
11:25-11:35	Experience Scenario: Post Harvest Loss Management and Processing in India	DECCO India (Virtual)
11:35-11:45	Mango Research Experience	Prof. Arjun Kumar Shrestha, PhD (Dean) Faculty of Agriculture, AFU
11:45-11:55	Government Farm's Experience	Mr. Ram Kumar Yadav, Acting Chief (HDC, Sarlahi)
11:55-12:05	PMAMP Component Experience	Dr. Jeet Bahadur Chand,
12:05-12:15	Local Level Experience	Mr. Badri Narayan Chaudhary, Chairperson of Ward-12, Lahan Municipality
12:15-12:25	Wholesale and Retailer's Experience	Mr. Binod Pandey, Falful tatha Tarkari Thok Byawasaya Mahasangh
15:25-13:40	---Lunch Break and Networking---	All
13:40-13:50	Mango Value Chain Experience	Ms. Anu Joshi Shrestha, Value-Chain Specialist, ICIMOD
13:50-14:05	Experience of HI-GRID Partners: Mango Value Chain Initiative in Lower Koshi River Basin	1. Community Development & Advocacy Forum Nepal 2. R&D Innovative Solution Pvt. Ltd. 3. Pathways Technologies Pvt. Ltd
14:05-14:15	Community Mango Orchard Management Experience	Mr. Binaya Adhikari, Farmer, Vinay Agricultural Farm
14:15-14:25	Experience of Cottage Industry	Ms. Prakriti Gautam, Khetipati Organics
14:25-14:35	Industry Sector's Experience	Mr. Araniko Rajbhandari, Director, Nepal Dairy
14:35-14:45	Experience of Mechanization in Mango Orchard	Mr. Krishna Sharma, President, NAMEA
14:45-14:55	Marketing Experience in Kathmandu and Major Cities	Mr. Bhuwan K.C., Kathmandu Organics
14:55-15:55	**Panel Discussion on Policy and Practice in Mango** ***Moderator: Ms. Sunita Nhemaphuki*** **Panelists:** 1. Ms. Sabnam Shivakoti, Joint Secretary, MoALD 2. Dr. Tikaram Chapagain, Chief, NHRC, NARC 3. Mr. Sushil Dev Subedi, Director, Insurance Authority 4. Mr. Rajendra Koirala, DDG, DoA 5. Dr. Babu Kaji Thapa, DGM, ADBL 6. Mr. D.B. Basnet, Chairperson, AEC/FNCCI 7. Mayor, Respective Municipality (1)	
15:55-16:10	Way forward for Scaling up Mango Value Chain in HI-GRID Area 1. Bardibas Municipality 2. Bhangaha Municipality 3. Janakpurdham Sub-Metropolitan City 4. Rajbiraj Municipality	
Closing Ceremony	***Requesting Dignitaries on Dias***	***Chair: Dr. Narahari P. Ghimire, DG,DoA***
16:10-16:15		Guests: ● Prof. Arjun Kumar Shrestha, PhD (Dean) Faculty of Agriculture, AFU ● Prof. Kishor Dahal, PhD (Asst. Dean) IAAS/TU ● Mayors ● Mr. Rajendra Koirala, Deputy Director General, DoA ● Mr. Gopal Prasad Shrestha, President, NHS ● Dr. Neera Shrestha Pradhan, ICIMOD
16:15-16:25	Synopsis of the Symposium	Mr. Surya P. Baral, Senior Horticulture Development Officer, NCFD
16:25-16:35	Technical Remarks	Mr. Gopal Prasad Shrestha, President, NHS
16:35-16:45	Special Remarks	Dr. Neera Shrestha Pradhan, ICIMOD
16:45-16:55	Special Remarks	Mr. Rajendra Koirala, Deputy Director General, DoA
16:55-17:05	Special Remarks	Prof. Kishor Dahal, PhD (Asst. Dean) IAAS/TU
17:10-17:15	Closing of the Symposium by Chair with Remarks	Dr. Narahari P. Ghimire, Director General, DoA

Some Glimpses of Mango Symposium-2024