

Quarterly Newsletter

AGRI-CONNECTION

March 2023 | Volume 8, Issue 1



Fresh vegetable market in Dharan Bazar-Sushil Thapa



Inside:

6 Research Mini-Grant Results

14 Research Brief

24 KidsZone

35 नेपालमा चैते धान: सम्भावना र चुनौतीहरू

39 मौरी पालनमा रमाउदै नाति पुस्ता (Grower's Story)

16 Nepal News

PROSPERITY THROUGH AGRICULTURAL TRANSFORMATION

Message from the President

Dr. Pradeep Wagle, NAPA President



Dear NAPA members and beyond,

It is my great pleasure to announce the release of our quarterly newsletter Agri-connection (AC), **Volume 8 Issue 1**, which highlights the incredible work being done by our committees and members. This newsletter is a valuable resource for our members, providing them with up-to-date information on NAPA's activities. I would like to take this opportunity to thank all of our members who have contributed to this newsletter and to the success of our organization. Your hard work and dedication are inspiring. As we move forward, let us continue to build on the momentum we have created and work together to keep moving forward.

In this issue, you can enjoy reading numerous articles and research synopses covering a diverse range of pertinent subjects, condensed highlights of Nepal's noteworthy agricultural news, captivating artwork crafted by children, and additional intriguing content.

As I am writing this presidential remark, we have new Editor-in-Chief Dr. Uma Karki, for our flagship publication Global Journal of Agricultural and Allied Sciences (GJAAS). I strongly believe that our new GJAAS Editorial Board will bring valuable perspectives and significant contributions to flourish GJAAS to a higher level. Research Mini-Grant (RMG) program has reviewed and approved 15 proposals covering a range of subjects from undergraduate students at different institutions in Nepal. Through the RMG Program, we remain committed to promoting research that makes a meaningful impact and builds the capacity of the next generation of young scientists in Nepal.

On the occasion of NAPA Day, NAPA and Policy Research Institute (PRI), Nepal jointly organized a two-day (January 6-7) virtual symposium on "*Agricultural Policies and Practices in Nepal: Pathways for Transformation.*" Ministry of Agriculture and Livestock Development (MoALD), Nepal Agricultural Research Council (NARC), Agriculture and Forestry University (AFU), Institute of Agriculture and Animal Sciences (IAAS, Tribhuvan University), Nepal Agricultural Cooperative Central Federation Ltd. (NACCFL), and Society of Agricultural Scientists-Nepal (SAS-Nepal) were collaborators. PRI's Nepal Public Policy Review (NPPR) Journal is featuring a special edition comprising selected papers from the symposium. The Socio-Economic and Cultural Committee (SECC) organized a very informative webinar on "*Tax Literacy Program*" on January 22. The Webinar Committee (WC) organized the 33rd webinar on February 19 entitled "*Agro-biodiversity for Agricultural Sustainability*", presented by a panel of experts from diverse fields on the occasion of the National Agro-biodiversity Year (BS 2079). Another panel discussion on "*Viability of Domestic Vegetable Value Chain & Food Security/Safety in Nepal*" has been scheduled for April 16. The Women in Agricultural and Allied Professions (WAAP) hosted a panel discussion on "*Women in agricultural education in Nepal: status and peospective initiatives*" on March 5. The Student Coordination Committee (SCC) organized a panel discussion on "*Career in Industry*" on March 12.

Finally, I would like to acknowledge the hard work of the AC Editorial Board, led by Dr. Sushil Thapa. I encourage all of our members to stay engaged and to share their ideas and experiences at newsletter@napaamericas.org. Your contributions will help us to continue to provide valuable content to our members.

Happy New Year BS 2080!

Editorial

The use of digital technology, such as remote sensing, the internet of things (IoT), automation, artificial intelligence (AI), and computer vision, is rapidly increasing in agriculture. While digital solutions have the potential to ameliorate the lives of millions of smallholders, most of these innovations are geared toward large-scale growers in developed countries. In addition, there are fundamental barriers to technology adoption by smallholders, including a lack of internet access, technical difficulties, and poor mobile network coverage. Such barriers are more pronounced among women growers, who often have limited access to education, training, and productive resources. Women's participation in agricultural education, the use of contemporary technology, and entrepreneurship is therefore of paramount importance for holistic agricultural development.

To discuss and synthesize various issues inherent to women in agriculture, NAPA hosted a panel discussion on women in agricultural education in Nepal. NAPA also hosted webinars on the importance of agrobiodiversity, a tax literacy program, and careers in the industry during the last quarter (January to March, 2023).

As a highlight of agriculture-related news and events in Nepal, this issue introduces a new section named "Nepal News." This issue also features another exciting column on "Research Brief." Articles on neglected fresh produce, the sterile insect technique (SIT), the policy and praxis of food safety, the orientation flight of worker bees, and spring rice (*Chaite dhan*) make this issue very special and useful to our readers. This issue brings together the remarkable story of a Nepalese bee farmer, who has turned a family business initiated by his grandfather into a success. As usual, this issue includes sections on KidsZone and member of the quarter, and summarizes NAPA's initiatives and achievements in organizational development, networking, research funding, and philanthropy.

Happy reading and Happy Nepali New Year BS 2080.

AGRI-CONNECTION Editorial Board



Dr. Sushil Thapa
Editor-in-Chief

Guest Editor:
Dr. Bharat Shrestha



Dr. Sanjok Poudel
Editor



Mr. Amrit Sharma
Nepal Correspondence



Mr. Tikaram Wagle
Nepali Editing

TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
Message from the President	2
Editorial	3
NAPA Announces New Editor-In-Chief for GJAAS	5
Research Mini-Grant 2022-2023 Results	6
Webinar on Agrobiodiversity for Agricultural Sustainability	7
Panel Discussion on Women in Agricultural Education	10
Webinar on Tax Literacy	13
Roundtable Discussion on Career in Industry	13
Research Brief	14
NAPA Committees	15
Nepal News	16
Dr. Khanal Delivers Talk in Nepal	19
Member of the Quarter	20
Membership Update	21
Appeal to Join/Renew NAPA Membership	22
KidsZone	24
Article: No More Neglect: Wonky and Ugly Fresh Produce...	26
Article: Sterile Insect Technique (SIT) ...	28
Article: Policy and Praxis of Food Safety ...	30
Article: Orientation Flight of Worker Bee	32
लेख: नेपालमा चैते धान: सम्भावना र चुनौतीहरू	35
कृषक आवाज: मौरी पालनमा रमाउदै नाति पुस्ता	39
कृषि कविता: मानो रोपेर खेतमा	43

© NAPA

Publisher

Association of Nepalese Agricultural Professionals of Americas (NAPA)

Email : napa@napaamericas.org

Website: <https://napaamericas.org/>



NAPA Announces New Editor-In-Chief for GJAAS

Dr. Uma Karki is a Professor of Animal Science and State Extension Livestock Specialist at the College of Agriculture, Environment and Nutrition Sciences, Tuskegee University, Tuskegee, Alabama. Dr. Karki got her Ph.D. in Forage and Grazing Land Ecology from Auburn University and Master's degree in Animal Science from the University of Western Australia. Her current research and Extension work focus on promoting the sustainable and climate-smart livestock production systems.

Dr. Karki has presented many research and extension papers in numerous national, international, and local conferences, meetings, and training events. Her research and extension works are published in various journals, conference proceedings, newsletters, training handbooks, research highlights, magazines, and many other outlets. She has solely edited two training handbooks and authored seven chapters in those handbooks. She served for the editorial board of NAPA book project and as an editor of the Global Journal of Agricultural and Allied Sciences (GJAAS) since its inception.



Did you know about GJAAS?

Global Journal of Agricultural and Allied Sciences (GJAAS) is a multi-disciplinary, peer-reviewed (double-blind) international journal published by NAPA.

Please consider this journal for your future publications.

For further information: <https://gjaas.org/index.php/GJAAS>

CLICK HERE FOR
NAPA Biennial Conference
PROCEEDINGS



CLICK HERE FOR
Global Journal of Agricultural and Allied Sciences



GJAAS
Global Journal of Agricultural and Allied Sciences

Research Mini-Grant 2022-2023 Results

The Research Mini-Grant (RMG) program is a key initiative that supports NAPA's motto of "*Agricultural Transformation for Food Security*." Through the generous contributions of sponsors from NAPA members, NAPA has provided funding for over 30 collaborative research projects in agricultural and related fields, led by Nepalese students and faculty in 2018 and 2020.

The Research and Capacity Building Committee (RCBC) finalized the list of research proposals for the 2022 November call. The committee announced 15 selected proposals from 60 qualified proposals received from the call. Selected proposals include a broad range of subject matters from agronomy, soil science, horticulture, entomology, plant pathology, animal science, and social sciences. Proposals were reviewed through a blind review process and selected based on their quality and merits.

The committee also invites researchers and subject matter experts to guide students in a topic that aligns with their interests and expertise and contributes to the success of the NAPA RMG – 2022-2023. Committee believes that support from an individual is the key to undertaking meaningful and practical research initiatives in Nepal. RMG also appeals for monetary support to build an RMG pool fund and continue such work in the future.

Following is the list of selected proposals from the NAPA RMG 2022-2023 submissions.

1. Documentation on utilization of neglected and underutilized crop species in Chishankhugadhi Rural Municipality, Okhaldhunga.
2. Are Pig Farms in Nepal safe from African Swine Fever?
3. Efficacy of different botanicals against Red Pumpkin Beetle (*Aulacophora foveicollis*) infesting cucumber in Sundarbazar, Lamjung.
4. Husbandry practice, gastrointestinal parasite prevalence, welfare, and reproductive status of dairy cattle in Chitwan, Nepal.
5. Screening of Nepalese rice landraces for cooking quality and micronutrient availability.
6. Quality maintenance of litchi fruit (*Litchi chinensis*) through post-harvest treatments in Bardibas.
7. Effect of different seed priming techniques on germination and seedling vigor of summer maize in Chitwan, Nepal.
8. Assessment of mycelial growth and yield attribute of Milky Mushroom (*Cloocybe indica*) on different agricultural substrates.
9. Biotransformation of cellulose by soil bacteria extracted from roots of medicinal plants growing in different regions of Nepal.
10. Evaluation of major agro-meteorological indices of Corn grown with climate change adaptation measures at Janaki rural municipality Kailali, Nepal.
11. Comparative study on multi-roles of home gardening: food security, biodiversity conservation, uplifting women's status, and mitigating climate change effect in terai and hills of Nepal.
12. Growth analysis of broiler on different feed additives under the effect of blue and green led lights in Tulsipur, Dang.
13. Effect of nitrogen management on prevalence of biotic stress in winter maize at Paklihawa campus, Nepal.
14. Evaluation of different feed types in the growth and survival of mono-sex Nile tilapia (*Oreochromis niloticus*) fry in Chitwan, Nepal.
15. Climate change impacts on apple production in Mustang district.

To ask questions about about the RMG program, please contact: research@napaamericas.org

To support RMG initiatives, please visit: <https://www.napaamericas.org/donate.php>

Webinar Series 33: Agro-biodiversity for Agricultural Sustainability

Prepared by - Rajan Shrestha and Sujata Bogati

The Webinar Committee (WC) hosted the 33rd Webinar presented by a panelist of experts from diverse fields. The talk covers a relevant and valuable discussion on the importance of agrobiodiversity in sustainable agriculture on the occasion of National Agro-biodiversity Year (BS 2079).

The key points of the discussion were:

- Genetic erosion is alarming and loss of agrobiodiversity is escalating
- Agrobiodiversity is underutilized and undervalued
- Local genetic resources with unique functional traits need conservation attention
- Decentralized participatory and site-specific grass-roots-level breeding programs are vital
- Supportive legal, policy, and institutional framework is inadequate

The webinar was set to a discussion platform by NAPA's president, Dr. Pradeep Wagle with an introductory note and sharing short information about the National Laboratory for Genetic Resource Preservation, Fort Collins, Colorado, managed by the United States Department of Agriculture-USDA. The laboratory is fire and flood-proof and presently holds over 500,000 genetic accessions from about 12,000 plant species, including a large capacity for future expansion. The major aspects of the talk are summarized in the report.

The 1st invited speaker of the panelists, Dr. Joshi serves as the Chief of the National Agriculture Genetic Resources Center (NAGRC, National Genebank), besides

his expertise in plant breeding focusing on the utilization of local genetic resources. This section of the discussion led by Dr. Joshi covered an overview of collections, roles, and functions of the NAGRC, Nepal towards the conservation of agrobiodiversity.

Status of Nepal

National Genebank, NAGRC was established in 2010, jointly with the Government of Nepal and the Nepal Agricultural Research Council (NARC). Owing to difficulties with the absolute functional alignment of standard practices as per international standards, NAGRC has developed its own nationally suited standards and protocols. The national Genebank presently houses >14,000 accessions of different crop species at -20°C environment, keeping it viable for about 100 years. In general, understanding and effort on agrobiodiversity are limited, as much focus is centered on crop species. This is despite a policy-guided approach towards a holistic agrobiodiversity, which encompasses six components including crop, forage, livestock, agro-insects, agro-microbial, and aquatic genetic resources. Based on these six components, a total of 50 Genebanks have been established across the country preserving >35,000 accessions overall. Dr. Joshi pointed that the initiative holds great value in agrobiodiversity conservation in Nepal. This is particularly in a background of estimated >95% of germplasm that traces to a foreign origin. Thus, to reach out and compete in a global market, efforts on increased availability and access to local genetic resources will be key in the future, benefiting both domestic and global populations.

Association of Nepalese Agricultural Professionals of Americas (NAPA) presents



NAPA Webinar Series: 33

Discussion on "Agro-biodiversity for Agricultural Sustainability"

On the Occasion of National Agro-biodiversity Year (BS 2079)

USA Time:
February 19, 2023 (Sunday)
7:30 PM CST

Nepal Time:
February 20, 2023 (Monday)
फागुन ८
7:15 AM



Dr. Devendra Gauchan
Honorary Research Fellow,
Alliance of Biodiversity
International and CIAT



Dr. Bal Krishna Joshi
Senior Scientist,
Plant Genetics/Breeding, NARC
Chief, National Genebank, Nepal

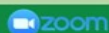


Dr. Bhuminand Devkota
Professor, Veterinary Science
Director, Post Graduate Program
AFU, Nepal

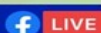


Dr. Dilip Panthee
Associate Professor
North Carolina State University

Panelists



829 0346 5507



www.facebook.com/NepaleseAgriculturistAmericas

Webinar Series 33 ...

An initiative to archive nationally important accessions in Svalbard Global Seed Vault, Norway is ongoing, yet to be realized with pending government approval. As a signatory of The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), Nepal has 614 accessions, that are made available for global community access through the multilateral system (MLS). Likewise, >23,000 accessions of Nepal origin are available in a Genebank at the Consortium of International Agricultural Research Centers (CGIAR). But current policies under the Convention on Biological Diversity (CBD) and ITPGRFA agreement prevent direct exchange/access to genetic accessions among other global entities. Nevertheless, the exchange of genetic resources is still possible through bilateral agreements. Genetic erosion and the rate at which it is occurring is the single most threat to agrobiodiversity. Historically and even today, an increased practice of single-genotype adoption has led to an estimated crop genetic loss of up to 50% in Nepal, and a similar trend is witnessed worldwide. Congruently, efforts have been superficially aggravated on crop biodiversity. This is a growing concern, Dr. Joshi stated and added that a deeper dissection is needed. Loss of insect diversity is one of the problems upfront. Reports have showcased that >70% of crops depend on bee pollination. A lack of insect-friendly agricultural research and production system is a cause for a loss of insect diversity and carries a negative impact on agrobiodiversity.

The importance of agrobiodiversity

The importance of agrobiodiversity is elucidated by Dr. Panthee, the second speaker for the panel discussion, with an example of the Irish 'potato' famine in 1845. Dr. Panthee describes that the famine occurred due to late blight disease infection on potatoes, which forced mass migration including the death of millions of populations. Then, a few resistant cultivars existed, which made the restoration process possible via improved varietal breeding against the disease. Underlining such historical lessons including several others, Dr. Panthee emphasized two key aspects; in- and ex-situ conservation of genetic resources. On top of it, maximal and equitable utilization of available global germplasms is critical. For instance, about 61% of naked barley germplasm origins in Asia, but Europe benefits the most with the same percentage of global production share, realized via improved breeding. Concerns were likewise, deeply expressed on the underutilization of indigenous germplasms of cereals, vegetables, and many others including an example of the premium quality rice, popular as basmati rice. These are genuine con-

cerns developing rapidly, under ongoing practices of extensive adoption of high-yielding hybrid/exotic varieties and growing area coverage under such varieties. Meanwhile, local genetic materials are widely neglected. Importantly, Dr. Panthee advocated for a strategic and selective breeding approach that considers an overall crop improvement, not just a yield but focusing on unique and marketable local genetic traits.

Livestock diversity

The third speaker for the panel discussion, Dr. Devkota shared his perspectives on animal diversity, primarily the domestic/livestock sector of Nepal. The Himalayan nation covers only 0.003% of the global land but contributes >1% of global biodiversity. The wildlife diversity is highly rich with many unique species indigenous to Nepal, that to a great extent are well conserved and protected in recent times supported by strict laws and conservation policies. Contrarily, indigenous livestock species are under declining population and/or a threat of extinction, some already claimed to be extinct. For instance, local breeds of cattle such as *Khaila*, *Lulu*, *Achhame*, *Siri*, and *Yaknak* are at risk of loss of habitats and extinction. Dr. Devkota expressed major concerns about government-supported extensive cross-breeding programs, becoming a rising risk to the preservation and maintenance of the genetic pool of such indigenous breeds. Exotic species likewise, displacing the local breeds have accelerated genetic erosion and diversity losses. A good example includes an increased risk of the indigenous goat 'Khari', which is considered a good quality breed is now endangered due to a massive extension of the Australian breed 'Boer' goat. This scenario also extends to others including sheep, pig, and chicken breeds. Dr. Devkota urged the governments to rethink the cross-breeding approach and suggested a transition towards a selective breeding process of indigenous types to check the genetic erosion and loss of unique agrobiodiversity features. For instance, the Lulu cattle breed is unique rare species in the world with a habitat above 3,000 m altitude at harsh environmental conditions with satisfactory productivity capacity.

Economic perspective

The economic and policy perspective on agrobiodiversity is another important aspect of this panel discussion, covered by Dr. Gauchan with expertise in agricultural economics and is involved directly in agrobiodiversity research and development in Nepal and beyond. During the talk, Dr. Gauchan showcased a high interest in how agricultural biodiversity can contribute to sustainable agriculture, poverty alleviation, economic development, and transformation to inclusive and resilient food sys-

Webinar Series 33 ...

tem development. According to him, the actual value of agrobiodiversity has not been captured and is undervalued as not many agrobiodiversity products/services get traded in the market. Only direct values such as in terms of productivity, profitability, risk reduction, and cost reduction have been captured to an extent. The market values do not reflect the true value of agrobiodiversity due to the complexity associated with it as a public good, and difficulties in monetizing option values or indirect services such as pollination and soil erosion control. Nevertheless, it is estimated that almost 5-8% of crop GDP is contributed by pollination itself. It is difficult to mainstream agrobiodiversity into developmental interventions due to a lack of its visibility. Gene traits like drought tolerance, disease resistance, nutrition traits, and climate resilience traits are not easy to access. Additionally, there is a lack of research and investment to characterize, evaluate, and display the value of such unique novel traits. Dr. Gauchan added that the outlook on genetic erosion should not be confined to the loss of gene resources only. But it is also an erosion of traditional knowledge and culture associated with genetic resources/materials. This has been neglected under a shade of market imperfections and policy failures.

While the concept of a gene bank is essential to agrobiodiversity conservation, only a small fraction of the total genetic pool can be captured in the gene bank. Real conservation of agrobiodiversity is perpetuated by smallholders and traditional farmers. Local genetic resources are preserved significantly, relying upon farmers at their costs without any institutional support such as subsidies, insurance, or bank credits. The unique functional traits could provide global benefits. Despite such prospects, however, global investment does not reach down to the regions locally conserving the genetic materials, giving rise to inequity and injustice. Further, policy-guided commercialization and centralized top-

down industrial breeding have neglected farmers' preferred traits and cornered the improvements on local genetic resources. Lack of priority on the use of improved local varieties and promotion of high-yielding hybrids has intensified the loss of agrobiodiversity. So far, the concept of biodiversity is largely limited to forest/wildlife conservation among the public, concerned private stakeholders, and government agencies. An understanding of agrobiodiversity is naïve and misleading in general.

An integrated approach between agrobiodiversity conservation and agricultural development should be exercised to control genetic erosion and loss of agrobiodiversity. Further, Dr. Gauchan stressed the mainstreaming of agrobiodiversity into agricultural economic development with inclusions in agro-tourism, trade, and so on. Such efforts on mainstreaming should be realized at policy, program, institution, and investment levels. Most importantly, decentralized participatory and site-specific grassroots-level breeding programs should be devised and launched to keep local agrobiodiversity intact for the future. Likewise, market failures should be addressed by creating value chains such as organic marketing, agro-eco-tourism, branding, and investments. Furthermore, a portfolio of existing and available species, varieties, and breeds should be promoted including actors like seed suppliers, community seed banks, cooperatives, and local traders.

Summary

In summary, the discussion with numerous questions from webinar participants was successful in elucidating wide aspects of agrobiodiversity including the meaning and importance, conservation needs and current efforts, dissection of existing issues and challenges, and potential solutions.

Please contribute to NAPA Endowment Fund

Business Name: Association of Nepalese Agricultural Professionals of Americas

QuickPay® with Zelle® payment: napaendowmentfund2021@gmail.com

Memo: Write 'NAPA endowment fund.'

For details: Please contact NAPA at napaendowmentfund2021@gmail.com or

NAPA treasurer Dr. Bishwo Adhikari at adhikaribn@gmail.com

Panel Discussion on Women in Agricultural Education in Nepal: Status and Perspective Initiatives

Prepared by - Sujata Bogati, Rajan Shrestha, and Kripa Dhakal

The Women in agricultural and allied professions (WAAP) hosted a panel discussion on women in agricultural education in Nepal: status and perspective initiatives. The webinar was moderated by Dr. Romy Das Karna, a WAAP committee member. Dr. Das set the roundtable discussion with her perspectives on women in education in Nepal and a welcome note to the invited key speakers.

Dr. Kalyani Mishra Tripathi, a professor at Agriculture and Forestry University (AFU) in the Department of Horticulture, commenced the discussion with a short presentation titled "Women in agriculture education in Nepal: status and prospective initiatives." In the presentation, Dr. Tripathi mentions that agriculture education formally started in 1957 in Nepal, which was soon structured into the College of Agriculture with a two years intermediate-level program (I.Sc. Ag.). Later it was re-structured as the Institute of Agriculture and Animal Science (IAAS). The institute was recently reformed into Agriculture and forestry university (AFU) in 2010. She also presented a brief overview of the status of vocational training and school-level agricultural education in Nepal. Several agricultural institutions generate human resources to serve the country's need for a scientifically driven commercial agricultural system. For example, AFU has eight constituent institutions and six colleges with agriculture degree programs. Other educational institutions with agricultural courses include Tribhuvan University (three constituent institutions and three affiliated colleges); Purbanchal University (two affiliated colleges); Kathmandu University; Far Western University; Madesh Agricultural University; and Center for Technical Education and Vocational Trainings (CTEVT).

The reach of Nepalese women in education, in general, has seen a gradual increase since 1956 (Figure 1). Several policies have geared and shaped women's education in agriculture. Gender equality and social inclusion (GESI) is one key policy. The GESI policy encompasses the inclusion of women, including ones with disabilities, marginalized, vulnerable, and excluded groups in the mainstream of development as mandated in the Constitution of Nepal, 2015. There are also several gender-responsive budgets being provided since then. Several scholarship programs in the past and present have

WOMEN IN AGRICULTURAL AND ALLIED PROFESSIONS (WAAP) PRESENTS

DISCUSSION ON "WOMEN IN AGRICULTURAL EDUCATION IN NEPAL: STATUS AND PROSPECTIVE INITIATIVES"

USA Time: March 5, 2023 (Sunday); 7:30 PM CST
Nepal Time: March 6, 2023 (Monday); फागुन २२; ७:१५ AM

Dr. Kalyani Mishra Tripathi
 Professor, Chairman, Service commission AFU Chitwan, Nepal

Pushpa Pandey
 Assistant Professor
 Institute of Agriculture and Animal Science, Paklihawa Campus, Nepal

Anugya Bhattarai
 Bsc Ag. 8th Semester
 Intern at PMAMP, Potato Zone, Bhaktapur, Nepal

zoom 829 0346 5507

facebook LIVE www.facebook.com/NepaleseAgriculturistAmericas

been undertaken focused on female students. A mandatory provision for a female teacher and female representation in school management has also been created. According to a UNESCO report (2021), women's literacy still stands low at 61.1%, compared to 75.5% for males. Even though there has been noticeable improvement, there are still challenges to overcome significantly in the remote hilly and mountainous regions.

Panel Discussion ...

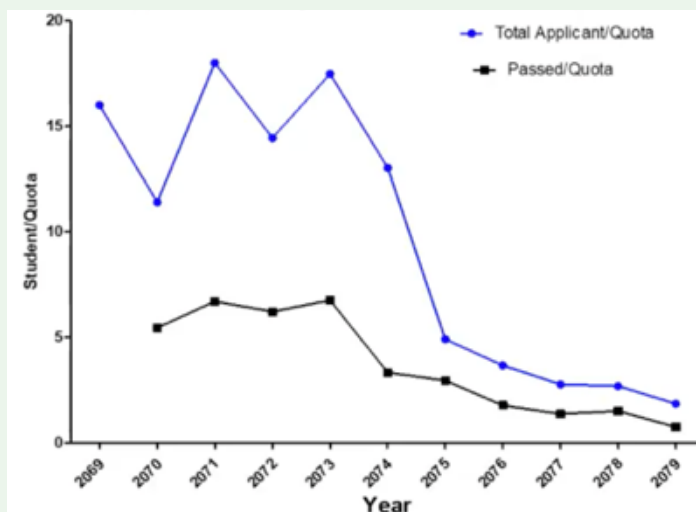
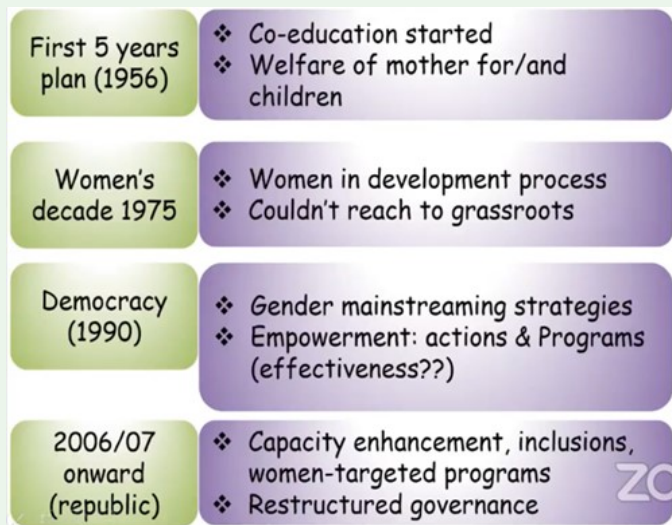


Figure 1. An overview of women's education in Nepal.

Figure 2. Number of applicants for agricultural education in Agriculture and Forestry University (AFU).

Women in agriculture education stood at 5-10% of participation around the 1990s; a gradual increase puts the participation at nearly 50% (Figure 2). Such gains have been realized along with several forms of reservations for female students in university/college enrollments, including in public services, non-governmental, and international organizations. However, political instability, including others in general, has become a huge deterring factor in recent years, leading to decreased student enrollments with an exponential rate of increments of educated youths pursuing education/careers abroad. There is very little women distribution in the department and at the authority level in different universities (Figure 3).

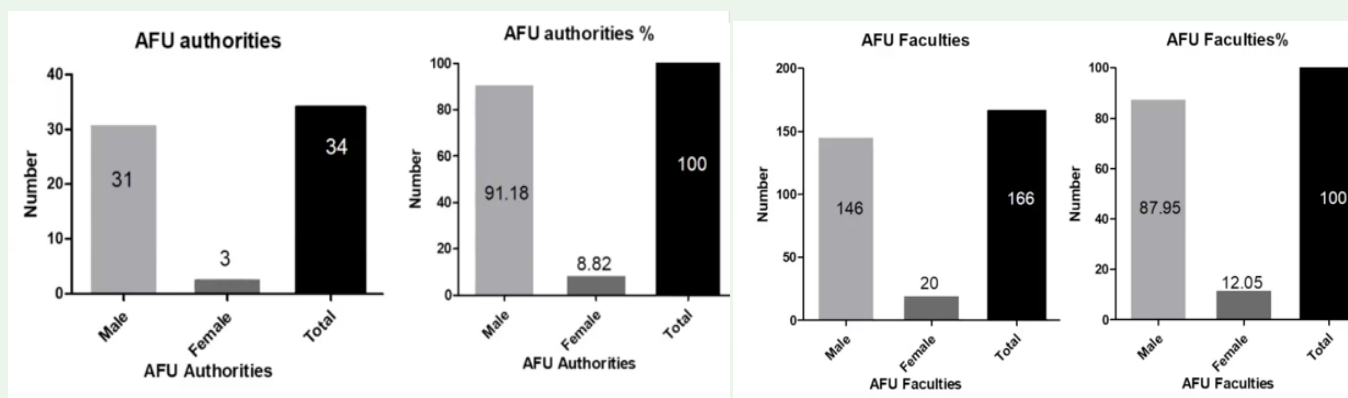


Figure 3. Distribution of male and female in Agriculture and Forestry University in Nepal.

The perspective of women's participation

- Entrepreneurship: There is a lack of women entrepreneurs with the skill and knowledge in agribusiness and no critical analysis of given opportunities.
- Inclusiveness: There is progress in the inclusiveness and empowerment of women in farming, financing, and the market.
- Productivity and income: Even though the role of women in food production and its utilization is essential, there is still a lack of women's involvement.
- Innovation and technology: As an agriculturist, only limited women's participation in the leadership programs.
- Policy and advocacy: Some women agriculturists and scientists have brought distinct differences in the field.

Panel Discussion ...

Challenges to women's access to agricultural education

- Gender stereotype: There is a belief that agricultural-related subjects are unsuitable for women. There are social and cultural biases.
- Socioeconomic factor: There is a lack of access to quality education for women.
- Lack of female role models: Women have been underrepresented in STEM.
- Work-life balance: Women often face greater demands on their time to responsibilities outside of work, such as caregiving and household work.
- Others: Financial struggle and limited public institutions are also challenges women face.

Suggestions for improvement

- Provide better access to education and training in government, NGOs, and other organizations.
- Address gender biases.
- Promote female role models.
- Advocate for women's rights and empowerment.
- Encourage policy and funding supports that promote women's participation and leadership.

Questions and discussions

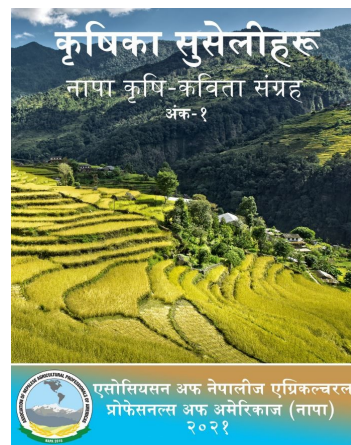
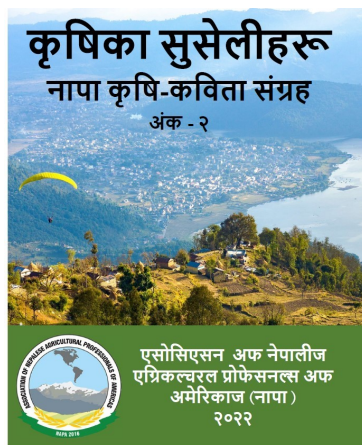
In the next discussion session, Anugya Bhattarai, an undergraduate student at AFU, shared her motivation toward agriculture education and the challenges faced by female students at present. Ms. Bhattarai mentioned a lack of a women-friendly environment at the University and found difficulties in putting out female-oriented

problems in line with existing gender differences. Also, she added, 'there is a lack of women-friendly technologies in the agriculture production and education systems, and because of that, female students are lagging'. Gender biases and associated stereotypes are other challenges with fewer training opportunities for female students.

Likewise, Pushpa Pandey, Assistant Professor from IAAS, Paklihawa, answered the challenges of tenure and leadership for women. In her experience, it is hard to outline the exact reasons, but she emphasized gender biases as the main factor, including a lack of quality education and strong support mechanisms. Also, a lack of self-confidence among women could be another reason for such challenges.

The final discussion session had interactive questions and answers from several participants. Dr. Rojee Pradhan also added her insights on challenges faced by women in education and suggested a need for counseling services at the universities. Dr. Gopi Upreti recognized and appreciated women's increased participation in agriculture and pointed out that the gender stereotype still today is a significant challenge, and the academic environment is yet to be conducive for female students. He added several scholarships, workshops, seminars, women empowerment, and financial support programs should exist. He urged female students coming to agricultural universities to possess a strong internal willingness and motivation. In conclusion, the panel discussion was a success, along with interactive participation from the attendees on the challenges, opportunities, and way forward to increasing women's involvement and participation in agricultural education.

NAPA Publishes Agri-Poem Compendiums



Webinar on Tax Literacy Program

Prepared by Ambika Tiwari

Socio-Economic and Cultural Committee (SECC) organized a very informative webinar entitled “Titled Tax Literacy Program” on January 22, 2023. The program was moderated by SECC chair Mr. D.P. Dhakal. It was great sharing this important information for educational and literacy purposes to NAPA members. NAPA and SECC would like to extend sincere thanks you to the presenter Mr. Dinesh Dulal, EA, CPB, who is federally licensed tax practitioner from Creative Tax Services, LLC based on Texas, USA.

In this member only program, more than 25 NAPA members and their families participated. NAPA President Dr. Pradeep Wagle welcomed Mr. Dulal and thanked him for his time and effort to share his invaluable information and knowledge with NAPA members. Thank you to NAPA-SECC for bringing right topics for right time since beginning of the year is the tax season in USA. NAPA subcommittee, SECC, is proud to be able to bring such an informative talk program as its very first initiation.

The presentation was divided into two sections, which covered personal tax rules and business tax rules. Personal tax education/literacy part covered checking tax filing status, standard vs. itemized deduction, international student tax filing rules, and money saving strategies during tax filing. Business tax education/literacy covered business models, eligible business expenses reportable during tax filing, and business tax planning strategies.

Mr. Dulal addressed several questions raised by the webinar participants. He also pointed out some “dos and don’ts” of tax filing. The program was adjourned with closing remarks from NAPA Vice President Dr. Ramjee Ghimire.



Association of Nepalese Agricultural Professionals of Americas (NAPA) Socio-Economic and Cultural Committee (SECC) Presents

Tax Literacy Program




Dinesh Dulal
Federally Licensed Tax Practitioner
Creative Tax Services, LLC
Texas, USA

USA Time:
January 22, 2023 (Sunday)
7:00 PM CST

Nepal Time:
January 23, 2023 (Monday)
6:45 AM

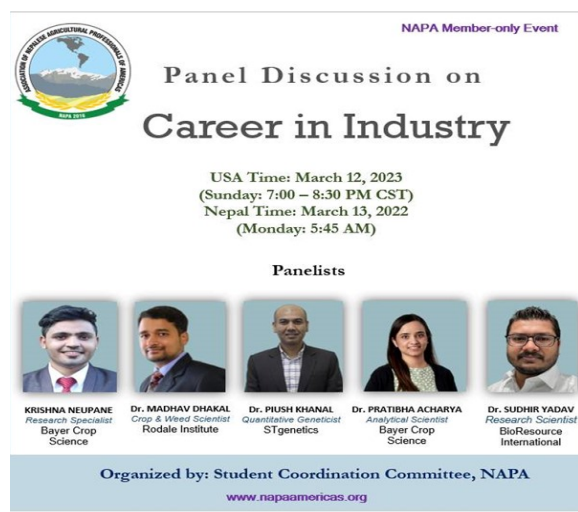
Roundtable Discussion on Career in Industry

Prepared by Madhav Parajuli

On March 12, 2023, the Student Coordination Committee (SCC) hosted a members-only virtual roundtable discussion event to provide graduate students with an opportunity to gain insight into careers in the industry. The event was held using the Zoom platform and was moderated by Mr. Madhav Parajuli (NAPA-SCC President). Five professionals: Dr. Prabha Acharya (Bayer Crop Science), Dr. Sudeer Yadav (BioResource International), Dr. Madhav Dhakal (Rodale Institute), Dr. Piush Khanal (STgenetics), and Mr. Krishna Neupane (Bayer Crop Science) were panelists. More than 65 participants attended the event. During the one-and-a-half-hour event, the panelists were asked three common questions by the moderator as listed below:

- How did you prepare yourself to get to your current position? Is there a different preparation to get into academia vs. industry jobs during your graduate study and research?
- What is your suggestion to current graduate students or postdocs if they are unsure whether to select academia or industry jobs?
- Work-life balance, work flexibility, work credits in industry/private jobs? In other words, Pros or Cons of working in industry/private jobs compared to academia or public sectors?

The attendees were provided with a chance to inquire and participate in a conversation with the panelists. Ultimately, Dr. Pradeep Wagle, the President of NAPA, delivered a concluding speech to bring the event to a close.








NAPA Member-only Event

Panel Discussion on Career in Industry

USA Time: March 12, 2023
(Sunday: 7:00 – 8:30 PM CST)
Nepal Time: March 13, 2022
(Monday: 5:45 AM)

Panelists

KRISHNA NEUPANE
Research Specialist
Bayer Crop Science

Dr. MADHAV DHAKAL
Crop & Weed Scientist
Rodale Institute

Dr. PIUSH KHANAL
Quantitative Geneticist
STgenetics

Dr. PRATIBHA ACHARYA
Analytical Scientist
Bayer Crop Science

Dr. SUDEER YADAV
Research Scientist
BioResource International

Organized by: Student Coordination Committee, NAPA
www.napaamericas.org

Research Brief

Soybean is Superior to Corn for Supplementing Nursing Ewes and Lambs Raised in Woodlands

S. Chaudhary^{1*}, U. Karki¹, B. Shrestha², and S. Lamsal¹

¹Tuskegee University, Tuskegee, AL; ²Texas A & M University, College Station, TX

Email: schaudhary8326@tuskegee.edu

Woodlands offer an enormous potential to expand grazing opportunities for sheep and goats and lower production costs in the southeast USA. Previous studies showed a satisfactory performance of mature sheep and goats; however, inferior performance of growing and lactating goats when stocked in woodlands and required supplementation. Information is limited on the type of supplement for improving the performance of small ruminants requiring a high plane of nutrition while raised in woodlands. A study was conducted to evaluate corn and soybean as supplements for nursing ewes and lambs stocked in woodlands.

Methodology

18 Katahdin-St. Croix cross-nursing ewes and their lambs (23) were divided into two uniform groups and stocked in separate sets of woodland plots (3 plots/group). Each group was rotationally stocked in the allocated set of plots with *ad libitum* hay from May to August 2022 (Figure 1). Group-1 animals (9 nursing ewes and 12 lambs) were supplemented with whole corn (0.5% of live weight (LW)) and Group-2 animals (9 nursing ewes and 11 lambs) with whole soybean (0.5% of LW) (Figure 2). Animals had free access to loose mineral mix, fresh water, and shelters throughout the study period. Animals' live weight, BCS, and FAMACHA scores were measured on Day 1, fortnightly during the study, and last day of the study.

Results

Soybean-supplemented group performed better than corn-supplemented group indicating that soybean is a better supplement than corn for nursing ewes and lambs raised in woodlands. Soybean-supplemented ewes and lambs had greater live weights (ewes - 22%, lambs - 6%) (Figure 3) and better body condition scores (BCS) (ewes - 8%, lambs - 10%) and FAMACHA scores (ewes - 13%, lambs - 15%) (Figure 4) than the corn-supplemented group.



Figure 1. Sheep consuming understory woodland foliage, Tuskegee, Alabama, USA.



Figure 2. Sheep eating supplements in woodlands, Tuskegee, Alabama, USA.

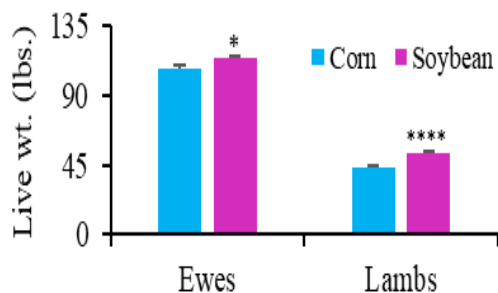


Figure 3. Live weight of nursing ewes and lambs with soybean or corn supplement in woodlands, (* $p < 0.05$, **** $p < 0.0001$).

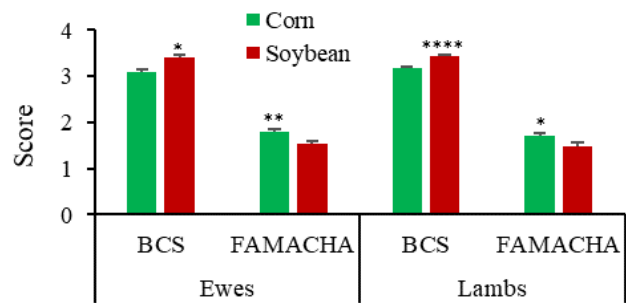


Figure 4. Body condition score (BCS) and FAMACHA score of nursing ewes and lambs with soybean or corn supplement in woodlands (* $p < 0.05$, ** $p < 0.01$, **** $p < 0.0001$).

Research Brief

Browse Species can be a Viable Resource for Raising Small Ruminants

B. Paneru^{1*}, U. Karki¹, S. Bhattra², N. Ellis¹, L.B. Karki³, and S.R. Mentreddy⁴

¹Tuskegee University, Tuskegee, AL; ²University of Georgia, Athens, GA; ³University of Maryland Eastern Shore, Princess Anne, MD; ⁴Alabama Agricultural and Mechanical University, Huntsville, AL

*Email: panerubidur@gmail.com

Browse (shrubs, trees, and vines) species play a vital role in small ruminant production such as supplementing nutrients, increasing diet choices, minimizing gastrointestinal parasites, and expanding grazing opportunities. Woodland occupies a major landcover (69%) in Alabama, where numerous voluntarily grown woody browse species are available. Availability and animals' preference for these species have been reported by researchers at Tuskegee University. However, information on the foliage-development patterns of browse species and the right time to begin harvesting/browsing is lacking in the southeast USA. This information is very helpful for producers who want to utilize voluntarily-grown browse species in woodlands with small ruminants. The researchers at Tuskegee University conducted an observational study to determine the growth patterns of browse species available in grazing lands and evaluated small ruminants' preference for those species.

Methodology

Browse species from two research sites: (1) Woodlands (2.8 ha) and (2) Browse (5.2 ha) of Tuskegee University were identified and marked with colorful ribbons in early winter 2019. The date when the first leaf sprout occurred was recorded, and canopy-development data were taken 14 days after the first sprout until the full canopy developed. Eight Kiko wethers (meat goats) and five Katahdin rams (hair sheep) were co-stocked rota-



Figure 1. Kiko wethers (8) and Katahdin rams (5) co-grazing in a woodland plot.

tionally in three woodland plots (0.4 ha each) from mid-May to mid-October 2019 (Figure 1). For evaluating vegetation preference, the extent of defoliation of browse species by animals was assessed by establishing multiple photoplots (Figure 2) and assigning defoliation scales ranging from 0 to 5 (0 = no defoliation, 5 = 80-100% defoliation).

Results

Sprouting and canopy-development studies showed that nine species began sprouting in early February, seven by mid-March, and three by late April. Time taken by browse species to attain the full canopy once sprouted varied widely that ranged from April 21 to May 21. Vegetation preference study showed animals having a high preference for seven species, moderate preference for nine, and least preference for 11 species. Results show that browse foliage can be ready for harvest or grazing beginning late April to mid-May. Producers can utilize or integrate moderately- to highly-preferred species to develop browse programs or manage these species with small ruminants present in woodlands or other grazing lands. The findings of this research can be applicable to other parts of the world, with similar climate and vegetation conditions. Moreover, these findings highlight the potential for using voluntarily-grown vegetation for



raising small ruminants to generate short-term incomes from the sale of animals and animal products while waiting for numerous years for timber harvest from woodlands.

Figure 2. Vertical photoplot used to assess the canopy development of browse species.

(For detailed information, please visit Global Journal of Agricultural and Allied Sciences (GJAAS) at <https://doi.org/10.35251/gjaas.2022.001>)

NAPA Committees

Executive Committee (EC) (2022-2024)

President

Dr. Pradeep Wagle

Vice President

Dr. Ramjee Ghimire

General Secretary

Dr. Nityananda Khanal

Joint Secretary

Dr. Sushil Thapa

Treasurer

Dr. Bishwo Adhikari

Executive Members

Dr. Buddhi Gyawali

Dr. Dev Paudel

Mr. Dol P. Khanal

Dr. Kripa Dhakal

Dr. Pramod Pokhrel

Dr. Uma Karki

Immediate Past President

Dr. Megha N. Parajulee

Nepal Liaison: Mr. Kiran Ojha

Advisory Council

Dr. Dainik B. Karki Nepali

Dr. Drona Rasali

Prof. Gopi Upreti

Dr. Lila B. Karki

Dr. Megha N. Parajulee

Dr. Nanda P. Joshi

Dr. Narayan Khadka

Dr. Peetambar Dahal

Dr. Prakash Malla

Endowment Fund Advisory Board (EFAB)

Chair

Dr. Megha N. Parajulee

Directors

Dr. Lila B. Karki, Founding Chair

Dr. Pradeep Wagle

Director/Member Secretary

Dr. Prem B. Bhandari

Outreach and Investment

Coordinators

Dr. Basu D. Bhandari

Dr. Aditya R. Khanal

Student Coordination Committee (SCC)

Chair

Mr. Madhav Parajuli

Member Secretary

Mr. Bipin Neupane

Members

Ms. Astha Pudasainee

Ms. Anju Pandey

Mr. Bhuwan Shrestha

Mr. Bibek Acharya

Mr. Deepak Ghimire

Mr. Manoj Paudel

Ms. Namrata Acharya

Ms. Sadikshya Poudel

Mr. Suraj KC

Mr. Uddhav Bhattarai

Membership Drive Committee (MDC)

Chair

Dr. Ramjee Ghimire

Members

Dr. Santosh Dhakal

Mr. Madhav Parajuli

Ms. Kabita Paudel

Information Technology Committee (ITC)

Chair

Dr. Dev Paudel

Members

Dr. Bijesh Mishra

Mr. Bipin Neupane

Dr. Pramod Pokhrel

Ms. Sandhya Neupane

Research/Policy Brief Editorial Committee (RBEC)

Chair

Dr. Ramjee Ghimire

Members

Dr. Lila Khatiwada

Dr. Pramod Pantha

Mr. Thaneshwor Bhandari

Award and Recognition Committee (ARC)

Chair

Dr. Uma Karki

Members

Dr. Nanda P. Joshi

Dr. Aditya Khanal

Global Journal of Agricultural & Allied Sciences (GJAAS)

Editor-in-Chief

Dr. Uma Karki

Managing Editors

Dr. Ananta Raj Acharya

Dr. Bharat Pokharel

Editors

Dr. Aditya R. Khanal

Dr. Chakra Budhathoki

Dr. Kalidas Subedi

Dr. Prem Bhandari

Dr. Rajan Ghimire

Women in Agricultural and Allied Professions (WAAP)

Chair

Dr. Kripa Dhakal

Members

Ms. Prava Adhikari

Ms. Pushpa Pandey

Dr. Romy Das Karna

Ms. Santoshi Chaudhary

Ms. Shubhechha Sharma

Research and Capacity Building Committee (RCBC)

Chair

Dr. Pramod Pokhrel

Members

Dr. Keshav Sharma

Dr. Santosh Dhakal

Dr. Sharad P. Marahatta

Dr. Shital Poudyal

Dr. Shyam Kandel

Dr. Sushil Paudyal

Collaboration and Resource Building Committee (CRBC)

Chair

Dr. Buddhi Gyawali

Members

Dr. Bharat Pokharel

Dr. Keshav Bhattarai

Dr. Krishna Paudel

Dr. Suraj Upadhyay

Webinar Committee (WC)

Chair

Dr. Khushi Ram Tiwari

Members

Dr. Dilip Panthee

Dr. Rajan Shrestha

Ms. Sujata Bogati

Nepal News

Highlights of agriculture-related news/events in Nepal

Compiled by: Anugya Bhattarai



Need for gender responsive policies

Solar Irrigation Pumps (SIPs) are growing among more farmers of Southern belts due to collaborative efforts of both the Government and Private sector involved. However, earlier research at the International Water Management Institute (IWMI) shows that access to SIPs for women and small-holder farmers is often limited. With many policies formulated in the past and recent years such as ADS 2015-35 and National Energy Strategy 2013, there are still some barriers for gender equality and social inclusion (GESI) implementations at the resource access level, particularly in the agricultural sector which is undergoing rapid feminization. This calls for stronger policies and better implementation on the government's side to ensure a sustainable, inclusive, and resilient agriculture system development.

(Source: The Kathmandu Post, 1/19/2023)

Chitwan farmers stage a protest by throwing vegetables on the road

The farmers of Chitwan protested by throwing vegetables at the Pulchowk area of Chitwan on the East-West Highway on Friday, February 3, 2023. They claimed that the domestic product is not getting a fair price due to vegetables imported from India. Farmers threw vegetables such as tomato, cauliflower, cabbage, pumpkin, pea, and other vegetables laden in six tractors on the road. The market glut during the season, more preference for Indian commodities among consumers, higher input costs, lack of market literacy among farmers, and inability to mobilize the product within the country have been continuously adding woes to the livelihood of farmers forcing them to take such measures every once in a while.

(Source: MyRepublica, 2/4/2023)

Import for vegetables in increasing trend in Nepal

Nepal has imported green vegetables and pulses in excess of Rs 17.4 billion in the first six months of the current fiscal year. This is nearly Rs 5 billion less than what the country imported in the fiscal year 2021/22 in the same period. Though the import of green vegetables has decreased, the decrease in export in turn has still added to the misery of the farmers. Since mid-July 2022, the country has only managed to export around Rs 368 million worth of vegetables, which is Rs 166 million less than what the country had exported in the first six months of the fiscal year 2021/22.

(Source: Onlinekhabar, 2/8/2023)

Nepal bans rose import ahead of Valentine's Day

Ahead of Valentine's Day, the Ministry of Agriculture and Livestock Development banned the import of roses to the country as a precautionary measure to prevent any exotic pest outbreaks associated with the flower. A similar action was taken even for marigold flower import during Tihar, specifically during times when the demand for the flowers surges. According to the Floriculture Association Nepal, demand for long-stem red roses explodes to 150,000 stems on Valentine's Day. The most local flower growers can come up with is 30,000-40,000 stems, and the rest have to be imported from India. Delhi, Bangalore, and Kolkata are the largest suppliers of red roses to Nepal, this in turn caused the prices to spike significantly. Homework needs to be done on the government's part to increase the national supply along with taking decisions as such so that consumers do not face the economic burden and the market remains in equilibrium.

(Source: The Kathmandu Post, 2/10/2023)

Canine distemper now threatens big cats in Nepal

Researchers with the College of Veterinary Medicine have confirmed the first cases of canine distemper virus (CDV), which can cause fatal neurological disease, in tigers and leopards in Nepal. The survey found 11% of tigers (three out of 28) and 30% of the leopards (six out of 20) had antibodies to CDV, indicating prior infection with the virus. The CDV was already circulating in dogs of Nepal, which might be the potential source of infection as mentioned by Dr. Jessica Bodgener, a veterinarian with Wildlife Vets International.

(Source: Cornell Chronicle, 2/16/2023)

Nepal ...

Nepal reports avian flu outbreaks in poultry

In general, across Asia, the highly pathogenic avian influenza (HPAI) situation appears to be starting a seasonal decline as the winter ends. However, Japan and South Korea report further suspected or confirmed outbreaks in poultry, as have India, Nepal, the Philippines, and Taiwan. Over the past month, Nepal's veterinary authority has registered seven HPAI outbreaks on poultry farms with the World Organization for Animal Health (WOAH). Directly affected by the H5N1 virus serotype have been almost 29,000 birds at commercial premises within about 10 km of the capital, Kathmandu. The latest six outbreaks affected flocks each of between 700 and 1,110 birds. Among these was a mixed flock comprising chickens and turkeys at the Nepal Animal Science Institute. So far, more than 18,700 poultry have been culled to control the spread of the virus.

(Source: Wattpoultry.com, 2/22/2023)

Decision to de-finance farmers

The Ministry of Finance (MoF) has decided to discontinue financing the farmers, which will undoubtedly further cripple the country's agricultural production. Despite the government's allocation of Rs 8.5 billion for agricultural self-sufficiency programs, the MoF has withheld Rs 8.457 billion of this amount. Officials at the Ministry of Agriculture and Livestock Development confirmed that the subsidy announced for the farmers at the local level under the government's agricultural program has been put on hold. With the increasing import of commodities, the decision will add to the plight of the farmers, in turn negatively impacting the country's production and also will be a hindrance in the execution of agriculture policies and programs previously planned and formulated by the government.

(Source: 2/22/2023)

Same standard of testing pesticides in both domestic and imported vegetables

While being criticised for delaying the implementation of pesticide testing standards for vegetables imported from India, the Ministry of Agriculture and Livestock Development (MoALD) has made it clear that the standards related to the 'maximum limit of pesticide residues' in vegetables and fruits are applicable to all domestic products and imported products. The goods entering Nepal should be tested at the customs wherein if there is an excess in the amount of pesticide residue, the sale and distribution of food including vegetables should be banned. According to the Plant Quarantine and Pesticide Management Center, some pesticides such as organophosphate, carbamate, and other insecticides are tested in the vegetables sold in the market as samples. Along with food technology, pesticide residues in the Kalimati vegetable market are tested in the rapid analysis laboratory. The quantity of pesticides is also seen in domestically produced vegetables.

(Source: My Republica, 3/2/2023)

Government hikes price of milk by NRs. 9.00 per liter

The government has decided to hike the price of milk by NRs. 9.00 per liter, taking the price to NRs. 65.00 per liter. Government officials said that the price hike will directly benefit farmers as they will get the price that has been hiked this time. The state-owned Dairy Development Corporation (DDC) will now determine the price of the milk and other dairy products as per the new price.

(Source: MyRepublica, 3/3/2023)

Impact of Nepal's end of LDC status on the agriculture sector

Nepal has upgraded from Least Developed Country (LDC) to Developing Countries List after the fifth UN Conference on Least Developed Countries held in Doha on March 5–9, 2023. Though this change brings with it the positive side of credibility and possible investments within the country, there are certain drawbacks to the list.

There are possibilities of reduced exports to some markets due to high tariffs, and adverse impact on access to funds specifically created for the LDCs, which is also relevant for the country's agriculture sector. The funding from the UN group could go down, although aid from multilateral donors like the World Bank and the Asian Development Bank as well as from most bilateral donors is not expected to be impacted.

Nepal will also lose preferential market access and see increased competition in international markets after graduation.

(Source: The Kathmandu Post, 3/12, 2023)

Nepal ...

Nepal squanders overseas seasonal work opportunities

South Korea and the United Kingdom have stopped hiring workers for seasonal work from Nepal this year. Seasonal work in the horticulture sector in the UK consists of picking fruits, vegetables, and flowers for six months. According to a notice published by the UK government, 45,000 visas are available in the horticulture sector this year. 1,124 Nepalis received UK visas for temporary work from 2019 to the first quarter of 2022, putting the country in the second spot after India among South Asian countries, the report said.

UK farms decided not to hire workers from Nepal citing the exorbitant recruitment fees many workers had to pay to secure jobs and their high absconding rates. "Illegal recruitment fees, high absconder rate in the last season, poor coordination, and lack of support from Nepal government are some of the major reasons for stopping the recruitments from Nepal," David Camp, chairman of the Association of Labour Providers, earlier told the Post in an email. Jeevan Baniya, assistant director at the Centre for Study of Labour and Mobility, Social Science Baha, a research institution, said that the Nepali authorities did not act in time to reap optimum benefits from the seasonal work schemes.

(Source: The Kathmandu Post, 3/14/2023)

Chemical fertilizer prices go up as government subsidies go down

The cost of agricultural necessities has increased as a result of the cut-off in government subsidies offered on the import of chemical fertilisers. Although the government had been planning this for a couple of months, a decision in this regard was made by the ministry this week. According to the ministry's spokesperson, Prakash Kumar Sanjel, a kilogram of urea will be costlier by NRs. 11 than its previous price whereas DAP and potash will be more expensive by Rs 7 and Rs 9 per kilogram, respectively. The new prices have been set as Urea: NRs. 25/kg; DAP: NRs. 50/kg; and Potash: NRs. 40/kg.

(Source: Onlinekhabar, 3/14/2023)

Dr. Khanal Delivers Talk in Nepal

During his personal visit to Nepal from January 11 to February 11, 2023, the Federation of Nepalese Industries and Commerce invited Dr. Nityananda Khanal, NAPA General Secretary to give a talk in the annual program planning workshop of the organization. The three-day workshop took place in Lumbini on January 20-22. Honoring the invite, Dr. Khanal made a presentation on "Planetary emergencies, fragile socioeconomic and food system: Challenges and opportunities for resilient circular economy and food sovereignty for Nepal." The attendees showed keen interest in the coverage and were actively engaged in the discussions both during the presentation for over an hour, and post-presentation conversations about how Nepal can cope with global climatic, social, and economic issues. Later, the leadership of the Federation also arranged Dr. Khanal's presentation to the Minister of Finance and staff on February 10, 2023. Then honorable Minister Bishnu Prasad Paudel expressed compliments and exchanged official and personal contacts for future conversations. Dr. Khanal also briefed the Minister about the Nepal Agriculture Policy Symposium convened by the NAPA and Policy Research Institute (PRI), Nepal on January 6-7, 2023 and its proceedings being published in the Nepal Public Policy Review (NPPR) journal. Minister Paudel appreciated the collaboration between the NAPA and PRI, and said he would look forward to reading the Proceedings.



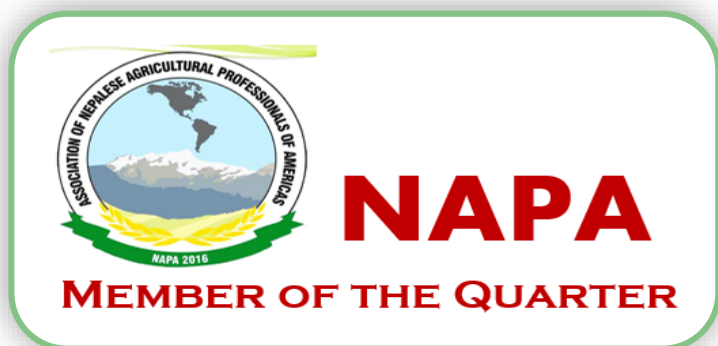
Member of the Quarter (January - March, 2023)



Congratulations!



Dr. Sanjok Poudel



Dr. Sanjok Poudel is a postdoctoral research associate at the Forage Lab at Virginia Polytechnic Institute and State University. He is a general member of NAPA and has been actively involved with NAPA and volunteered in numerous activities since 2016. Dr. Poudel served as an executive member from 2018-2020, helping to organize several events and initiatives aimed at promoting the interests of NAPA. He also served as an assistant editor of Agri-Connection from 2018-2020 and an editor from 2020 to date, demonstrating an unwavering dedication to his work and has been instrumental in the publication of numerous valuable resources. He has been actively engaged in collecting information, and writing and editing articles along with giving a new look to the Agri-Connection.

Dr. Poudel is originally from Chitwan, Nepal. He earned his B.S. in Agriculture Science from the Institute of Agriculture and Animal Science, Tribhuvan University, Nepal, before earning his M.S. in Animal Science from Tuskegee University, Alabama, USA. He then went on to earn his

Ph.D. in Crop and Soil Environmental Science from Virginia Polytechnic Institute and State University, where he is currently working as a postdoctoral research associate. Dr. Poudel has published over dozen of peer-reviewed journal articles on the use of forages in animal production and sustainable grazing management. His expertise in the field has been recognized through several awards, including the 2023 American Forage and Grassland Council Emerging Scientist Award and the 2022 Crop Science Society of America (CSSA) Gerald O. Mott Award.

Dr. Poudel is an active member of NAPA, contributing significantly to the growth and success of the organization. Through his efforts, he has been able to connect with fellow Nepalese agricultural professionals, helping to build a stronger, more connected community.

Congratulations, Dr. Poudel. We appreciate your contribution to the organization!

Membership Update (March 31, 2023)

Member Category	Members
Founding life member	5
Life member	158
Student member	126
Associate member	46
Regular member	18

Student Member	Affiliation
Arjun Upadhyay	North Dakota State University
Bikash Adhikari	Mississippi State University
Deepak Subedi	University of Georgia
Mahesh Ghimire	University of Georgia
Manish Gautam	The University of Texas
Manila Karki	North Dakota State University
Om Prakash Ghimire	Clemson university
Samikshya Bhattarai	Texas A&M University
Sandesh Poudel	University of Georgia
Sittal Thapa	North Dakota State University
Sujan Ghimire	South Dakota State University

Associate Student Member	Affiliation
Anugya Bhattarai	Agriculture and Forestry University
Alok Dhakal	Tribhuvan University, Institute of Agriculture and Animal Science, Paklihawa Campus, Nepal
Prashant Ghimire	Agriculture and Forestry University
Sandhya Adhikari	Institute of Agriculture and Animal Science, Nepal

Life Member	Affiliation
Dr. Indira Paudel	Carnegie Institution of Science

Associate Life Member	Affiliation
Krishna Prasad Sapkota	UC Davis for Horticulture Innovation Lab project via FORWARD Nepal

Welcome New NAPA Members on Board!

Appeal to Join/Renew NAPA Membership

We would like to request potential members to join NAPA - a **common professional platform for all of us**. Meanwhile, we request all members who are not currently in good standing to renew their memberships. Members' contributions thus far to bring NAPA to the current level is greatly appreciated. We request our dedicated members and well-wishers to promote NAPA to the next level by recruiting eligible friends/colleagues/students in your network. New NAPA members must write the recruiter's name in the "referred by" row in the membership form. **The highest recruiter(s) will be recognized at our Biennial Scientific Conference.**

A few reasons to join/renew NAPA membership:

NAPA is a member-driven voluntary organization. Members can benefit from the association to advance their career growth, develop organizational practices and leadership skills at all stages. Some of the membership benefits include:

- Peer-to-peer networking and research collaboration opportunities
- Professional development and advancement
- Serving on various committees
- Opportunity to publish scientific works in NAPA's various outlets (Journal, Book, Research/Policy Brief, and Agri-Connection)
- Opportunity to sponsor scholarships and research mini-grants in preferred agricultural institutions and disciplines in Nepal through NAPA
- Eligibility for organizational awards, scholarships, and endowment funds
- Opportunity to share scientific works, experiences, and expertise via association's Talk Sessions (Webinars) and Online Teaching/Learning Programs
- Joining global expert repository to contribute to Nepalese Agriculture and beyond
- Keeping up-to-date on association's programs and activities
- Volunteering and charitable opportunities
- Discounted rates for registration and hotel reservation during scientific conferences organized by the association

Please check for more details on Joining NAPA at <http://napaamericas.org/join-napa.php> and membership type and fees at <http://napaamericas.org/membership.php>. We look forward to welcoming you for a great cause. Please let us know if you have any questions and willingness to volunteer in various committees.



Thank you.

On behalf of NAPA Executive Committee,
Dr. Ramjee Ghimire
Vice President
Chair, Membership Drive Committee
Email: ramghi@gmail.com

BECOME A
MEMBER
JOIN TODAY!

Renew now



Please join or renew your membership. Become a life member if possible!

Membership Type and Fee

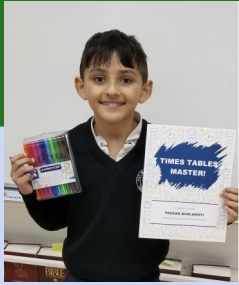
NAPA Membership Drive Committee seeks to create a database of students, faculty, researcher, and other professionals of agriculture and allied fields in public, private and nonprofit institutions, industries, and enterprises working in Americas, Nepal and beyond; establish contact with potential NAPA members and promote awareness about NAPA's vision, mission, goals, objectives, and activities; conduct membership drive; inform members in advance their membership; and regularly update the membership directory on the NAPA website. NAPA membership pool has nine categories including honorary members, senior members, and members for the eligible spouse.

Table 1. Membership fees and eligibility.

Membership Type	Fee	Eligibility
Regular Member	USD 50 (for two years)	Individuals who hold at least an undergraduate or bachelor or equivalent degree in agriculture or allied areas
Student Member	USD 25 (for two years)	Current students of agricultural and allied areas of studies who are in good standing student status.
Life Member	USD 200 (one time)	Individuals having met regular/general member's category and pay defined dues at a time.
Life Member (eligible spouse)	USD 100 (one time)	Eligible spouse of Life members
Family (Joint) Member	USD 15 (for two years) or USD 50 (one time for Life Membership)	Spouse of a member of any of the five categories (regular/general, student, life, honorary, and associate), who is not eligible for other categories of membership. Family members will not have voting right.
Associate Membership (Outside Nepal)	USD 25 (for two years) or USD 100 (one time for Life Membership)	Interested individuals who do not qualify for membership types above. Associate members shall not have a voting right and shall not be eligible for the candidate of the Executive Committee. An Associate member may become Associate Life member with the payment of defined dues at a time.
Associate Life Membership from Nepal	NPR 5,000 (one time)	Interested individuals who do not qualify for membership types above. One-time membership fee of NRs. 5,000.00 (five thousand rupees) to become Associate Life Member.
Associate Student Membership from Nepal	NPR 1,000 (one time)	Undergraduate and graduate students in good standing in Nepal. One-time membership fee of NRs. 1,000.00 (one thousand rupees) to become Associate Student Member as long as they are a student in Nepal.

NAPA is for and by members. Please join NAPA and request your friends and family to join too. We would like to request eligible and interested people to join the NAPA family and work together with other fellow members. You can access this link to join NAPA: <https://napaamericas.org/join-napa.php>.

Why Do We Celebrate Holi?



Prerak Burlakoti
*Grade-4,
British Columbia,
Canada*

Holi is one of the major festivals in Hindu religion. Although there are several mythical stories on why Hindus celebrate Holi, I think there are three major reasons which I will discuss in this article.

The first one relates to Prahlad, Hiranyakashipu and Holika. Once upon a time, there was an evil king named Hiranyakashipu who wanted everyone to praise him. However, there was this one boy named Prahlad who only praised the gods. The king got very mad and threatened Prahlad with mean and horrendous words, but it did not stop the boy. The king had a sister named Holika who could sit in a fire and still come out perfectly fine. So, the king made the boy sit on Holika's lap in a fire, but the boy had a trick up his sleeve: praying. Since the little boy prayed to the God, he was safe, and Holika died in the fire. This just showed that people loyal to God with good intentions always win over evil. Since that day, people have started celebrating Holi every year to recognize the win of good over evil.

The second story is about Krishna and Radha. According to the myth, young Krishna,

who had a darker complexion, was jealous of Radha's bright complexion. So, he went to his mother Yashoda, and complained about it. His mother told him to put any color of paint on her face. Krishna followed this advice and put many colorful paints on Radha's face. Some people believe this is a reason to spray colors on faces during Holi and to signify equality no matter what the skin complexion is.

The third story is about Shiva and Parvati. One day, Shiva was meditating on Mount Kailasha, his home. Parvati, who had been wanting Shiva's attention, asked god Kamadev, who had a bow and arrow, to disturb Shiva's meditation. As you probably guessed, he hit Lord Shiva with the arrow as per Parvati's wish. When Lord Shiva finally stopped meditating, he was very mad, and Kamadev was burnt to ashes by Shiva. It is said that it was on the day of Holi that Kamadev had sacrificed himself for the good of all beings. Although Lord Shiva later realized his mistake and granted Kamadev immortality in an invisible form, this day has been celebrated every year as Holi to remark on the need for peace and forgiveness.



Holi, also known as Fagu Poonima in Nepal, is celebrated in early March. But why do we celebrate Holi?

A long time ago, Hiranyakashyapu, a demon king, tried making everyone in his kingdom worship him.

He had a son named Prahlad but Prahlad was a devotee of Vishnu. Hiranyakashyapu tried to make Prahlad worship him but he refused. Hiranyakashyapu got an idea. Holika, the king's sister, had a magical power. She could stay in a fire without getting burnt. He decided to make Prahlad stay in a fire with Holika. But to their surprise, Prahlad was not hurt but Holika disappeared in the fire. Hiranyakashyapu was shocked and never did anything to Prahlad again. We celebrate Holi to show that good will triumph over evil.

Holi was first celebrated by putting ash on people's foreheads, but then it was changed to colorful powder to make it more fun for the people celebrating. Other people say that Holi is celebrated to welcome the coming of spring or as a love festival. There are many stories but Holi is a really fun festival that celebrates many things!



Aayush Bhandari
*Grade-7,
Dallas, Texas*

KidsZone



KidsZone

Fun Facts About Hummingbirds

Sushan Thapa
Grade 4, Missouri



Hummingbirds are beautiful birds of Trochilidae family. They play a big role in pollination, visiting up to 2,000 flowers in a day. Now, I am going to share with you some hummingbird facts.

- The name hummingbird actually comes from the humming sound that their wings make as they beat so fast.
- There are more than 325 unique species of hummingbirds in the world.
- Hummingbirds are the only birds in the world that can fly backwards.
- Hummingbirds have no sense of smell.
- A hummingbird egg is smaller than a jellybean and is called a nestling, hatchling, or a chick.
- The modern species of hummingbirds arrived in Europe more than 30 million years ago.
- The calliope hummingbird is the smallest far-distance traveling bird in the world, traveling more than 5,000 miles every year. They can fly up to 30 miles an hour.
- Hummingbirds have very high energy needs. To keep up with their metabolism, they feed on about 1,000 to 2,000 flowers a day. They consume about half of their weight in nectar between sunrise and sunset.



- The smallest hummingbird measures only 2.0 inches and weighs less than 2.0 grams.

Please Encourage Your Kids to Participate

Dear NAPA members and AC readers,

Please inform and encourage your kids to contribute for KidsZone. Creations such as arts, drawings, and any forms of writings (short essay, poem, story, memories, etc.) related to agriculture and allied sciences are accepted.

KidsZone also includes features on kids, animals, plants, life at school, and issues of particular interest to kids.

Please include the following:

Name:
School (optional):
Grade:
State/District:
(And a photograph)

KIDS TODAY, SCIENTISTS TOMORROW!

No More Neglect: Go for Wonky and Ugly Fresh Produce for Smart Reasons

Swornim Khatiwada¹ and Bed P. Khatiwada^{2*}

¹Brisbane Christian College in Brisbane, Australia; ²Brisbane Fresh Produce Markets in Brisbane, Australia

*Email: bedkhatiwada@gmail.com



Fruit and vegetables (fresh agriculture produce) are healthy sources of energy, proteins, vitamins, fat, minerals, and many other micronutrients. However, the consumption of these fresh produce is not meeting the nutritive requirements as recommended by the World Health Organization (WHO). The skyrocketing price of fresh agriculture produce in recent months and the increase in the general cost of living are further putting pressure on the family budget and consumption of fresh produce. Even in the developed countries, this economic pressure is real, and a number of strategies are in discussion, including making some smart choices for previously neglected fresh produce, the ugly looking fruits, and vegetables.

Worldwide trend

One third of the fresh agricultural produce never hit supermarkets' shelves just because they do not meet the cosmetic standards and specification set for 'premium' grade. These precious harvests that come from the use of all important production resources, including, farmland, water, fuel, fertilizer and pesticides, and labour for agronomic operations, harvest and postharvest, get wasted for the cruel reason of not meeting the shape and size for the 'premium' markets. These markets ask for produce having a no blemishes or skin markings, or odd size and shapes which has little or nothing to do with the internal quality and nutrients. Each year an estimated 1.3 billion tonnes or one-third of total fruit and vegetables are wasted for this reason. Such a consumer psychology of 'purchasing with their eyes' is gradually changing with the noteworthy initiatives of worlds' popular supermarket chains like Intermarche' of France, Asda in the UK, Walmart in North America, Coles and Woolworths in Australia and others.

Some recent initiatives are gaining popularity for providing cheaper produce and at the same time contributing to the environmental health and circular economy out of the 'otherwise waste' which would end up in landfill leading to greenhouse gas emission, primarily methane. The lat-

est French fashion initiated by Intermarche' in 2014, of eating scary, disfigured and unglamorous fruits and vegetables looking at its inner beauty (nutrients), is on the rise, where shoppers are getting around 30% cheaper produce and making fantastic contribution to their environment and economics of food production. The grotesque apple, the ridiculous potato, the hideous orange, the disfigured eggplant or the ugly carrot, the shoppers are increasingly realizing the previously untapped benefits of going for 'wonky' fresh produce. An increase in 24% of customer traffic within two days of launching these initiatives made Intermarche' to expand the scheme to their 1,474 outlets across France, thanks to the wise consumer community. A light-hearted social message enticed the customers with the fair discount in adopting the neglected produce and is yielding the strategic shift in value towards respecting food if it does not compromise on safety and quality. Walmart in North America also launched its campaign on introducing ugly looking fresh produce under the brand 'I'mperfect' through all its



Figure 1. Ugly fresh produce in market in Australia (from left to right are The Odd Bunch apples, I'mperfect carrots and Market Buy capsicums respectively from Woolworths, Coles, and Aldi supermarket chains).

stores along with other premium grade produce. In Australia, three retailers that share 85% of total fresh produce supermarket business, initiated the campaign of selling the ugly and wonky produce as their flagship programs in recent years. Supermarket 'Coles' choose to use

No More Neglect ...

the word 'Imperfect' while 'Woolworths' used the word 'odd bunch' whereas 'Aldi' calls it 'market buy'. All these new lines are gaining popularity due to price offer, discounts and an increase in consumers' awareness, thanks to ongoing social awareness campaigns.

Smart decision, multiple benefits

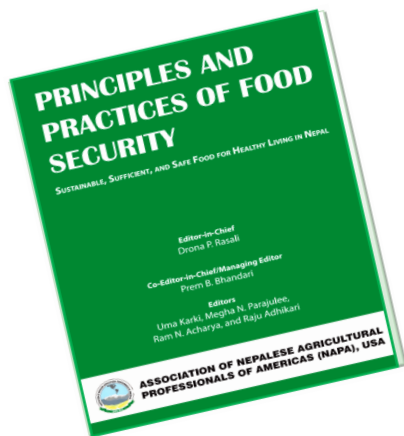
Safety and quality of fresh produce for human consumption should never be compromised. Production farms, facilities/infrastructures, and processes are certified under the certification schemes such as SQF, GlobalGAP, and Freshcare, which are accredited by Global Food Safety Initiatives. This means that safety and quality aspects of such wonky produce from certified farms are not under compromise regardless of the size or shape or skin markings of the produce. Thus, throwing away produce for cosmetic appearance based on the specifications and standards set by the primary industries and retailers is the major serious concern and always requires for alternative thoughts by campaigners. This influenced worlds' retailers' chains to develop separate sets of standards and specification for allowing such ugly produce into their chain. Such welcoming initiatives of the supermarket chains around the world have positive impacts on reducing food losses in the farm by one-third or so. Almost 90% of these food losses on the farm would otherwise end up in landfill, producing methane. This can reduce environmental footprints and help mitigate climate

change. By reducing the price of produce along the supply chain, fresh produce can be made affordable for more consumers in this time of high cost of living.

What next?

Despite the initiatives of the many supermarket chains, majority of consumer communities are still 'buying with their eyes' and have anecdotal perception of the relationship of size, shape, and color to nutrient contents. Appealing color, sizes, and shapes give consumers a sense of satisfaction, but in turn, there is always a trade-off of the price and environmental footprints. The campaign should also extend to the wider public through mass media or hoarding boards infographics in public spaces to create more awareness based on the research and facts. This should emphasize the message of how individuals' contribution as a member of society can create a more just and sustainable world, such as through smart and wise decisions to purchase wonky produce. Organizing small workshops at the community level, schools or shopping centres can provide an opportunities for the mass to observe and absorb this message.

(Swornim Khatiwada is a Year 10 student in Brisbane Christian College in Brisbane, Australia while Bed P. Khatiwada works as Postharvest and Quality Specialist in Brisbane Fresh Produce Markets in Brisbane, Queensland, Australia).



NAPA has published a book entitled:

"Principles and Practices of Food Security: Sustainable, Sufficient, and Safe Food for Healthy Living in Nepal.

Please save your copy today!

Contact NAPA if you need further information.

napa@napaamericas.org

Please send your articles:

newsletter@napaamericas.org, ag.sushilthapa@gmail.com

Sterile Insect Technique (SIT) to Eradicate Fruit Fly

Prashant Ghimire

Agriculture and Forestry University, Chitwan, Nepal

Email: ghimireprashant2000@gmail.com



The Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann) (Figure 1) is one of the world's most destructive fruit pest and is subject to strict quarantine measures in many countries where it is not officially present. It can infest more than 330 plant species. Because of its wide distribution over the world, it can tolerate cooler climates better than most other species of tropical fruit flies and is ranked first among economically important fruit fly species (Weldon, 2020).



Figure 1: Adult male Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann). Source: USDA

The presence of this pest was officially reported in the Dominican Republic, one of the major exporters of fruits to the USA in March 2015 (Figure 2). It was found in an almond tree near the coast of Punta Cana, the eastern region of the island (FAO, 2018). It was found that the pest had already spread to 2053 km² in the eastern part of the country, constituting a major outbreak. Although the trading partners immediately banned on most exports of fruit and vegetables listed as hosts of the pest, it resulted in a loss of over \$40 million within nine months of 2015 (IAEA, 2019). The outbreak was centered on Punta Cana, one of the busiest tourist destinations in the Caribbean. The agricultural production sites affected by the ban were more than 200 km away from the outbreak (FAO, 2018).

To combat this outbreak, the International Atomic Energy Agency (IAEA), the Food and Agriculture Organization of the United Nations (FAO), and the United States Department of Agriculture (USDA) immediately joined hands and initiated an eradication campaign with support from Guatemala, Mexico, USA Moscamed Programme and regional organizations, such as the International Regional Organization for Plant and Animal

Health (OIRSA) and the Inter-American Institute for Cooperation on Agriculture (IICA) (IAEA, 2019).

The Dominican Republic successfully eradicated the medfly by using an integrated approach that includes the sterile insect technique (SIT) (Figure 3) - an environmentally friendly and effective method to suppress or eradicate selected insect populations - applied on an area-wide basis (Zavala-López et al., 2021). The SIT is an autocidal control method that is based on the mass-rearing, radiation-based sterilization, and release of the same species that are targeted for population control (Plá et al., 2021). The last fly was detected in January 2017 and official eradication was announced in July 2017 after six generations had passed with no detections of the pest. The Dominican Republic is now on the list of countries that have successfully eradicated the Mediterranean fruit fly and has substantially strengthened its fruit fly surveillance system and emergency response capacity (Zavala-López et al., 2021). In the context of

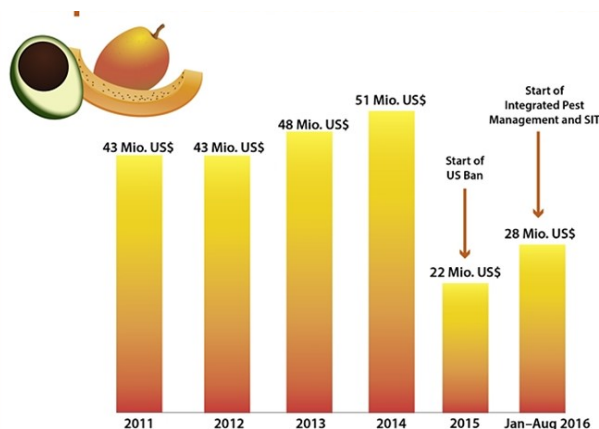


Figure 2: Trend of export of Dominican fruit products to the USA. Source: IAEA, 2019

Nepal, there are many fruit fly species that have been reported which includes, *Bactrocera dorsalis*, *Bactrocera zonata*, *Bactrocera correcta*, *Bactrocera cucurbitae*, *Bactrocera tau*, *Bactrocera scutellaris*, *Bactrocera diversus*, *Bactrocera caudatus*, *Bactrocera minax*, *Bactrocera yoshimotoi*, *Bactrocera tsuneonis*, *Dacus longicornis* (Adhikari, 2019). The *Bactrocera minax* is a major pest of sweet orange and hill lemon in the eastern hill of Nepal, that has been causing horrendous losses and an economic backlash to farmers.

Sterile Insect Technique ...

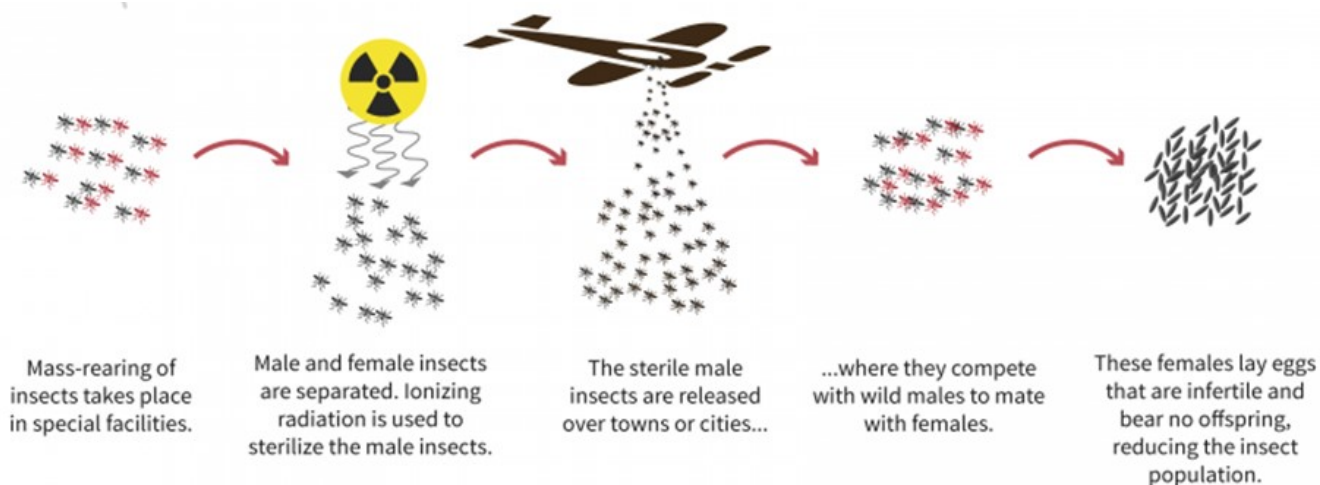


Figure 3: STI execution method to control fruit fly. Source: IAEA, 2019

Despite the increasing trend of the area of cultivation the production of sweet orange in the Sindhuli district (the hub of sweet orange) of Nepal, severe infestation accounts annually for 30% of yield loss due to Chinese fruit fly (Rai et al., 2022). The major management practices applied includes the use of chemicals, destruction of fallen fruits, use of pheromones and baits, pruning of trees, etc. These practices are able to reduce the pest to a certain level, however every year the problem still entails and incurs huge losses (Sharma and Dahal, 2020). Thus, the complete eradication of fruit fly is necessary to ensure farmers' profit and export produce to foreign markets without having heavy quarantine restrictions. Adopting similar measures of STI could help Nepal to eradicate fruit fly.

References

- Adhikari, D. 2019. Status and Management of fruit fly in Nepal. National Plant Protection Workshop. Lazimpat, Kathmandu.
- FAO. 2018. Eradication of the Mediterranean fruit fly from the Dominican Republic using nuclear technology. Food and Agriculture Organization of the United Nations. Available at: <https://www.fao.org/in-action/kore/good-practices/good-practices-details/en/c/1143708/>
- IAEA. 2016. How a nuclear technique is helping the Dominican Republic win the war against the Medi-

terranean fruit fly. International Atomic Energy Agency. Available at: <https://www.iaea.org/newscenter/multimedia/photoessays/how-a-nuclear-technique-is-helping-the-dominican-republic-win-the-war-against-the-mediterranean-fruit-fly>

- Plá, I., J. García de Oteyza, C. Tur, M.A. Martínez, et al. 2021. Sterile Insect Technique Programme against Mediterranean Fruit Fly in the Valencian Community (Spain). *Insects*, 12(5), 415.
- Rai, A., L.P. Sah, K. Adhikari, and K. Shrestha. 2022. Farmer's Perception of Fruit Fly *Bactrocera* spp. In Mandarin Orange and their Management in Sankhuwasabha District of Nepal. *Journal of the Plant Protection Society*, 7(01), Article 01.
- Sharma, P., and B.R. Dahal. 2020. Life cycle and eco-friendly management of Chinese fruit fly (*Bactrocera minax*) in sweet orange (*Citrus sinensis* Osbeck) in Nepal. *Archives of Agriculture and Environmental Science*, 5(2): 168–173.
- Weldon, C. 2020. *Ceratitis capitata* (Mediterranean fruit fly). CABI Compendium, CABI Compendium, 12367.
- Zavala-López, J. L., G. Marte-Díaz, and F. Martínez-Pujols. 2021. Successful area-wide eradication of the invading Mediterranean fruit fly in the Dominican Republic. In *Area-wide Integrated Pest Management*. CRC Press.

Agri-Connection is an effort of connection - a means of linkage among Nepali hearts worldwide. We invite and encourage you to send us your articles, intellectual ideas, opinions, thoughts, perspectives, memoirs, and literary creations.

Editorial Board

Policy and Praxis of Food Safety Regulation at Local Government Jurisdiction in Nepal

Shobha Osti

University of Queensland, Brisbane, Australia

Email: s.osti@uq.net.au



Safe and quality food is fundamental right as enshrined in Constitution of Nepal 2015. Realising importance of food safety in human health and wellbeing, the legal instruments to regulate the food safety system have been developed right from 1960s. Food Act 1966, Food Rule 1970, Food Safety Policy 2019, Right to food and Food Sovereignty Policy 2019 and decentralisation of the food safety and quality responsibilities to the local government portfolios are some of the important developments happened since then. Increased economic liberalisation and international trade after 1990s along with membership of the country in World Trade Organization (WTO) and other international organizations urged to formulate food safety rules and regulations (Bajagai, 2020). Despite plethora of policies, acts, regulations and authorities, the lack of sufficient resources such as infrastructures, facilities and human capital at all three tiers of government is hindering the translation of these policies and programs into real practice. The new constitution of Nepal has devolved the responsibility of food safety and quality regulation to the local governments however, the local governments neither have the capacity and confidence for effectively regulate this sector nor they have capacity development plan (FAO, 2018). Even though, the food safety at local level has a direct linkage to overall health and wellbeing of community and their participation in economic affairs, during initial years of practicing federalisms, only handful of local governments formulated required policy and regulation in areas of food safety and many have not. This situation warrants to think over the jurisdiction of food safety system at local government. The local governments and their political leaderships should make it a priority and work with respective ministries and departments at federal and provincial level to strengthen their food safety service system and make the realisation of the food safety dream come true.

Food safety: Plethora of laws, miserable action

Laws and regulations to promote food safety and provide safe and quality foods to consumers were enacted in Nepal right from 1966 when Food Act 1966 and Food Rules and Regulation 1970 were legislated. With the consistent decrease in the Global Hunger Index from 37.4 in 2000 to 19.1 in 2022 (THT, 2023),

Nepal should be seriously taking initiatives on improving its food safety and quality services system. The development of legal instruments is one important aspect while equally important aspect is how these laws are enacted and practiced in the ground to realise the intended goal set by those laws and regulations and to bring changes in food safety practices in families and societies. Most recently, with the implementation of Agriculture Development Strategy (ADS, 2015-2035), improvement in food safety and quality has been emphasized. Component four of the ADS focuses on increasing competitiveness in the market where quality and safety of food is expected through enhanced food safety and quality standards formulation and regulated by effective institutional arrangements and regulations (FAO, 2018). Food Safety Policy 2019 has been approved and is being implemented which is expected to improve the food safety situation of Nepal through proactive initiatives and actions. This policy aims at strengthening regulatory system to monitor, control, and facilitate the food safety at all levels of government.

Despite the development of legal base and policy, awareness of the stakeholders and consumers in Nepal, the federalisation of Nepal decentralises food safety and quality control responsibilities to local governments. In the same line, the Local Government Operation Act 2017 allocates the responsibility of protecting local peoples' health from consumption or sale of unsafe foods, to local government (Koirala, 2022). In contrary, ground situation is miserable. Consumers struggle to get safe and quality foods. Poor infrastructures like roads, processing industries, warehouses, slaughter houses, electricity are set of hardware issues. Equally important issues contributing to this situation are poor quality of water, lack of health services and limited information and education and outreach, weak food supply chains and lack of coordination and collaboration among stakeholders like government, non-government and private sectors, research, education and other market actors. Many of these barriers are beyond the capacity and scope of local governments, thus, continued support from federal and provincial governments is paramount.

Policy and Praxis ...

Prerequisites for food safety and quality in practice

Local government can formulate their own food safety and quality control laws, regulations and standards and programs thanks to the Local Government Operation Act 2017. Food safety defines the sets of practices in handling, preparing, or storing the food in a way to reduce the risk of peoples becoming sick from its consumption. Food quality refers to the overall excellence of the food that includes all properties of food including external or internal parameters like nutrient content, external appearance, flavour, and additional information of food manufacturers, packaging and information on production or use by dates. Mass sensitisation and awareness among the consumers, community members and all stakeholders on safe and quality food is crucial for effective implementation of food safety and quality laws and regulations. Adulterations, mislabelling, not following the minimum good hygiene practices (GHP), and not following the good manufacturing practices (GMP) are most common issues in local food markets or eateries. Control of adulterations and food frauds and implementation of GHP at the local hotel, restaurants, food booths or parlours and practicing GMP in local food industries who produce, process, or store the food are paramount.

The formulation of local level acts, regulations and standards should be the first priority of local government jurisdiction because they have authority to formulate laws. This lays the foundation for the successful implementation of any food safety laws. This can be done alongside the participatory discussion and stakeholder's consultation and meetings by including all possible stakeholders working in the jurisdiction such as consumers community, public institutions, private business communities or law enforcing agencies. Such participatory work will help develop a feeling of 'ownership' among the stakeholders and give opportunity to them to address their issues and concerns in the local laws and legislations and participate in the implementation of such laws. Education and empowering community members at each local government jurisdiction could be a step towards achieving the smooth implementation of food safety and quality regulations.

The trusted and able human resources with technical and managerial competencies and the facilities and infrastructures like laboratories for objective analysis and assessments of food samples are critical for successful implementation of the laws as people in the democracy always asks for a 'fair and lawful treatment' for every-

one. This could be possible through the establishment of Food Reference Laboratory where analysis of pesticides, adulterations, veterinary inedible drugs, toxins including mycotoxins and heavy metals can be done. This gives confidence to the food control authorities and personnel for the implementation of the laws based on facts and evidence of wrongdoing. This, however, asks for consistent and coordinated efforts among the law enforcing institutions and their facilitating and proactive engagements with the stakeholders, mainly the service providers and private business entities in the local food economy.

The common, safe, and bright future

The common future for the health of people, local economy and overall food safety confidence among the stakeholders and consumers community depends on the dedicated actions and accountability in everyone's part. Hanging the food safety certificate in the wall will not help address the current food safety issues and anomalies but every conscious consumer should be able to realise the food safety in practice or in reality. Since food safety and quality are directly related to food security, public health, environmental health and progress and prosperity of the communities and people involved along the food value chains, this could also be an avenue to bolster internal tourism and local economy.

References

- Bajagai, Y.N., P. Koirala, B.P. Khatiwada and R. Adhikari. 2020. Food safety and food quality regulations: status, issues and way forward. In D. P. Rasali, et al. (eds.), Principles and practices of food security: sustainable, sufficient, and safe food for healthy living in Nepal (pp. 296-312). Association of Nepalese Agricultural Professionals of Americas.
- FAO. 2018. Food safety policy and legislation in the newly decentralised Federal Democratic Republic of Nepal. Regional Office for Asia and the Pacific, Food and Agriculture Organization of the United Nations.
<https://www.fao.org/3/BU682EN/bu682en.pdf>
- Koirala, N. 2022. Policies and perspectives of food health and safety in Nepal: Is Nepal ready? eFood. eFood. Wiley Science. 1-2.
- THT. 2023. Nepal makes progresses in hunger reduction. The Himalayan Times.
<https://thehimalayantimes.com/kathmandu/nepal-makes-progresses-in-hunger-reduction>.

Orientation Flight of Worker Bee

Bibek Sodari

Agriculture and Forestry University, Rampur, Chitwan

Email: bibeksodari333@gmail.com



Bees do not naturally know the location of the hive. Before going on foraging expeditions to collect nectar or pollen, they must learn this in the form of orientation flight, which serves as the vehicle for this education (Capaldi and Dyer, 1999). In order to survive and make the colony productive, worker bees are responsible for all of the functions. They perform different in-hive functions, including cleaning, feeding bee brood, building comb, and making honey in the first three weeks after emergence. Later, they become foragers in the last half of their lives. It was found that in order to become a forager, a bee needs at least one orientation flight. Moreover, almost all bees take numerous orientation flights before they began to forage (Capaldi et al., 2000). Worker bees perform short orientation flights for about 15-20 minutes before they begin foraging. Bees nearer to foraging age fly farther away, while younger bees prefer to remain closer to the hive (Tautz et al., 2008). After the shifting of the colony or hive, pre-foragers will also perform re-orientation flights (Winston, 1987).

Significances of orientation flight

Bees learn to associate position of the sun, time of day, and directionality and also get information about landmarks during the flight (Winston, 1987; Capaldi and Dyer, 1999). Foragers need to have robust long-term memories regarding floral and hive locations along with odor and appearance of preferred floral sources (Robinson and Dyer, 1993; Menzel et al., 2006). This information is vital for later foraging behavior, as bees have to navigate between floral resources and hive (Becker, 1958). Honeybees get many opportunities to examine the hive and the surrounding landscape during orientation flights, suggesting that bees slowly become familiar with the region's topography (Capaldi et al., 2000).

Physiology and genetics of orientation flight

As orientation flights are distinct learning experiences driven by innate behavior, they present an ideal opportunity for molecular study. A classical immediate-early gene (IEG) called Early Growth Response Protein 1 (Egr-1; also known as zif268, NGFI-A, Krox-24, or Zenk) is a transcription factor whose expression is activity-dependent and connected to learning and novelty detection in many vertebrate species (Knapska and Kaczmarek, 2004). There is evidence to suggest that the

mushroom bodies of some species of insects, a part of the brain involved in memory and sensory integration, facilitate spatial learning (Mizunami et al., 1998; Farris, 2008). Lutz and Robinson (2013) found that the mushroom bodies quickly and temporarily stimulate an insect homolog of Egr-1 in response to orientation. This study shows that honeybee orientation involves a molecular mechanism that is understood to play a role in many other types of learning and is the first instance of an Egr-1 homolog working as a learning-related immediate-early gene in an insect. This transcriptional response was found to occur in both foragers who were made to reorient as well as young bees. Furthermore, it was found that visual perception of new environment is necessary along with exercise for Egr stimulation (Lutz and Robinson, 2013). Older bees often stop in front of the hive entrance, release the Nasanov glands at the ends of their abdomens, and emit a scent called geraniol, a chemical compound that smells like geraniums, to support the young foragers in finding their way home. Bees that are picking up scents fan their wings, dispersing the geraniol across the region bees that release an attractive scent from the Nasanov glands in their abdomens, and disperse this by fanning their wings. (Figure 1) (Tautz et al., 2008).



Figure 1. Young bees returning to the hive receive help in landing from older hive.

Buckner's pioneer contribution

Becker (1958) was one of the first to examine the role of orientation flights in the large-scale landscape features that bees use for homing. While this behavior

Orientation Flight ...

was recognized long ago, Becker (1958) established its importance in long-distance homing. Orientation flights provide bees with environmental information that enables them to recognize their hives. However, the spatial scale covered by orientation flights has its limits, as homing success is not good from larger distances. Homing success improves with increasing age after a single orientation flight, and previous flights provide bees with prior foraging experiences, leading to more successful homing from all distances. Interestingly, intervening features like hills or forests don't seem to affect homing after an orientation flight (Becker, 1958).

Appearance of orientation flight

Orientation flights differ from how foraging bees normally conduct their work. Foragers quickly depart and return to the hive, but those involved in orientating take a more passive attitude. These young bees fly a short distance after leaving the hive, make their way back to the front of the hive and move in a zigzag motion. The bee flies larger circles around the hive for a few minutes before coming back and entering. The bees can memorize where their colony is and any adjacent landmarks due to this flight exercise (Tautz et al., 2008).

Orientation flight in comparison to swarming and robbing flight

It can be confusing for new beekeepers to differentiate between orientation flight, swarming, or robbing flights. Orientation flights are mainly flying around the hive and hovering near the entrance also known as play-flight. In contrast, bees show an aggressive behavior where multiple bees can be seen fighting at the entrance in robbing. Thus, the major sign of robbing is wrestling of multiple bees on the landing board. Meanwhile, swarming is a natural process when the population in the hive has reached its peak and almost half of the bees leave the hive to search for a new home. A huge cluster appears nearby which will act as the starting point from where the hunt for a new home will begin. A group of honeybees spills out of the hive (Figure 2), filling the area around the nest with their buzzing (Tautz et al., 2008). Understanding the differences between these types of flights is crucial for beekeepers to manage their colonies effectively.

Details of orientation flight

Bees use a variety of indicators to navigate, such as the position of the sun and the presence of prominent geographical features (Capaldi et al., 2000). Orientation flights can be categorized into short and long-range flights: (1) Short-range flights are likely related to learning the specific features of the hive's immediate surroundings and are performed more frequently under unfavorable weather conditions. (2) The bees spent less



Figure 2. The swarm establishes itself close to the previous nest and sends out scouts to look for a new one.

time checking the surroundings of the hive from the first to the fourth flight, which led to a reduction in the duration of long-range orientation flights. (3) Extended parallel landscape structures on the ground served as a guide for some of the single orientation flights. (4) In a series of orientation flights, bees explored new areas of the landscape. (5) According to foraging flights conducted after orientation flights, the acquired visual information plus path integration is sufficient for successful homing even from unfamiliar areas, as indicated by the longer foraging flights and potential involvement of a previously unexplored area of the terrain. (6) After the initial orientation flights, exploration and foraging flights may be integrated, possibly leading to extremely long and complicated flights (Degan et al., 2014). Furthermore, even when the distance was nearly the same, homing performed better from locations that provided a view of the landmarks close to the nest than from locations that were visually isolated from the nest surroundings (Capaldi and Dyer, 1999). Comparisons between orientation and foraging flights indicate that when bees develop into foragers, both surface speed and flight distance increase over time. In addition to flying farther and straighter, foraging bees exhibited a significantly higher ground speed than orienting bees, as illustrated in Figure 3 (Capaldi et al., 2000). and flight distance increase over time. In addition to flying farther and straighter, foraging bees exhibited a significantly higher ground speed than orienting bees, as illustrated in Fig 3 (Capaldi et al., 2000).

Orientation Flight ...

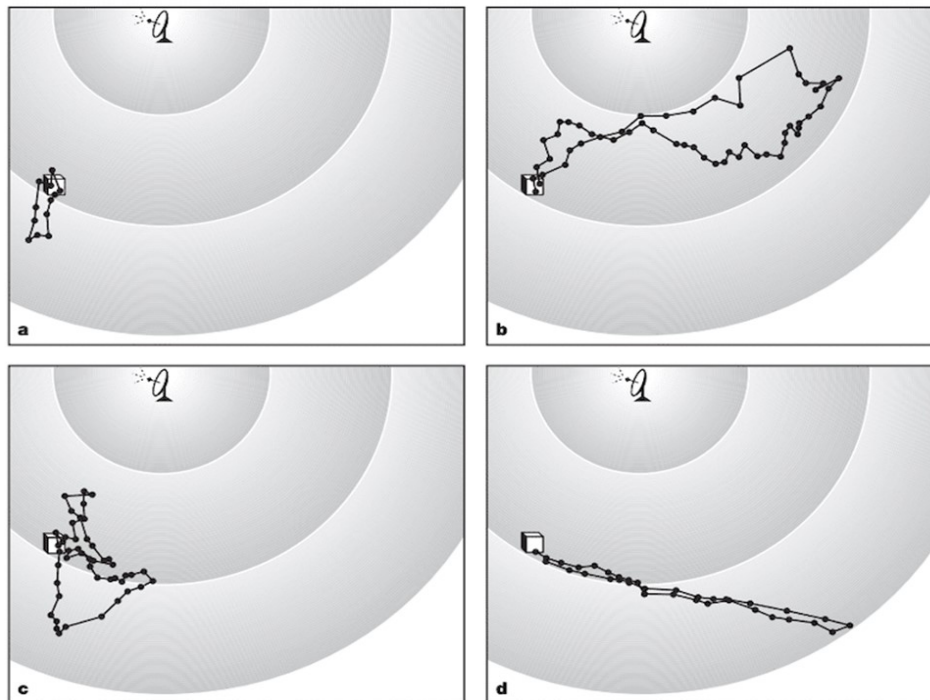


Fig 3. Orientation (a-c) and foraging flights monitored by harmonic radar. Source: Capaldi et. al, 2000

Conclusion

A young bee undergoes a significant turning point during the orientation flight. After working for two to three weeks inside the hive, the bee engages in a certain behavior that enables her to start learning aspects of the environment that she will utilize for the rest of her life as a forager. It has been found that learning occurs quite quickly during the orientation flight, and the new information can be applied immediately to homing. Certainly, it is an incredible effort for a tiny animal like a honeybee to find its nest from as far as 10 km away.

References

- Valentine, J.W. 1969. Patterns of taxonomic and ecological structure of the shelf benthos during Phanerozoic time. *Palaeontology*, 12(4): 684-709.
- Simpson, G.G. 1994. *Tempo and Mode in Evolution*. Columbia Univ. Press, New York.
- Becker, L. 1958. Untersuchungen ueber das Heimfindevermoegen der Bienen. *Z. Vgl. Physiol.* 41: 1-25.
- Capaldi, E.A., A.D. Smith, J.L. Osborne, S.E. Fahrbach, S.M. Farris, D.R. Reynolds, ... and J.R. Riley. J.R. 2000. Ontogeny of orientation flight in the honeybee revealed by harmonic radar. *Nature*, 403 (6769): 537-540
- Degen, J., A. Kirbach, L. Reiter, L., K. Lehmann, P. Norton, M. Storms, ... and R. Menzel. 2015. Exploratory behaviour of honeybees during orientation flights. *Animal Behaviour*, 102: 45-57.
- Tautz, J., H.R. Heilmann, and D. Sandeman. 2008. *The buzz about bees: biology of a superorganism*. Berlin: Springer.
- Capaldi, E.A., and F.C. Dyer. 1999. The role of orientation flights on homing performance in honeybees. *Journal of Experimental Biology*, 202(12): 1655-1666.
- Schopf, J.W. 1994. Disparate rates, differing fates: tempo and mode of evolution changed from the Precambrian to the Phanerozoic. *Proceedings of the National Academy of Sciences*, 91(15): 6735-6742.
- Wehner, R., and M.V. Srinivasan. 1981. Searching behaviour of desert ants, genus *Cataglyphis* (Formicidae, Hymenoptera). *Journal of comparative physiology*, 142(3): 315-338.
- Allan, S. A., K.N. Slessor. M.L. Winston, and G.S. King. 1987. The influence of age and task specialization on the production and perception of honey bee pheromones. *Journal of insect physiology*, 33 (12): 917-922.
- Lutz, C.C., and G.E. Robinson. 2013. Activity-dependent gene expression in honey bee mushroom bodies in response to orientation flight. *Journal of Experimental Biology*, 216(11): 2031-2038.

नेपालमा चैते धान: सम्भावना र चुनौतीहरू

शौरभ शर्मा

कृषि तथा वन विज्ञान विश्वविद्यालय, चितवन

इमेल: : shauravsharma5151@gmail.com



आर्थिक वर्ष २०७७/७८ को कृषि तथ्यांक अनुसार नेपालमा १४ लाख ७३ हजार हेक्टर क्षेत्रफलमा धान खेती भई ५३ लाख २१ हजार मेट्रिक टन धान उत्पादन भएको थियो र औसत उत्पादकत्व ३.८१ मे. टन प्रति हेक्टर रहेको थियो। बाली विकास निर्देशानलयको तथ्यांक अनुसार धानले देशको कुल गार्हस्थ्य उत्पादनको केवल ७% ओगटेको छ भने कृषि गार्हस्थ्य उत्पादनमा २०% ओगटेको छ। करिब ९२% धान खेती असारमा अर्थात बर्षे धानका रूपमा गरिँदै आएको छ भने करिब ७% चैते धानका रूपमा र १% जाडो मौसम अर्थात माघको अन्तिममा रोपिँदै आएको छ। सरकारले आउँदो दुई वर्षभित्रमा नेपाललाई धानमा आत्मनिर्भर बनाई तीन वर्षपछि निर्यात गर्ने उद्देश्यले तराईका जिल्लामा बृहत्तर धान उत्पादन योजना सुरु गरेको हो । नेपाललाई धानमा आत्मनिर्भर बनाउन सरकारको बृहत्तर धान विस्तार योजना अन्तर्गत सिँचाइको सुबिधा भएको भूभागमा चैते धान खेती प्रोत्साहन गरिएको छ । विभिन्न अनुसन्धान अनुसार चैते धानको उत्पादकत्व प्रति हेक्टर ४ टन रहेको छ भने मुख्य सिजनमा लगाइने वर्षे धानको उत्पादकत्व ३.१७ टन मात्रै रहेको छ । वर्षे धानभन्दा चैते धानको उत्पादन धेरै भएकाले, धान उत्पादनमा वृद्धि र आत्मनिर्भर हुन चैते धान खेतीमा लगानी बढाउनुपर्ने देखिन्छ।

चैते धानको तराई, मध्यतराई, मध्यपहाड र उच्चपहाडी क्षेत्रमा मात्र नभएर हिमाली जिल्ला ताप्लेजुड र सोलुखुम्बुमा पनि उत्पादन हुने देखिएको छ। बाह्रै महिना सिँचाइ सुविधा हुने केही ठाउँमा मात्र चैते धान लगाउँदै आइएको छ। सङ्घीय सरकारको प्रधानमन्त्री कृषि आधुनिकीकरण परियोजना

(PMAMP) अन्तर्गत धानको सुपर जोन, जोन, बल्क र पकेट कार्यक्रम छुट्याई चैते धानमा चक्लाबन्दी जस्तो प्रभावकारी कार्यक्रम कार्यान्वयनमा छ। प्रधानमन्त्री कृषि आधुनिकीकरण परियोजनाले चैते धान खेती विकास र विस्तारका लागि महत्व दिँदै आएको छ । यो परियोजनाअन्तर्गत ५७ हजार हेक्टरमा धानखेती हुने गरेकामा ७ हजार हेक्टरमा चैते धान खेती हुने गरेको छ । चैते धानका लागि पनि कृषि मन्त्रालयले बीउ, सिँचाइ, कस्टम हाइरिड सेन्टर (कृषि मेसिन औजार भाडामा लगाउने) लगायत विभिन्न प्रविधिमा सहयोग गर्दै आएको छ।

चैते धान खेतीका लागि बाह्रै महिना सिँचाइ सुविधा भएको जमिन चाहिन्छ। धान रोप्ने महिना नेपाली पात्रोको चैत्र महिना भएकाले यसलाई चैते धान नाम दिइएको हो भने बसन्त मौसममा खेति हुने गरेकोले अंग्रेजीमा Spring rice नाम प्रचलनमा छ। चैते धान खेतीले खाद्यान्न उत्पादन बृद्धिसँगै बाह्य चामलको आयात प्रतिस्थापन गर्नमा सहयोग पुऱ्याउने देखिन्छ। प्रधानमन्त्री कृषि आधुनिकीकरण परियोजनाले किसानलाई चैते धान खेतीको लागि बीउ तथा यान्त्रीकरणमा ५० प्रतिशत अनुदान समेत दिएको छ । सिँचाइ सुविधा सहज भएको ठाउँमा चैते धान खेतीको उत्पादन प्रतिहेक्टर ६० क्विन्टलसम्म रहेको छ। वर्षेनी दुई बाली मात्र खेती गरेका किसानले चैते धान खेतीसमेत गरेपछि तीन बाली घरमा भित्र्याउन सक्छन् ।

धानको बिउ उम्रन ब्याडमा राख्ने समयमा चिसो हुनाले तापक्रम बढ्न थालेपछि ब्याड राख्ने चलन छ। तर यसले चैते धानको समयावधि पर धकेली कटनको समयमा वर्षा भइ सुकाउन समस्या र कतिपय

नेपालमा चैते धान ...

स्थानमा वर्षे धान लगाउनलाई समेत ढिला हुनसक्छ। तसर्थ चैते धानको कटानी १०-१५ दिन अगाडि ल्याउन सकेमा कृषकलाई सहज हुने तथा धानको गुणस्तरमा सुधार भई कृषकले मूल्य बढी पाउने सम्भावना रहन्छ। तसर्थ, चिसो सहन सक्ने एवम् छिटो पाक्ने जातहरूको अंकुरित बीउ प्लास्टिकको टनेलमा नर्सरी ब्याड तयार गरी लगाउनुपर्छ।

चैते धान समयमै रोपेर मलखाद र पानी व्यवस्थापन गर्न सक्दा बढीभन्दा बढी उत्पादन गर्न सकिन्छ। चैते धानबालीमा मलखाद व्यवस्थापन गर्दा प्रति रोपनी ३०० किलो (१०-१२ डोको) कम्पोष्ट वा गोठेमल, ९.६ किलो युरिया, ३.२६ किलो डिएपी, २.५ किलो पोटास साथै १ किलो जिङ्क सल्फेट प्रयोगका लागि सिफारिस गरिएको छ। कम्पोष्ट र गोठेमललाई रोपाई गर्नुभन्दा १५ दिन अगाडि जोतेर माटोमा मिलाउनु पर्छ। युरियाको मात्रा तिन भाग लगाई (२:१:१ अनुपातमा) एक भाग रोप्नु अगाडि, एक भाग गाँज पलाएको बेला र अन्तिम भाग बाला आउने बेला छर्नु पर्दछ। नेपालमा रासायनिक मलको समस्या सधैं भइरहेको सन्दर्भमा नाइट्रोजन रसायन पूर्तिको लागि ढैंचा बिरुवा लगाएर जोत्न सकिन्छ। चैत महिनामा दिन लामो र रात छोटो हुने गर्दछ। आकाशमा बादल नलाग्ने बेला, सूर्यको ताप बढी हुने र सूर्यको किरणको शक्ति बालीको हरित कण (chlorophyll) मार्फत प्रकाश संश्लेषण (photosynthesis) प्रक्रिया बढी हुने भएकाले असारको तुलनामा चैतमा धान उत्पादन धेरै हुन्छ। आकाशमा कम बादल र बढी सुक्खा हुने भएकाले रोग/कीराको समस्या पनि कम हुन्छ। साथै असारको तुलनामा माटोमा पानीको मात्रा कम हुन गई झारपातको समस्यापनि कम हुने र व्यवस्थापन गर्न सजिलो हुने गर्दछ। असार महिनामा तराई भू-भागमा बाढीको एवम् चुरे तथा मध्य पहाडमा पहिरोको जोखिम हुने गर्दछ। त्यस्तो ठाउँमा चैते धान लगाई असार धान नलगाउने परम्परा स्थापित गर्न सके माटोको संरक्षण एवम् बाढी र पहिरोको जोखिम

न्यूनीकरण गर्न सकिने देखिन्छ। बढी पानी जम्ने, नहर क्षेत्र, तथा डुबान हुने क्षेत्रमा चैते धान उत्पादन बढी हुन्छ। बर्खे बाली जोगाउन समस्या हुने भएकाले चैते धान खेती गरिन्छ। किसान भने सिँचाइ असुविधा मात्र नभई परम्परागत खेतीका कारण चैते धान लगाउन नसकिएको बताउँछन्।

नेपाल कृषि अनुसन्धान परिषदले निकालेका नयाँ जातहरू ग्रामीण किसानसम्म पुग्न र स्थापित हुन अलिक समय लाग्ने गर्छ। बाह्रै महिना सिँचाइ सुविधा हुने केही ठाउँमा मात्र चैते धान लगाउने गरिएकामा अहिले ने.कृ.अ.प. (NARC) ले निकालेका नयाँनयाँ जातहरू सुक्खा सहन सक्षम (drought tolerant) भएकाले कम सिँचाइ हुने ठाउँमा पनि लगाउन थालिएको छ। तराई, भित्री तराई र नदी बेसिन क्षेत्रका लागि हालसम्म करिब ११ प्रजातिका चैते धान विकास गरिएको छ। यी सबै छोटो अवधिका प्रजातिहरू हुन् जसको दाना भने लामो हुने गर्दछ।

चैते धानमा सञ्चालित एकीकृत शत्रुजिव व्यवस्थापन (IPM) पाठशालाको अध्ययनबाट धानको जातीय परीक्षणमा चैते-५ को उत्पादन प्रति हेक्टर ७ टन देखिएको छ। त्यस्तै चैते स्थानीय रैथाने जातको उत्पादन प्रति हेक्टर ३ टन, चैते सानो उत्पादन प्रति हेक्टर दुई २.८ टन, चैते ठूलो उत्पादनप्रति हेक्टर ३ टन रहेको छ। अध्ययनबाट पराललगायत अन्य सबै कारणले किसानले चैते-५ मनपराएको देखिन्छ। अझै पनि मसिनो र छिटो पाक्ने जात कम छन्। पुराना सजिलै पाइने चैते धानका जात खाँदा त्यति मीठो नहुने किसानको गुनासो छ। हाल उपलब्ध चैते धानका धेरैजसो जात मोटो भएकाले किसान र उपभोक्तामाझ त्यति लोकप्रिय हुन सकेका छैनन्। तिनलाई चिउराका रूपमा बढी प्रयोग गरेको पाइएको छ। CH-45 तराईमा लोकप्रिय चैते धानको प्रजाति हो, तर यसलाई आंशिक रूपमा Chaite-2 र Chaite-4 ले प्रतिस्थापन गरेको देखिन्छ। बिन्देश्वरी प्रजाति

नेपालमा चैते धान ...

तालिका १. नेपालमा चैते धानको रूपमा सिफारिश भएका जातहरू

प्रजाति	सिफारीस वर्ष (वि.स.)	पाक्ने अवधि (दिन)	उत्पादन क्षमता (मे.टन/हे)	सिफारिस गरिएका क्षेत्रहरू
हर्दिनाथ-१	२०६०	१२०	४.०३	तराई, भित्री मधेश, नदी किनार (समुद्र सतह देखि ८०० मिटर उचाई सम्म)
हर्दिनाथ-३	२०७४	१२५	५.५	तराई, भित्री मधेश, नदी किनार, बेसी तथा समतल फाँट (समुद्र सतह देखि ७०० मिटर उचाई सम्म)
चैते-५	-	१२०-१२५	४.६	तराई, भित्री मधेश, नदी किनार, बेसी तथा समतल फाँट (समुद्र सतह देखि ७०० मिटर उचाई सम्म)
चैते-२	२०४४	१२५	४.६	तराईको सिंचित भूभाग
चैते-४	२०४४	११८	४.८	तराईको सिंचित भूभाग
चैते-६	२०४८	१२५	४.८	तराई र भित्री मधेश (समुद्र सतह देखि ३०० मिटर उचाई सम्मको सिंचित भूमि)
बिन्देश्वरी	२०३८	१२८	४.३	तराई र भित्री मधेश
CH-45	२०२३	११८	५.५	तराई भित्रिमधेश तथा मध्यपहाड

चैते धानको लागि उन्मोचित भएपनि मनसुनमा वर्षा हुने तराई भूभागमामा खेती गरिन्छ।

वर्षे धान भन्दा दोब्बर फल्ने भएपनि पर्याप्त सिँचाइको कमीले किसानहरू आकर्षित हुन नसकेका हुन्। चाहिएको समयमा मलखादको व्यवस्था मिलाउन नसक्दा पनि सोचेअनुरूपको उत्पादन हासिल गर्न नसकिएको हो। चैते धान लगाउँदा तीन बालीसम्म लगाउन मिल्छ, अन्य बालीभन्दा बढी फल्छ, र उत्पादकत्व पनि बढी हुन्छ। तर चैते धानलाई पानी बढी चाहिने हुनाले सिँचाइ असुविधाका कारण किसान त्यसतर्फ आकर्षित हुन नसकेको पाइन्छ। विशेषगरी चैते धान भित्र्याउँदा पानी पर्ने, किसान बेफुर्सदिला हुने र घाममा राम्रोसँग सुकाउन नसकिने हुँदा किसानले त्यति जागर गर्दैनन्। वर्षे धानबाली भित्र्याउन नपाउँदै बाढीले सखाप पार्ने बाढी प्रभावित क्षेत्रका किसानका लागि चैते धान खेती उपयुक्त छ।

पशुपालनका हिसाबले गाईवस्तुलाई चाहिने पराल उत्पादनका लागि पनि चैते धानको महत्व विगतमा धेरै थियो तर अहिले बर्सिम, टिवसेंटी, नेपियर जस्ता घाँसप्रतिको बाक्लो आकर्षणले परालको महत्व नबुझेर चैते धान लगाउनेको संख्यामा निकै कमी आएको हो। उचित समयमा सिँचाइ नहुने, झारपात एवम् रोग/कीराको एकीकृत

नेपालमा चैते धान ...

एकीकृत व्यवस्थापनमा किसानको लापरवाही र वर्षा अगावै (pre-monsoon) वर्षाका कारण चैते धानको उत्पादनमा कमी आएको देखिन्छ।

किसानले चैते धान असारमा भित्र्याउन भ्याइ-नभ्याइ भएर पूर्ण रूपमा नसुकाई भण्डारण गर्ने हुँदा धानलाई अर्को वर्ष बिउका रूपमा प्रयोग गर्न सम्भव भएको छैन। लगानीको तुलनामा आम्दानी बढी हुने भएपछि कृषक चैते धानप्रति आकर्षित भएका हुन्। चैतेधानको क्षेत्र विस्तार भए पनि बिक्रि वितरणका लागि भने समस्या हुने देखिएको छ। स्थानिय खाद्य संस्थानले चैते धान खरिद नगर्ने भएका कारण कृषकलाई आफूले उत्पादन गरेको धान बिक्रीमा समस्या हुने भएको हो। चैते धानमा चिस्यान बढी भएका कारण खरिद नहुने गरेको देखिन्छ। जेठको अन्तिम वा असार मध्यमा काटिने यो धान सुकाउन, विशेषगरी कुनै प्राविधिको विकास एवम् उपलब्धता हुनसके उत्पादनमा बृद्धि आउने देखिन्छ। चैते धानको क्षेत्र विस्तारमा नर्सरी व्यवस्थापन, झार/कीरा/रोग ब्यवस्थापन र बाली कटाई पछि सुकाउने कार्य (post-harvest drying) प्रमुख चुनौती हुन्। यस सन्दर्भमा चैते धानसँग सम्बन्धित प्राविधिहरूलाई एकितृत गर्न आवश्यक देखिन्छ।

खाद्य सुरक्षामा सरकारको ध्यानाकर्षण भएपनि, बर्खे धानको उत्पादन स्तर र उत्पादकत्वलाई हेर्दा सरकारले यसलाई उपेक्षा गरेको प्रतित हुन्छ। उन्नत जातको बिउ वितरण एवम् उपयुक्त सिँचाईको व्यवस्थापन स्थानीय तहबाटै हुन अत्यावस्यक छ। चैते धान खेतिको विस्तारले नेपालको वार्षिक धान-चामल आयात घटाउन साथसाथै कृषि गृहस्थ उत्पादन पनि बढाउने निश्चितप्राय छ। यसतर्फ सम्बन्धित सरोकारवालाको बेलैमा ध्यान जाओस्।

(हाल राष्ट्रिय धानबाली अनुसन्धान कार्यक्रम, NRRP-NARC, हर्दिनाथ, धनुषामा इन्टर्नको रूपमा कार्यरत शर्माले यो लेख धान प्रजनक/वरिष्ठ वैज्ञानिक अमृत

प्र. पौडेल र रबेन्द्र साहसँगको सोधपुछ र अन्य लेखका आधारमा तयार परेका हुन्।)

सन्दर्भ सामग्रीहरू

चैते धान सम्बन्धि जानकारीमुलक पुस्तक, बाँसगढी नगरपालिका, बर्दिया

<https://www.bansgadhimun.gov.np/>

नेपालमा चैते धान

<https://nagariknetwork.com/opinion/505101-1618895706.html>

धानमा आत्मनिर्भर बनाउन चैते धान खेती शुरु
<https://clickmandu.com/2017/04/14051.html>

चैते धान खेती विस्तार गरिँदै

<https://www.news24nepal.tv/2023/03/11/930956>

चैते धानले बनाउँछ आत्मनिर्भर

<https://gorkhapatraonline.com/index.php/news/16495>

चैते धानको क्षेत्र विस्तार

<https://www.karobardaily.com/news/20699>

चैते धान लगाउने घटे

<https://www.reportersnepal.com/2023/02/762576>

कृषि पत्रिका <https://krishipatrika.com/2021/06/21672/>

ढँचा मल, रासायनिक मलको विकल्पमा उत्तम

<https://gorkhapatraonline.com/news/18027>



<https://risingnepaldaily.com/>

फोटो १. चैते धान खेती।

मौरी पालनमा रमाउँदै नाति पुस्ता

प्रस्तुति – अमृत शर्मा

कृषि तथा वन विज्ञान विश्वविद्यालय, चितवन

इमेल: sharma1amrit@gmail.com



पछिल्ला केही वर्षहरूमा नेपालमा मौरीपालन व्यवसाय फस्टाउँदै गएको पाइन्छ। खासगरी मानिसहरू महको महत्वबारे सचेत हुँदै गएकोले महको माग नेपाली बजारमा बढेको बुझ्न सकिन्छ। विभिन्न प्रजातिका मौरीहरूको उपलब्धता एवम् प्रशस्त चरनक्षेत्रको समजोडले, नेपाल मौरीपालन व्यवसायमा ठूलो सम्भावना बोकेको मूलुकमा गनिन्छ। यहाँ पाइने प्रमुख मौरीका प्रजातिहरू एपिस् मेलिफेरा, सेरेना, ल्यवोरियोसा र डोर्साटा रहेका छन्, जसमध्ये मेलिफेरा र सेरेनालाई घरमै घर बनाएर व्यवस्थापन गर्न सकिन्छ।

कम लगानीमै राम्रो आमदानी हुने भएकोले ग्रामीण क्षेत्रहरूमा मौरीपालनलाई जीविकोपार्जनको एक दिगो आधारका रूपमा लिने गरिएको छ। मौरीहरू धेरै बोटबिरुवाको परागसेचनका लागि महत्वपूर्ण प्राणी हुन्। विश्वका प्रमुख खाद्यबालीको परागसेचनमा सहयोग गर्ने मौरीको आर्थिक देन करिब २३५-५७७ अर्ब अमेरिकी डलर प्रति वर्ष रहेको अनुमान गरिन्छ। यस अर्थमा पनि मौरीपालनले हुने लाभ मौरीजन्य वस्तु (जस्तै मह, पराग, मैन, रानी पदार्थ आदि) को दाँजोमा अन्न उत्पादनमा बढी हुने गर्छ। नेपालमा मौरीपालन एवम् महको प्रयोग प्राचीन कालदेखि भएको पाइन्छ। विभिन्न वैदिक लेखमा समेत महको महिमा उल्लेखित छ।

सुरुवातको चरण

नवलपुर जिल्लाको पूर्व (गैँडाकोट-८) मा अवस्थित “सागर मौरीपालन उद्योग” नेपालमा मौरीपालन-व्यवसायीकरणको सुरुवातकर्ता मानिन्छ। दुई कट्टा क्षेत्रफलमा फैलिएको यस उद्योगले केही थप ठाउँ

भाडामा लिएर आफ्ना गतिविधिलाई निरन्तरता दिँदै आएको छ। नेपालमा वि.सं. २०५१/५२ मा युरोपबाट मेलिफेरा जातको मौरी भित्रिएपछि, गैँडाकोटमा दुई घर मौरी पालेर, नविन सागर उपाध्यायले मौरीपालन प्रारम्भ गर्नुभयो। त्यसअगाडि उहाँले जिविकोपार्जनार्थ विभिन्न कृषि उद्यम गर्ने क्रममा भेडापालन समेत गर्नुहुन्थ्यो। “त्यसबखत उहाँलाई धेरै छिमेकीले जिस्क्याएछन्” नविन सागरका नाति एवम् हाल उद्योगका वित्त-व्यवस्थापक तथा संचालक (Finance and Operation Manager) सन्देश गौतमले बताउनुभयो। “सागरले डिगा नपालेर नभएको डिगा पालेर के होला”, हजुरबुवाका रोचक स्मरणबारे गौतमले भन्नुभयो, “मौरीपालन व्यवसाय स्थापित नभईसकेकाले, मौरीलाई डिगाको संज्ञा दिएर मानिसहरू मौरी व्यवसायीको खिसिटिउरी गर्थे।” अहिले त्यसप्रकारका वाक्यांश प्रयोग गर्ने मानिसहरू चकित छन्। धैर्य गरेर निरन्तर संघर्ष गर्नेहरू अन्तिममा सफल हुन्छन्, भन्ने भनाईको ज्वलन्त उदाहरण बनेको छ, सागर मौरीपालन उद्योग। नविनसागरले आफ्नो जीवनकालमा विद्यालय एवम् पुस्तकालय निर्माण लगायतका सामाजिक कार्य पनि गर्नुभयो।

आफ्ना पाँच छोराछोरीलाई भाग लगाउँदै गर्दा, नविनसागरलाई, आफ्नो व्यवसायमार्फत परिवारलाई जोड्ने विचार आयो। त्यसकै फलस्वरूप आज सागरपरिवार नातिपुस्तासम्म एक भएर व्यवसायिक कर्ममा अगाडि बढिरहेको छ। वि.सं. २०६३ मा सागर मौरीपालन उद्योगको नामले दर्ता भएको उद्योग, समयानुकूल विकाससँगै आज देशको एक महत्वपूर्ण उद्योगको रूपमा स्थापित भएको छ। हजुरबाका कुरा

मौरी पालनमा ...

सम्झदै गौतमले भन्नुभयो, “मौरी खाने चरा र अरिङ्गाल बर्खामा आउँदा, उहाँले एक चरा मारेको ५ रूपयाँ र एक अरिङ्गालको २५ पैसा दिनुहुन्थ्यो। हामी बिदा हुँदा गुलेली लिएर चरा एवम् अरिङ्गाल धपाउन लाग्थ्यौं। अहिले बुझ्दा हजुरबुबाले सबैलाई मौरीपालनमै समाहित गर्न यस्तो जुक्ति लगाउनुभएको रहेछ जस्तो लाग्छ।”

वार्षिक १० मेट्रिक टन मह उत्पादन

मौरीसँग गाढा प्रेममा पर्नुभएका सन्देश गौतमले MBA-Agribusiness तहसम्म अध्ययन गर्नुभएको छ। विषयगत विज्ञताका साथसाथै लगनशीलताले उहाँको काममा निपूर्णता ल्याएको देखिन्छ। “वर्षेनी करिव ५०० मौरी घर चरनको लागि लगिन्छ र औसत एक घरबाट २०-२५ किलोग्राम मह उत्पादन हुन्छ” युवा उद्यमी गौतमले भन्नुभयो। अधिकांश मेलिफेरा जातका भएपनि, केही मात्रामा सरेना समेत पालेको उहाँले बताउनुभयो। वार्षिक १० मेट्रिक टन मह उत्पादन मात्र नभई सागर मौरीपालन उद्योगले, ६-७ हजार मौरीका घर समेत निर्माण गर्छ। यसका अलावा ग्राफिटिङ्ग विधिवाट रानी उत्पादन गरेर बिक्री गर्छ। उद्योगमा मौरीजन्य अन्य उत्पादन (प्रोपोलिस, रोयल जेलि, मैन, भेनम) र मौरीपालनका अन्य उपकरण (पोलेन ट्रयाप, भेनोम एक्स्ट्र्याक्टर, सुरक्षाजन्य लुगा आदि) पनि उपलब्ध छन्। “अहिले यहाँबाट ७०-८० थरी साना-ठूला वस्तुहरू विक्री हुन्छन्” गौतमले भन्नुभयो। यहाँबाट उत्पादित सामान देशैभर जानेभएपनि महको खपत भने मुख्यगरी पोखरा, काठमाण्डौं, चितवन, बुटवल र हेटौँडामा हुनेगरेको गौतम बताउनुहुन्छ। यहाँ उपलब्ध महको नाम मौरी चर्ने बोटबिरुवामा आधारित हुन्छ। जस्तै फाफर, तोरी, चिउरी, लिची लगायतका बोटबाट उत्पादित महलाई युनिफ्लोरा महको नाममा प्याकेजिङ्ग गरिन्छ भने सिसौ, युक्यालिप्टस (मसलाबोट), रुदिलो लगायतका बोटबाट उत्पादित

महलाई जंगल मल्टिफ्लोराको नाममा प्याकेजिङ्ग गरिन्छ।

हाल १६ स्थायी कर्मचारीहरू कार्यरत यस उद्योगमा आवश्यकता अनुसार अन्य अस्थायी कर्मचारीहरू पनि नियुक्त हुन्छन्। यसरी उद्योगले मौरीजन्य पदार्थ उत्पादन सँगसँगै रोजगारी समेत सिर्जना गरेको छ। मौरीपालनमा कुल लागतको १५-२०% लाभांश प्राप्त हुनेगरेको उहाँले बताउनुभयो। पछिल्लो १५ वर्षको मात्रै कुरा गर्दा मह प्रतिकिलो ६५ बाट ९०० रूपैयाँसम्म पुगेको छ। नेपालमा खासगरी कार्तिक र चैत्र महिना मह उत्पादनको लागि प्रमुख महिना हुन। यी महिनामा हुने उत्पादन व्यवस्थापन हुन सके, आयात प्रतिस्थापन र निर्यात प्रवर्धन गर्न सहज हुने गौतमको बुझाई छ।

“हाम्रो उत्पादनमा विविधता भएकोले, बजारमा हाम्रा खास प्रतिद्वन्दी नै छैनन्। तथापी बजारमा आफ्नो अस्तित्व बनाईराख्न हामी सुलभ मुल्यमा गुणस्तरीय वस्तु उपलब्ध गराउँछौं। महको बजार मूल्य सरदार ९०० रूपैयाँ प्रति केजी भएपनि, हामी यहाँ ६००-८९० रूपैयाँ प्रति किलो बेच्ने गर्छौं” गौतम भन्नुहुन्छ। उद्योगसँग परिचित जोकोहीले यी कुरा अनुभूत गर्न



फोटो १. सागर मौरीपालन उद्योगमा उत्पादित विभिन्न नामका महहरू।

मौरी पालनमा ...

सक्छन्। मौरीजन्य वस्तु बिक्रीका अलावा यस उद्योगले कृषक एवम् नव-व्यवसायीलाई मौरीपालन एवम् घर निर्माणको तालिम प्रदान गर्छ। युवाहरूलाई स्वरोजगार बनाउने र महिलाहरूको सवलीकरण गर्ने पक्षमा सागर मौरीपालन उद्योगको प्रसंशनीय भूमिका रहेको देखिन्छ।

योजना र चुनौतीहरू

नेपालमा विषादी प्रयोगको दर (१७० ग्राम प्रति हेक्टर) अन्य देशको तुलनामा कम भएपनि यसले मौरीपालनको क्षेत्रमा भने प्रत्यक्ष असर गरेको छ। मौरीपालनका क्रममा प्रमुख ध्यान दिनुपर्ने विषयमा गौतमले चरन क्षेत्रको छनोट, विषादीको प्रकोपबाट सुरक्षा, मौसमको प्रतिकूलता एवम् सडकको समस्यालाई प्राथमिकतामा राख्नुभयो । घर सरसफाई एवम् निरीक्षणमा आफूहरू सजग रहेकोले, मौरीमा रोग र किराको प्रकोप नरहेको उहाँ बताउनुहुन्छ। “बजार व्यवस्थापनको कुरा गर्दा, पहिले महको उत्पादन भन्दा माग बढी भएकोले केही समस्या नभएपनि पछिल्लो दुई वर्षदेखि (कोरोना महामारी पश्चात्) माग भन्दा उत्पादन बढी भएकाले समस्या बढेको छ”, उहाँले भन्नुभयो। आगामी योजनाबारे प्रश्न गर्दा गौतमले, रानी प्रजनन लगायतका अन्य नयाँ प्रविधी देशमा भित्र्याएर नेपालमै मौरी अनुसन्धानको एक केन्द्र स्थापना गर्ने लक्ष्य रहेको बताउनुभयो।

उद्योगले सामना गर्नुपरेका चुनौतीहरूबारे गौतमले भन्नुभयो “कतिपय किसानले मौरीले बन्द नगरेका महकोष (uncapped honey cells) बाट पनि मह काढ्ने हुनाले महमा पानीको मात्रा बढी हुनेगर्छ। अर्को प्रमुख चुनौतीमा मानिसहरूको मौरीबारे रहेको गलत धारणा हो। दाङ, परासी, भैरहवा लगायत ठाउँमा मौरी चरनको लागि लग्दा मौरीले बोटबिरूवालाई क्षति गरेको र उत्पादनमा कमी ल्याएको भन्छन्, जबकि परागसेचनको लागि मौरी अपरिहार्य छ। कतिपयले भने, मौरीपालकलाई हुने फाईदा देखेर, गलत

नियतका साथ दुष्प्रचार गर्छन्। यस विषयमा सरकारले आम मानिसलाई सचेत गराउन जरूरी देखिन्छ।” “कहिलेकाहीं प्राकृतिक रूपमै मह दाना (crystallized) जस्तो देखिने गर्दा मानिसले चिनी मिसाएको आशंका गर्ने पनि उहाँले जानकारी दिनुभयो। महको ठोस शुद्धता नाप्ने उपकरण नभएर यो समस्या जताततै व्याप्त छ। “दुई वर्ष अगाडि हाम्रो एक किसानले, एन्टीबायोटिक (औषधी) प्रयोग गरेको भेटिएपछि, जापानको लागि निर्यात हुन लागेको २० टन मह बिचमै रोकियो। सानो गलतिले कहिलेकाहीं ठूलो नोक्सान निम्त्याउँछ। त्यसकारण पूर्ण सजगता अपनाउनुपर्छ”, गौतमले स्मरण गर्नुभयो।

सरल रूपमा वार्तालाप गर्न रूचाउने उहाँ सकारात्मक उर्जाले भरिपूर्ण हुनुहुन्छ। रामपुरका कृषि विद्यार्थीहरू उद्योग भ्रमणमा आउँदा उहाँ ठट्टा गर्नुहुन्छ, “यो हाम्रो व्यवसाय मौरीलाई कसरी झुक्क्याउने भन्नेमै केन्द्रिकृत छ। जस्तो कि यो हेर्नुस, यो पोलेन ट्रयापमा मौरी बाहिरबाट पराग लिएर पस्दा, सानो छिद्रको कारण मौरी मात्र भित्र पस्छ। खुट्टाको पराग भने बाहिरै झर्छ। सबै झरेको पराग सङ्कलन गरेर



फोटो २. मौरी घर निरीक्षण गर्दै गौतम।

मौरी पालनमा ...

हामी प्रशोधन गर्छौं। मौरीलाई थाहा हुन्न र पटक पटक पराग ल्याउँछ। हामी त्यही पराग प्रयोग गर्छौं। कहिलेकाहीं पाप गन्या जस्तो लाग्छ।” यस्तो सुनेर विद्यार्थीहरू गलल्ल हाँस्छन्। गौतम पुनः अर्को विषयवस्तु तर्फ लाग्नुहुन्छ। यसरी यो उद्योग विद्यार्थीको लागि पनि एक महत्वपूर्ण सिकाईकेन्द्र हुन पुगेको छ।

“मौरीबाट मैले अथक परिश्रमको पाठ सिकें, लगनशीलता एवम् अनुशासन सिकें”, गौतमले कुराकानीको अन्त्यतर्फ सुनाउनुभयो। “कहिलेकाहीं भने असहज परिस्थिती आउँछन्। साह्रै गार्हो हुन्छ। धैर्यता अँगाल्दै हिँड्नुपर्छ। युवा उद्यमीले बजारको समस्याबारे पनि सजग हुनुपर्छ। लक्ष्यमा अडिग रही धैर्यताका साथ अगाडि बढ्नु पर्छ” उहाँले भन्नुभयो।

अन्त्यमा

५५०० भन्दा बढी व्यवसायिक मौरीपालक भएको नेपालमा करिब २ लाख ५० हजार मौरीका घर रहेको मौरीपालक संघको आंकडाले देखाउँछ। प्रति घर २५

हजार देखि ७० हजारसम्म मौरी हुने एक घरबाट ५०-६० किलोग्राम सम्म पनि मह काढेको पाइन्छ। औसत उत्पादन भने २०-२५ केजी प्रतिघर रहेको छ। कुल गृहस्थ उत्पादनको १% भन्दा कम हिस्सा ओगटेको मौरीपालन व्यवसायले वर्षेनी करिब ४ हजार मेट्रिक टन मह उत्पादन गर्छ। छिमेकी चिन र भारतमा ठूलो बजार भएको यस व्यवसायलाई सरकारले विशेष प्राथमिकतामा राख्नुपर्ने देखिन्छ। यसको लागि सागर मौरी उद्योग जस्ता अग्रणी व्यवसायीको साथ, सहयोग र सहकार्यमा, आयात प्रतिस्थापन एवम् निर्यात प्रवर्धनका निमित्त पहलकदमी लिनुपर्ने देखिन्छ।

(रामपुर क्याम्पसमा कृषि स्नातक तहमा अध्ययनरत अमृत शर्माले सन्देश गौतमसँग गरेको संवादमा आधारित।)

सगर मौरीपालन उद्योग" बारे थप जानकारी लिनेको लागि तलको लिंक प्रयोग गर्न सक्नुहुनेछ:

<https://www.sagarbee.com/>



फोटो ३. चरनका क्रममा मौरीका घरहरू।



फोटो ४. टुनिको काठबाट बनेको मौरीका घरहरू।

For past issues of Agri-Connection, please visit:

<https://napaamericas.org/newsletter.php>

कृषि कविता

(नापाको तेस्रो द्वैवार्षिक बैज्ञानिक सम्मेलन-२०२२ अन्तरगत आयोजित कृषि कविता प्रतियोगितामा
तृतीय स्थान हासिल गर्न सफल कविता, बधाई छ रमेश प्रभात)

मानो रोपेर खेतमा

रमेश प्रभात
चितवन, नेपाल



रोप्दा रोप्दै धानको बीउ
खेतको आलीमै जन्मेको हुँ म
गोड्दा गोड्दै घैयाको बाली
बारीको कान्तामा हुर्केको हुँ म
हो, यस्तै छ मेरो अतीत
म किसानको छोरो !

मेरो मनभरि छपक्कै
असारि असार बसेको छ
फाँडेर मनको जङ्गल
उखेलेर प्रदूषित विचार
रोपेर मनभरि रङ्गीन सपना
असारि असार हुर्काएको छु
मैले मेरो मस्तिष्कमा !

पहिलै पारेर खेत
उब्जाउनु छ मैले धान
धान - नेपालीको शान
धान - नेपालीको पहिचान
जन्मैदा होस् कि मर्दा
न्वारानमा होस् कि बिहेमा
नभई हुन्न चामल
भित्र्याउनु चामलको रास
गुजुगुजे हिलोमा
रोप्छु म धानको बीउ
हो, म किसानका सन्तति !

विचार रोपेर पाखामा
फल्दो रहेनछ धान
हुर्कंदो रहेनछ खेती
हो, असारमा नरोपे धान
भदौमा के गोड्ने मैले?
मंसिरमा के भित्र्याउने घरमा?

सधैं चिन्ताले पिरोल्छ मन।
चिन्ता रोपेर मनको गहामा
चिन्ता बाहेक केही नफल्ने रहेछ
त्यसैले, तिमी पनि आऊ
यो गुजुगुजे हिलोमा
रोप एक मुठा धान !

नगरे खेती हामी भोकै पर्छौं
गाउँ भोकै पर्छ
सहर भोकै पर्छ
अरूको के कुरा
सिङ्गो देश भोकै पर्छ
त्यसैले,
नगरी खेती बस्न सकिदैन म !

कृषिप्रधान यो मुलुकमा
चिरेर खेतको छाती
कङ्क्रिट उमारेर खेतमा
के गर्दै छ यो सरकार?
खेती किन पर्दैन हँ?
उसको प्राथमिकतामा !

चिन्तित हुन्छु सधैं म
चैतको उखरमाउलो गर्मीमा
प्रतीक्षा म गर्दैछु
दकिंदो झरी सहितको
असारको पन्थ
मानो रोपेर खेतमा
मुरी फलाउनु छ मैले,
हुँ म,
म किसानको छोरो।

Association of Nepalese Agricultural Professionals of Americas (NAPA)

E-mail: napa@napaamericas.org

Website: www.napaamericas.org