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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 perspective 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!
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.
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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
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.
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 (Clocybe indica) on different agricultural substrates.
9. Biotransformation of cellulose by soil bacteria extracted from roots of medicinal plants growing in different regions of Nepal.
12. Growth analysis of broiler on different feed additives under the effect of blue and green led lights in Tulsipur, Dang.
15. Climate change impacts on apple production in Mustang district.

To ask questions about the RMG program, please contact: research@napaamericas.org
To support RMG initiatives, please visit: https://www.napaamericas.org/donate.php
Agri-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 grassroots-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.
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 germplasm 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 concerns 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-
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.

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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 prospective 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 re-structured into the Institute of Agriculture and Animal Science (IAAS). The institute was recently re-formed 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 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.
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).

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.
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

Association of Nepalese Agricultural Professionals of Americas (NAPA)
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 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.

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.
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).
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 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 rotationally 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.

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

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

Figure 2. Vertical photoplots used to assess the canopy development of browse species.
### NAPA Committees

<table>
<thead>
<tr>
<th>Committee Name</th>
<th>Chair</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executive Committee (EC) (2022-2024)</strong></td>
<td>President: Dr. Pradeep Wagle</td>
<td>Dr. Ramjee Ghimire, Mr. Bipin Neupane, Ms. Astha Pudasainee, etc.</td>
</tr>
<tr>
<td><strong>Student Coordination Committee (SCC)</strong></td>
<td>Chair: Mr. Madhav Parajuli</td>
<td>Mr. Bipin Neupane, Ms. Astha Pudasainee, etc.</td>
</tr>
<tr>
<td><strong>Membership Drive Committee (MDC)</strong></td>
<td>Chair: Dr. Ramjee Ghimire</td>
<td>Dr. Santosh Dhakal, Mr. Madhav Parajuli, Ms. Kabita Paudel, etc.</td>
</tr>
<tr>
<td><strong>Information Technology Committee (ITC)</strong></td>
<td>Chair: Dr. Dev Paudel</td>
<td>Dr. Bijesh Mishra, Mr. Bipin Neupane, Dr. Pramod Pokhrel, etc.</td>
</tr>
<tr>
<td><strong>Research/Policy Brief Editorial Committee (RBEC)</strong></td>
<td>Chair: Dr. Ramjee Ghimire</td>
<td>Dr. Lila Khatiwada, Dr. Pramod Pantha, Mr. Thaneshwor Bhandari, etc.</td>
</tr>
<tr>
<td><strong>Award and Recognition Committee (ARC)</strong></td>
<td>Chair: Dr. Uma Karki</td>
<td>Dr. Nanda P. Joshi, Dr. Aditya Khanal, etc.</td>
</tr>
<tr>
<td><strong>Global Journal of Agricultural &amp; Allied Sciences (GJAAS)</strong></td>
<td>Editor-in-Chief: Dr. Uma Karki</td>
<td>Managing Editors: Dr. Ananta Raj Acharya, Dr. Bharat Pokharel, etc.</td>
</tr>
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<td><strong>Women in Agricultural and Allied Professions (WAAP)</strong></td>
<td>Chair: Dr. Kripa Dhakal</td>
<td>Members: Ms. Prava Adhikari, Ms. Pushpa Pandey, Dr. Romy Das Karna, etc.</td>
</tr>
<tr>
<td><strong>Research and Capacity Building Committee (RCBC)</strong></td>
<td>Chair: Dr. Pramod Pokhrel</td>
<td>Members: Dr. Keshav Sharma, Dr. Santosh Dhakal, Dr. Sharad P. Marahatta</td>
</tr>
<tr>
<td><strong>Collaboration and Resource Building Committee (CRBC)</strong></td>
<td>Chair: Dr. Buddhi Gyawali</td>
<td>Members: Dr. Bharat Pokharel, Dr. Keshav Bhattarai, Dr. Krishna Paudel</td>
</tr>
<tr>
<td><strong>Webinar Committee (WC)</strong></td>
<td>Chair: Dr. Khusi Ram Tiwari</td>
<td>Members: Dr. Dilip Panthee, Dr. Rajan Shrestha, Ms. Sujata Bogati, etc.</td>
</tr>
</tbody>
</table>

**Endowment Fund Advisory Board (EFAB)**
- Chair: Dr. Megha N. Parajulee
- Directors: Dr. Pradeep Wangal, Dr. Lila B. Karki, Founding Chair
- Director/Member Secretary: Dr. Pradeep Wangal
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- Dr. Shital Poudyal, Dr. Shyam Kandel, Dr. Sushil Paudyal

**Collaboration and Resource Building Committee (CRBC)**
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- Members: Dr. Bharat Pokharel, Dr. Keshav Bhattarai, Dr. Krishna Paudel, Dr. Suraj Upadhya

**Webinar Committee (WC)**
- Chair: Dr. Khusi Ram Tiwari
- Members: Dr. Dilip Panthee, Dr. Rajan Shrestha, Ms. Sujata Bogati

**Agri-Connection, Volume 8, Issue 1 - March 2023**
**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: MyRepública, 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 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 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 Nepali government are some of the major reasons for stopping the recruitment of workers 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.
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)

<table>
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<tr>
<th>Member Category</th>
<th>Members</th>
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<tbody>
<tr>
<td>Founding life member</td>
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<tr>
<td>Life member</td>
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<td>Student member</td>
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<td>Associate member</td>
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<td>Regular member</td>
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<table>
<thead>
<tr>
<th>Student Member</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arjun Upadhyay</td>
<td>North Dakota State University</td>
</tr>
<tr>
<td>Bikash Adhikari</td>
<td>Mississippi State University</td>
</tr>
<tr>
<td>Deepak Subedi</td>
<td>University of Georgia</td>
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<tr>
<td>Mahesh Ghimire</td>
<td>University of Georgia</td>
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<tr>
<td>Manish Gautam</td>
<td>The University of Texas</td>
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<tr>
<td>Manila Karki</td>
<td>North Dakota State University</td>
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<tr>
<td>Om Prakash Ghimire</td>
<td>Clemson university</td>
</tr>
<tr>
<td>Samikshya Bhattarai</td>
<td>Texas A&amp;M University</td>
</tr>
<tr>
<td>Sandesh Poudel</td>
<td>University of Georgia</td>
</tr>
<tr>
<td>Sittal Thapa</td>
<td>North Dakota State University</td>
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<td>Sujan Ghimire</td>
<td>South Dakota State University</td>
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<th>Associate Student Member</th>
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<tbody>
<tr>
<td>Anugya Bhattarai</td>
<td>Agriculture and Forestry University</td>
</tr>
<tr>
<td>Alok Dhakal</td>
<td>Tribhuvan University, Institute of Agriculture and Animal Science, Paklihawa Campus, Nepal</td>
</tr>
<tr>
<td>Prashant Ghimire</td>
<td>Agriculture and Forestry University</td>
</tr>
<tr>
<td>Sandhya Adhikari</td>
<td>Institute of Agriculture and Animal Science, Nepal</td>
</tr>
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<tr>
<th>Life Member</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Indira Paudel</td>
<td>Carnegie Institution of Science</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Associate Life Member</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krishna Prasad Sapkota</td>
<td>UC Davis for Horticulture Innovation Lab project via FORWARD Nepal</td>
</tr>
</tbody>
</table>
Association of Nepalese Agricultural Professionals of Americas (NAPA)

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

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

<table>
<thead>
<tr>
<th>Membership Type</th>
<th>Fee</th>
<th>Eligibility</th>
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</thead>
<tbody>
<tr>
<td>Regular Member</td>
<td>USD 50 (for two years)</td>
<td>Individuals who hold at least an undergraduate or bachelor or equivalent degree in agriculture or allied areas</td>
</tr>
<tr>
<td>Student Member</td>
<td>USD 25 (for two years)</td>
<td>Current students of agricultural and allied areas of studies who are in good standing student status.</td>
</tr>
<tr>
<td>Life Member</td>
<td>USD 200 (one time)</td>
<td>Individuals having met regular/general member's category and pay defined dues at a time.</td>
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<tr>
<td>Life Member (eligible spouse)</td>
<td>USD 100 (one time)</td>
<td>Eligible spouse of Life members.</td>
</tr>
<tr>
<td>Family (Joint) Member</td>
<td>USD 15 (for two years) or USD 50 (one time for Life Membership)</td>
<td>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.</td>
</tr>
<tr>
<td>Associate Membership (Outside Nepal)</td>
<td>USD 25 (for two years) or USD 100 (one time for Life Membership)</td>
<td>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.</td>
</tr>
<tr>
<td>Associate Life Membership from Nepal</td>
<td>NPR 5,000 (one time)</td>
<td>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.</td>
</tr>
<tr>
<td>Associate Student Membership from Nepal</td>
<td>NPR 1,000 (one time)</td>
<td>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.</td>
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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](https://napaamericas.org/join-napa.php).
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 decided to make Prahlad sit in a fire with Holika. But to their surprise, Prahlad was not hurt but Holika disappeared in the fire. Hiranyakashipu was shocked and never did anything to Prahlad again. We celebrate Holi to show that good will triumph 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. Parbati, 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 Parbati’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.
Hummingbirds are beautiful birds of the 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!**
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 agro-nomic 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 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 latest French fashion initiated by Intermarche’ in 2014, of eating scarry, 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 costumer 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 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

![Figure 1. Ugly fresh produce in market in Australia](image-url)
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.

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The Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann) (Figure 1) is one of the world's most destructive fruit pests 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).

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 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.
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


Figure 3: STI execution method to control fruit fly. Source: IAEA, 2019
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 through, 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 federalism, 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 leaders 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 was 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 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


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
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 lading 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 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 Figure 3 (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


अर्थात वर्ष २०७७/७८ मा कृषि तथा अनुसार नेपालमा १४ लाख ७३ हजार हेक्टर क्षेत्रफलमा धान खेती भए ५३ लाख २१ हजार मेट्रिक टन धान उत्पादन भएको थियो र आफ्नो वॉर्डर उपादकक्षम ३.८९ मेट्रिक टन प्रति हेक्टर रहेको थियो। बालि विकास निदेशालयको तथ्याङ्क अनुसार धान खेतो देखि कुल गाईस्थल उत्पादनको केवल ८% ओगटेको ७ भने कृषि गाईस्थल उत्पादनमा २०% ओगटेको छ। करिब ६२% धान खेती असामा अर्थात वर्ष धानका रूपमा गरिदै आएको ५ भने करिब ६% चैते धानका रूपमा र ११% जाडो मौसम अर्थात माघो अन्तिममा रोपिदै आएको ५। सरकारले अवैध दुई धानमा प्रदान गरेको नेपाललाई धानमा आल्मिनिबर्ष बनाउन तीन वर्षसँग्कर निर्यात गर्ने उद्देश्यले तराईका जिल्लामा बृहत धान उत्पादन योजना सुरु गरेका हो। नेपाललाई धानमा आल्मिनिबर्ष बनाउन सरकारको बृहत धान वित्त योजना अन्तर्गत सिचाइको सुविधा भएको भावसागरमा चैते धान खेती प्रमुख धानका रूपमा विविध अनुसन्धान अनुसार चैते धानको उत्पादकत्व प्रति हेक्टर ५ टन रहेको ७ भने मुख्य सिजामा लगाइने वर्ष धानको उत्पादकत्व ३.१५ टन माघ रहेको ७। वर्ष धानमन्दा चैते धानको उत्पादन धारे भएकाले, धान उत्पादन धारा देखि र आल्मिनिबर्ष हुन चैते धान खेती नगाली वटाउसपर्ने देखिन्छ।

चैते धानको तराई, मध्यतराई, मध्यपहाड र उच्चपहाडको क्षेत्रमा मात्र नभए हिमाली जिल्ला तापलेजुङ र सोलुखुम्बुमा पनि उत्पादन हुने देखिन्छ। बालिह महिना सिचाइ सुविधा हुने केही ठाउँमा मात्र चैते धान लगाउँदै आइएको ५। सहस्वधैय सरकारको प्रधानमन्त्री कृषि आधुनिकीकरण परियोजना (PMAMP) अन्तर्गत धानको सुपर जोन, जोन, बलक्र र पकेट कार्यक्रम छूटबाट चैते धानमा चकलाबन्दी जस्तो प्रभावकारी कार्यक्रम कार्यान्वयनमा ५। प्रधानमन्त्री कृषि आधुनिकीकरण परियोजनाले चैते धान खेती विकास र विस्तारका लागि महत्त्वदिन्छ आएको ५। यो परियोजना अन्तर्गत ७६ हजार हेक्टरमा धान खेती नुने गरेको ५ हजार हेक्टरमा चैते धान खेती हुने गरेको ५। चैते धानको लागि पनि कृषि मन्त्रालयले बीउ, सिचाइ, कास्टम हाउर्ड सेन्टर (कृषि मैसिन औजार भाषामा लगाउने) लगायत विविधन प्रतिधिमा सहयोग गर्दै आएको ५।

चैते धान खेती नगाली बालिह महिना सिचाइ सुविधा भएको जमिन चहिन्छ। धान रोजन महिना नेपाली पात्रको चैत महिना भएकाले यस्तै चैते धान नाम दिइएको हो भने वस्तु मौसममा खेती हुने गरेकोले अंग्रेजीमा Spring rice नाम प्रचलनमा ५। चैते धान खेतीले खाद्यजन्तु उत्पादन बढ्इसै बाघ्य चामलको आयात प्रतिस्थापन गर्नमा सहयोग पुर्याउने देखिन्छ। प्रधानमन्त्री कृषि आधुनिकीकरण परियोजनाले किसानलाई चैते धान खेतीको लागि बीउ तथा यानीकरणमा ५० प्रतिशत अनुदान समेट दिइएको ५। सिचाइ सुविधा सहज भएको ठाउँमा चैते धान खेतीको उत्पादन प्रति हेक्टर ६० विव्हटलसम्म रहेको ५। वर्षी दुई बालि मात्र खेती गरेको बिसानले चैते धान खेतीसमेत गरेपछि तीन बालि धारा भित्ताउन सक्छन्।

धानको बिउ उमन व्यापार रासङ्ग समयमा चिसो हुनाले तापक्रम बढन थाइल्पछि व्यापार रासङ्ग चलन्छ। तर यस्तले चैते धानका समयावधि पर धालै कटनिको समयमा वर्ष भइ सुकाउन समस्या र कतिपय

आप्रवृत्ति -

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स्थानमा वर्ष धान लगाउनलाई समेट दिला हुनसक्छ। तस्थायै चैते धानको कटाई १०-१५ दिन अगाडि व्युँ उनसकमा कृष्कलाई सहज हुन्छ तथा धानको गुणस्तमा सुधार भर्ने कृष्कले मूल्य बढी पाउने सम्भावना रह्न्छ। तस्थायै, चिसो सहन सकने एवम छिटो पाको जातहरुको अनुकूल बीउ प्लास्टिकको टनलाई नसरी व्याप तयार गरी लगाउनुपर्छ।

चैते धान सम्मै रोपेर मलखाद र पानी व्यवस्थापन गर्न सक्दैर मानिसको बढी उत्पादन गर्न सकिन्छ। चैते धानलाई मत्रिमा मलखाद व्यवस्थापन गर्नु १५ दिन अगाडि जोतेर माटोमा भमलाउनु पर्छ। युरियाको मात्र तिन भाग लागाउँ (२:१:१ अनुपात) एक भाग रोप्नु अघाटि, एक भाग व्याप गर्नु भरोसो बेला र अवित भाग बाला आउने बेला छरू पर्दछ। नेपालमा रासायनिक मलको समस्या सच्चाई भइस्को सन्दभामा नाडक्त्रुकहरू रसायन पूर्तिको लागि धानको बीउ लगाउँएको छ। चैते महिनामा दिन लामो र रात छोटो हुने गर्दछ। आकाशमा बादल नलाग्ने बेला, सूर्यको ताप बढी हुने र सूर्यको कियनको झकिजको हरित कण (chlorophyll) माफित प्रकाश सान्चेर्ण (photosynthesis) प्रक्रिया बढी हुने भएकाप्रत्याः असारको तुलनामा चैतमा धान उत्पादन धेरै हुन्छ। आकाशमा कम बादल र बढी सुख हुने भएकाले रोग/कीरको समस्या पनि कम हुन्छ। साथै असारको तुलनामा माटोमा मानिसको मात्रा कम हुन्छ ज्ञानपत्रको समस्यापनि कम हुने र व्यवस्थापन गर्न सजिस्नु हुने गर्दछ। असार महिनामा तराई भु-भागमा बालीको एवम् घुरे तथा मध्य पहाडमा पहिरोको जोखिम हुने गर्दछ। त्यस्तो ठाउँमा चैते धान लगाउ असार धान लगाउने परम्परा स्थापित गर्न सके माटोको संरक्षण एवम् बाली र पहिरोको जोखिम न्यूनकरण गर्न सकिन्छ देखिन्छ। बढी पानी जपने, नहर क्षेत्र, तथा झरानु हुने क्षेत्रमा चैते धान उत्पादन बढी हुन्छ। बढी बाली जोगाउन समस्या हुने भएकले चैते धान खेती गरिन्छ। किसान भने सिंचाई असुविधा मानौ नभई परम्परागत हेतौको कारण चैते धान लगाउन नसकिएको बताउछन्।

नेपाल कृषि अनुसार तर्कधारा लिनका नयाँ जातहरु रामी रेमानस्तम्भ पुगन र स्थापित हुन अतिव सामय लाग्ने गर्दछ। बढी महिना सिंचाई सुविधा हुने केही ठाउँमा माटै चैते धान लगाउने गरिएको अहिलेने नै.कृ.अ.प. (NARC) ले निर्देशका नयाँ नयाँ जातहरु सुख्खा सहन सक्ने (drought tolerant) भएका यो सिंचाई हुने ठाउँमा पनि लगाउन थालिएको छ। तराई, भित्री तराई र नदी बेलोको क्षेत्रको लागि हालसम्म करिब ११ प्रजाती केही ठाउँमा चैते धान लगाउने गर्ने भएका नै.कृ.अ.प. (NARC) ले तनकालेका नयाँ नयाँ जातहरु कृषिकी एवम बाढी र पहिजलो र परम्परागत खेतीका कारण चैते धान लगाउन नसकिएको बताउछन्।

नेपालमा चैते धान...
चैते धानको लागि उन्मोचित भएपनि मनसुनमा वर्ष हुने तराई भूभागमा खेती हुन्छ। तराई र भभत्री मधेशको भसांर्चत भूभागमा, अगदिया धेरै अरूँ धेरै फल्छ र उत्पादकत्व बढी हुन्छ। तर चैते धानको लागि उन्मोचित भएपनि मनसुनमा वर्ष हुने तराई भूभागमा खेती हुन्छ।

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| CH-४५ | २०२३ | १२५ | ५.५ | तराई भिमी मधेश, थोम्पसनहाइड
नेपालमा चैते धान ...

एकीकृत व्यवस्थापनमा किसानको लापरवाही र वर्षा अगाडि (pre-monsoon) वर्षा कारण चैते धानको उत्पादनमा कमी आएको देखिन्।

किसानले चैते धान असारमा भित्र धान नसुकाई भण्डारण गर्न हुँदा धानलाई अर्को वर्ष बिचुका र प्रयोग गर्न सम्भव भएको छ। लगानीको तुलनामा आम्दानी बढी हुने भएपछि कृषि चैते धानप्रति आकर्षित भएका हुन। चैते धानको क्षेत्र विस्तार भए पनि विक्रि वितरणका लागि भले समस्या हुने देखिन्। स्थायिक साइ संस्थाले चैते धान खरिद नगर भएको कारण कृषिककारो आपूर्ति उत्पादन गर्ने धान बिक्रीमा समस्या हुने भएको हो। चैते धानमा विस्तार बढी भएका कारण खरिद नहुने गरेको देखिन्। जेठोको अन्तिम वा असार मध्यमा काठिन यो धान सुकाउन, विशेषतः मुनि प्रविधिको विकास एवम् उपलब्धता हुनसके उत्पादनमा फुंदै आउँस देखिन्। चैते धानको क्षेत्र विस्तार नसरी व्यवस्थापन, झार/कीरा/रोग व्यवस्थापन र बाली कटाई पछि सुकाउने कार्य (post-harvest drying) प्रमुख चुनौती हुन। यस सन्दर्भमा चैते धानसङ्ग समबन्धित प्रविधिहस्तलाई एकृत गर्न आवश्यक देखिन्।

लागि सुरक्षा नसकाई सरकारको ध्यानाकर्षण भएपछि, बर्षा धानको उत्पादन स्तर र उत्पादकत्वका हेदै सरकारले यसलाई उपेक्षा गरेको प्रतित हुनु। उन्नत जानको बितिवितरण एवम् उपयुक्त तिङ्ठाईको व्यवस्थापन स्थायीय तहबाटे हुन अत्यावश्यक छ। चैते धान खेतीको विस्तारले नेपालको वाणिज्य धान-चामल आयात घटाउन सत्कार खृषि गृहस्वरूप उत्पादन पनि बढाउने निश्चित प्राय । यसै विषयमा विशेषत निवेश दिनेको जाँसीको वेलेमा ध्यान जाँसी।

(हाल राष्ट्रिय धानवारी अनुसंधान कार्यक्रम, NRRP-NARC, हरिद्वार, धनुषामा इन्टरनको रूपमा कार्यरत शर्माले यो लेख धान प्रजननकार्य वैज्ञानिक अभ्यास।)

सन्दर्भ सामग्रीहरू

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

ढैंचा मल, रासायनिक मलको विकल्पमा उतम
पित्र र विद्या, जसलाई नेपालमा मौरी पालन विद्वानले राज्यालाई नेपाली बजारमा बढाउन सक्दै । यसलाई नेपालमा मौरी पालन विद्वानले वर्षभरमा नेपालमा मात्र हाल वित-व्यवस्थापन तथा संचालक (Finance and Operation Manager) सन्दर्भ गौरवको बजामा लिन सक्दै ।

अन्तर्राष्ट्रिय तथा राष्ट्रिय मौरी पालन विद्वानले नेपालमा मौरी पालन विद्वानलाई नेपालमा मौरी पालन विद्वानसँग घाँट बनाएर व्यवस्थापन गर्न सक्दै । कम संख्यको प्रधानको व्यवसायक हाल नेपालमा मौरी पालन विद्वानले नेपालमा मौरी पालन विद्वानसँग घाँट बनाएर व्यवस्थापन गर्न सक्दै ।

नेपालमा मौरी पालन विद्वानले नेपालमा मौरी पालन विद्वानलाई नेपालमा मौरी पालन विद्वानलाई नेपालमा मौरी पालन विद्वानको रूपमा स्थापन भएको छ । हजुरबुझका कुरा कृषक आवाज
मौरी पालनमा ...

समझदै गौतमले भन्नुभयो, “मौरी खाने चरा र अरिङ्गाल खुरी आउदा, उहाले एक चरा मारेको ५ रुपयो र एक अरिङ्गालको २५ पैसा दिनुनुहुन्छ। हामी बिदा हुंदा गुलेली लिए चरा एवम् अरिङ्गाल धपाउन लाग्नुहोस्। अहिले बुढाहु जुङ्गबाट सबैबाट मौरीपालनमा समाहित गर्न यस्तो जुङ्गबाट लगाउनुबाट रहेको रहेछ जस्तो लाग्छ।”

वारिक १० मेट्रिक टन मह उत्पादन

मौरीसौंग गादा प्रेममा पनुभएका सन्देश गौतमले MBA-Agribusiness तहसलम अध्ययन गर्नुभएको छ। विषयगत वित्तका साथसाथ लागाउनुभए उहाले काममा लिन्पुरिन्ता ल्याएको देखिएको। “वर्षको परिचय ५०० मौरी धार चरनको लागि लगिन्छ र औपनास एक घारबाट २०-२५ किलोग्राम मह उत्पादन हुन्छ” युवा उद्योगका भन्नुभयो। अधिकांश मौरीसौंग जातका भएपन, केही मात्रामा सर्नित समेत पालेको उहाले बताउनुभयो। वारिक १० मेट्रिक टन मह उत्पादन मात्र नभई सागर मौरीपालन उद्योगले, ६-७ हजार मौरीको घार समेत निर्निर्नाई गर्न। यसको अन्तर्गत ग्राफिटिङ्ग विधिबाट रानी उत्पादन गरे बिकी गरेका छ। उद्योगमा मौरीजन्य अन्य उत्पादन (प्रोपोलिस, रोयल जेलिंग, मैन, भेनसम) र मौरीपालनका अन्य उपकरण (पोलेन ट्राप, भेनोम एक्स्ट्रैक्टर, सुकाशाजन्य लुगा आदि) पनि उपलब्ध छन्। “अहिले यहाँ बाटौ ५०-६० थरी साना नूला वस्तुहरू विक्री हुन्छन्” गौतमले भन्नुभयो। यहाँ उद्योग उत्पादन सामान देशै देश भएपन महफेरा खप्त भने मुख्यगरी पोखरा, काठमाण्डौ, चितवन, बुढाहु र हेटौडामा हुनेको गौतमले भन्नुभयो। यसाँ उपलब्ध महको नाम मौरी चरन बोटबिचनामा आधारित गरेछ। जस्तो फाफर, तोरी, चिउनी, ढिरो लागायतका बोटबाट उत्पादित महलाई युनिफलोरा महको नाममा प्याकेजिङ्ग गरेछ भने सिसो, युक्तालिप्त (मसलाबोट), रुदिलो लागायतका बोटबाट उपलब्धिएको जियाजल मल्टिफलोरा नाममा प्याकेजिङ्ग गरियो।

हाल १६ स्थायी कर्मचारीहरू कार्यरत यस उद्योगमा आवश्यकता अनुसार अन्य अस्थायी कर्मचारीहरू पनि नियुक्त हुनेछन्। यस्तो उद्योगले मौरीजन्य पदार्थ उत्पादन संगबीत रोजगारी समेत सिर्जना गरेको छ। मौरीपालनमा कुल लागतको ८५-२०% लाभांश प्राप्त हुनेहरूको उहाले बताउनुभयो। पिछलो १५ वर्षको मात्र कुरा गर्दा मह प्रतिकिलो ६५ बाट १०० रुपैयाहुर गरेका छ। नेपालमा खासगरी कार्तिक र चेत्र महिना मह उत्पादनको लागि प्रमुख महिना हुन। यी महिनामा हुने उत्पादन व्यवस्थापन हुन सके, आयाम प्रतिस्थापन र लियोत प्रवर्थन गर्न सहज हुने गौतमले बुझिएका छ।

“हाम्रो उत्पादनमा विविधता भएकोले, बजारमा हाम्रा खास प्रतिगृहत नै छैनन्। तथापि बजारमा अपनो अस्तित्व बनाइएको हाम्री सुलभ मूल्यमा गुणात्मक वस्तु उपलब्ध गराउँछौ। महएको बजार मूल्य सरदार १०० रुपैयाँ प्रति केजी भएपन, हाम्रो यहाँ ६००-१०० रुपैयाँ प्रति रुपै बेचने गरिएको छ।” मौरी भतनुहुतछ।

उद्योगसौंग परिचित जोकोबीले यी कुरा अनुभूत गर्दै फोटो १. सागर मौरीपालन उद्योगमा उत्पादित विविधता नामका महहरू।
मौरी पालनमा ...

सक्छन्। मौरीजन्य वस्तु बिक्रीका अलावा यस उद्योगले कृषक एवं नव-व्यवसायीलाई मौरीपालन एवं घर निर्माणको तालिम प्रदान गर्नुहोस्। युवाहरूलाई स्वरोजगार बनाउने र महिलाहरूको सवोच्चको गर्न लक्ष्य सागर मौरीपालन उद्योगको प्रसंस्करणीय भूमिका रहेको देखिँछ।

योजना र चुनौतीहरू

नेपालमा विषादी प्रयोगको दर (१५० ग्राम प्रतिहे क्विक्टर) अन्य देशको तुलनामा कम भएको यसले मौरीपालनको क्षेत्रमा भने प्रत्यक्ष असर गरेको छ। मौरीपालनको क्रममा प्रमुख ध्वनि निर्माण दिनुपर्ने विषयमा गौतमले घरण क्षेत्रको छनोट, विषादीको प्रकाशकार सुरुवा, मौरीको प्रतिकृतता एवं सडकको समस्यालाई प्राथमिकतमा रूप दिन्छ। घरण सरस्कार एवं निर्माणमा आपूर्ति सजग रहेकोले, मौरीको रोग र किराको प्रकोप नथरेको उहाँ बाटनुहुन्छ।

"बजार व्यवस्थापनको कुरा गदाि, पहिले महको उत्पादन भन्दा माग बढी भएकोले केही समस्या नभएपनि परिस्थितिले दुई वर्षै चैक (कोरोना महामारी पश्चात्) माग भन्दा उत्पादन बढी भएकोले समस्या बढेको छ", उहाँले भन्नुहुन्छ। आगामी योजनाबारे प्रश्न गौतमले, रामपुरका कृषकवादिनी उद्योग भ्रमणमा आउने उहाँले ठुट्रा बाटनुहुन्छ, "यो हाम्रो व्यवसाय मौरीलाई कसरी झुक्ने भएको छ, जस्तै पौधो भएको छ, जस्तै को ठुम्दुल्लो, सानो हाम्रो एक ककसानले, एतटीबा ट्राइक (औद्योगिक) प्रयोग गरेको भएको छिमिपछि, जापानको सरकार भनेस्को कारण मौरीबाट चरनको लागि झूठ गर्न्छ, जबको परागसेवकको लागि मौरी पराग भन्दा बाहिरले छछ। बाहिरले राज सबै झरेको पराग सङ्कलन गरेर"

सरल रूपमा वार्तालाप गर्न स्वाभिमान उहाँले भनेसक्रि सकराटमक उजाले भरिपूर्ण हुन्छ। रामपुरका कृषि विद्याखंडहरू उद्योग भर्मणामा आउदा उहाँ ठुट्रा बाटनुहुन्छ, "यो हाम्रो व्यवसाय मौरीलाई भन्दा झुक्ने भएको छ, जस्तै को हेनुहुन्, यो पोलाइ त्याप्रचार मौरी बाटरानु रोक्ने पराग लिहिएको छ, सानो झिउनको कारण मौरी मात्र भन्दा पस्छ। खुट्रा पराग बन्ने बाहिरै झाँस। सबै झिउनी पराग सड़कलन गरिएको छ। दाङ, परागसेवको लागि मौरीबाट चरनको लागि झूठ गर्न्छ, जबको परागसेवकको लागि मौरी पराग भन्दा बाहिरले छछ। बाहिरले राज सबै झरेको पराग सङ्कलन गरेर"
मौरी पालनमा ...

हामी प्रशोधन गर्न। मौरीबाट थाहा हुन र पटक पटक पराग ल्याउँछ। हामी त्यही पराग प्रयोग गर्न। कहिलेकाही पाप गन्या जस्तै लाग्न।” यस्तो सुनेघर
विद्वानहरु गल्ला हाउँछ। गौतम पुनः अर्को विश्वासतर हरु लाग्नुहुन्छ। यस्तो यो उद्योग
विद्वानहरुले लागि पलट एक महत्वपूर्ण सिकाइकेन्द्र हुन पुगेको छ।

“मौरीबाट मैले अथवा परिश्रमको पाठ सिकेकौ, लगानशीलता एवम् अनुशासन सिकेकौ”, गौतमले कुराकानीको अन्तर्वित सुनाउनुभरो। “कहिलेकाही भने असहज परिस्थिति आउँछ। साई हाउँछ। धैर्यता ऑगलै डिंपुर्युप्रस्तु। युवा उद्योगीले बजारको समस्तिको पलट सजग हुनिपछ। लक्ष्यमा अडिङ रही धैर्यताको साथ अगाडि बढ्नु पर्नु।” उहाँले भनुभरो।

अन्त्यमा

५५०० भन्दा बढी व्यवसायिक मौरीपालक भएको लेखनमा कवित २ लाख ५० हजार मौरीका घाँट रहेको मौरीपालक संघको आंकडाले देखाउँछ। प्रति घाँट २५ हजार देखि ४५ हजारसम्म मौरी हुने एक घाँटबाट ५०-६० किलोग्राम सम्म पति मह काठेको पाइनुहो। औसत उत्पादन भन्दे २०-२५ केजी प्रतिघाँट रहेको छ। कुल गृहस्थ उत्पादनको १% भन्दा कम हिस्सा ओगटेको मौरीपालन व्यवसायले वर्षी करिब ४ हजार मेट्रिक टन मह उत्पादन गर्न। छिमेकी चिन र भारतमा ठूलो बजार भएको यस व्यवसायलाई सरकारले विशेष प्राथमिकतामा राख्नेछ। यसको लागि सागर मौरी उद्योग जस्ता अग्रणी व्यवसायीको साथ, सहयोग र सहकारिता, आयात प्रतिस्थापन एवम् निर्यात प्रवर्धनका निमित वहलकदमी लिनुपूर्व देखिनुहो।

(रामपुर क्याम्पसमा कृषि स्नातक तहमा अध्ययनवर अमृत शमालीले सतदेश गौतमसिंग गरेको सावादमा आधारित।)

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कृषि कविता

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तृतीय स्थान हासिल गर्न सफल कविता, बधाई छ रमेश प्रभात)

मानो रोपेर खेतमा

रमेश प्रभात

विद्वान, नेपाल

रोदा रोदे धानको बीउ
खेतको आँतीम जमेको हृङ्ग म
गाउदो गाउदो धेराको बासी
बारीक धानका मुद्दा कहरको हृङ्ग म
हो, पस्तै छ मेरो अतित
म किसानको छोरो !

मेरो मनभर छुपके असारे असार बसको छ
फडिङर मनको जहरले
उखेल उभिघट विचार
रोपेर मनभरे रहुनी सपना
असारे असार हुयको छु
मैले मेरो मस्तिष्कमा !

पहेले पारेर खेत
उभारुनु छ मैले धान
धान - नैपालीको धान
धान - नैपालीको पहिचाना
जनमेदा होस कि मर्दी
न्यारामा होस कि बिविबाह
न्महेल हुङ्ग पात्रा
भिराउनु पात्रको रास

gुज्जुनु गुज्जु हिलीमा
रोपेर मधानको बीउ
हो, म किसानका सन्तति !

विचार रोपेर पाठमा
फडीर रहेन्दर धान
हुडङ्गे हुडङ्गे खेती
हो, असारमा रोपेर धान
भद्रामा के गोठुङ्गे मैले?
मसिरमा के भिथाउने घरमा?

सर्दी जनकाले पिरोलछ मन।
विचार रोपेर मनको गझामा
विचार बाएक केही नफल रहेछ
स्वस्तैले, दिक्की दनि आउँ
एहुनु एहुनु हिलिमा
रोपेर एक मुझा धान !

नगरी खेती हाम्रो भके पछी
गाउ भके पछी
सहरे भके पछी
असारको के कुरा
सिङ्गटे देखि भके पछी
स्वस्तैले,
नगरी खेती ब्रह्म सबितकृङ्ग म !

कृषि धाने छु भुविनाका
सिङ्गटे खेतका छाती
कहरके उभारे खेतमा
के गाउ छ यो सहजार?
खेती किन पर्दै हुङ्ग?
उसको प्राकृतिकतामा !

सितित हुङ्ग सर्दी म
सेवको सेवमाउली गर्मीमा
प्रतीक्षा ग गद्दांछ
उदीदो इसी सहजातको
असारको पल्ला
मानो रोपेर खेतमा
मुरी मर्दाउनु छ मैले,
हो, म
म किसानको छोरो।

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