

Quarterly Newsletter

# AGRI-CONNECTION

December 2022 | Volume 7, Issue 4



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**PROSPERITY THROUGH AGRICULTURAL TRANSFORMATION**

## Message from the President

Dr. Pradeep Wagle  
NAPA President



Dear valued NAPA members and friends,

First of all, I would like to wish Happy New Year 2023 to valued NAPA members, families, and well-wishers. Also, I would like to wish you a Happy 7<sup>th</sup> NAPA Day (NAPA was officially registered on January 6, 2016 in the USA as a non-profit, non-governmental, non-religious, and non-political professional organization). On the occasion of NAPA Day, NAPA and Policy Research Institute (PRI), Nepal jointly organized a two-day (January 6-7, 2023) virtual symposium on “*Agricultural Policies and Practices in Nepal: Pathways for Transformation.*” The symposium collaborators were the 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). The symposium brought more than 500 participants together with 39 presentations from five different countries (USA, Canada, Nepal, Bangladesh, and Australia). I would like to congratulate the symposium organizing committee led by Dr. Buddhi R. Gyawali (Chair of NAPA’s Collaboration and Resource Building Committee) and Dr. Hari S. Neupane (Senior Research Fellow and Head of the Research Department at PRI, Nepal). I strongly believe that this event has provided a roadmap for the agricultural transformation in Nepal and beyond. In addition, this event greatly promoted NAPA into global prominence as a leading organization for professionals of Nepalese origin in agricultural and allied sciences.

On the occasion of NAPA Day, we also released the second issue of Ag. Poetry Compendium (कृषिका सुसेलीहरू: नापा कृषि-कविता संग्रह), which includes 54 poems written by poets currently residing in different parts of the world. I would like to congratulate the editorial board members, Dr. Bharat M. Shrestha, Ms. Ambika Adhikari Tiwari, and Mr. Dol P. Dhakal.

As I am writing this presidential remark, NAPA has recently closed the application deadline for the third phase of the Research Mini-Grant (RMG). A total of 69 research proposals have been received from undergraduate students at different universities and colleges across Nepal in a wide range of research areas. Currently, the Research and Capacity Building Committee (RCBC) is reviewing proposals with the help of subject experts. Further, we successfully completed the first round of subject-specific interactions among NAPA members with the primary goal of building professional networks among members at various stages of their careers. The second round of interactions will be announced soon. The webinar committee organized the 32<sup>nd</sup> webinar entitled “*Transformative pathway towards food sovereignty, circular economy, and agroecosystems health*” and presented by our General Secretary Dr. Nityananda Khanal in the past quarter. A panel discussion on “*Agro-biodiversity for Agricultural Sustainability*” has already been announced for February 19, 2023 on the occasion of the “National Agro-biodiversity Year (BS 2079).”

Since its first inception in 2016, the past 24 issues of our Agri-Connection (AC) have effectively communicated numerous historical achievements of NAPA. I would like to acknowledge the hard work of our past and current AC editorial teams and express my heartfelt thanks to all of them for bringing this NAPA’s flagship newsletter to its current height. This current issue of AC mainly contains the highlights of NAPA activities and accomplishments, an article on global food security, a success story of a grower in Nepal who has been promoting organic agriculture for the last 30 years, committee updates, and NAPA’s engagement in various social and charitable junctures.

I kindly request our members and beyond to share intellectual ideas, opinions, thoughts, perspectives, literary creations, kids’ creativities, and accomplishments with our AC Editorial Team at newsletter@napaamericas.org. Finally, I would like to thank you all for your continued solidarity and support to bring NAPA to this height.

(Note: This issue was delayed and released at the end of January 2023, therefore, the presidential message contains some information from January events - Editorial Board).

# Editorial

Healthy human-food relationships are paramount to the development of a circular and solidarity economy that strengthens socio-economic resilience and promotes human and social values through diversity, efficiency, and synergy. Several countries around the world are adopting “Agro Ecology” models that embrace the socio-cultural, political, economic, and environmental aspects of agriculture and are based on the principle of “working with nature.” The “Go biointensive” model in Kenya, Low external input systems in Ethiopia, the Community seed fair/bank approach in Zimbabwe and Uganda, and the Promotion of locally adapted or underutilized crop species in Zambia and Malawi are some examples, which can provide good lessons for Nepal and other countries.

Agroecology is a holistic bottom-up approach helping to deliver contextualized solutions to local problems. Participatory research, experiential learning, and a combination of science with indigenous local knowledge are greatly emphasized. Agroecology seeks to transform food and agricultural systems by addressing the root causes of problems in an integrated way providing long-term solutions. Further, agroecology calls for transparent, accountable, and inclusive governance mechanisms to create enabling environment that fosters cooperation between stakeholders, reduces the use of external inputs, and minimizes trade-offs at different levels.

To discuss and synthesize various issues inherent to inadequate agricultural growth in Nepal and recommend transformative and pragmatic policies, programs, and practices, NAPA and Policy Research Institute (PRI-Nepal) in coordination with several governmental and non-governmental agencies recently organized a two-day virtual symposium. Presented papers are listed in this issue. NAPA also hosted a webinar focusing on agroecological approaches. As a highlight of sustainable farming practices, this issue includes a grower’s experience who has been promoting organic farming for the last 30 years. An article on “advancing agriculture for global food security” also makes this issue very special to our readers. As usual, this issue summarizes NAPA’s initiatives and achievements in organizational development, networking, research funding, and philanthropy.

## AGRI-CONNECTION Editorial Board



**Dr. Sushil Thapa**  
*Editor-in-Chief*



**Dr. Sanjok Poudel**  
*Editor*



**Dr. Sita Thapa**  
*Editor*



**Mr. Amrit Sharma**  
*Nepal Correspondence*



**Mr. Tikaram Wagle**  
*Nepali Editing*

### Guest Editors:

Dr. Bharat Shrestha  
Dr. Bijesh Mishra

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**Publisher**

Association of Nepalese Agricultural Professionals of Americas (NAPA)

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



## Call Announced in November 2022

Agricultural Policy Symposium - Virtual

### Agricultural Policies and Practices in Nepal: Pathways for Transformation

January 6-7, 2023

Poush 23-24, 2079

Registration: [www.napaamericas.org/agpolicysymposium.php](http://www.napaamericas.org/agpolicysymposium.php)



#### Schedule

Date	USA Central Time	Nepali Date	Nepali Time
Jan 6, 2023	6:15 PM – 10:15 PM	Poush 23	6:00 AM – 10:00 AM
Jan 7, 2023	6:15 AM – 10:15 AM	Poush 24	6:00 PM – 10:00 PM
Jan 7, 2023	6:15 PM – 10:15 PM	Poush 24	6:00 AM – 10:00 AM

#### Organizers



Association of  
Nepalese Agricultural  
Professionals of  
Americas (NAPA)



Policy Research  
Institute (PRI)  
(Think Tank of the  
Government of Nepal)

#### Collaborators

Ministry of Agriculture and Livestock Development (MoALD)  
Nepal Agricultural Research Council (NARC)  
Agriculture and Forestry University (AFU)  
Institute of Agriculture and Animal Sciences (IAAS, TU)  
Nepal Agricultural Cooperative Central Federation Ltd. (NACCFL)  
Society of Agricultural Scientists-Nepal (SAS-Nepal)

## Selected Papers for the Symposium

SN	Presentation Titles	Author(s)
1	An Overview of Urban Soil Contamination and Need for Soil Quality Assessment Guidelines in Nepal	<i>Birendra Sapkota*, Roshan B. Ojha*, Hemu Kharel Kafle, Ambika Paudel, Shova Shrestha, Santa M. Rai, and Sujan Maharjan</i>
2	Waste Management in Nepal	<i>Sabina Devkota*, Geeta Bhattraai Bastakoti, and Shree P. Vista</i>
3	Promotion of Organic/Ecological Agriculture for Safe Food Production in Nepal	<i>Hari Bahadur K.C.</i>
4	Policy and Enabling Environment for Organic Agriculture	<i>Maheswar Ghimire*, Bhola K. Shrestha, Basudev Kafle</i>
5	Implementing Scientific Land Reform for Climate Resilient & Sustainable Agriculture Yields in Nepal	<i>Bishwa Acharya*, Keshav Bhattarai, , Buddhi Gyawali, and Bharat Pokharel</i>
6	Sustainable Transformation of Agri-food Systems in South Asia: Agroecological & Circular Economic Perspectives	<i>Ganga D. Acharya</i>
7	New Paradigm for Agricultural Sustainability, Food Sovereignty, and Endogenous Circular Economy	<i>Nityananda Khanal* and Sushil Thapa</i>
8	Assessment of Agricultural Trade and Policies in Nepal	<i>Arun G.C.</i>
9	Socio-economic Importance of Agriculture to Nepal	<i>Sabin Basi*, Shobha Poudel, and Bishnu R. Upreti</i>
10	Strengthening National Agricultural Research System for Sustainable Agricultural Development	<i>Shreemat Shrestha* et al.</i>
11	Policy Gaps and Practices on Genetic Diversity, the Heterogeneous and Localized Evolutionary Population as well as Native Landraces in Agriculture of Nepal	<i>Bal K. Joshi</i>
12	Crop Genetics and Breeding Policy for Agricultural Transformation in Nepal	<i>Khusi R. Tiwari*, Dilip R. Panthee, Bal K. Joshi, Kalidas Subedi, and Mahendra Tripathi</i>
13	Intellectual Property Rights and Plant Breeding in Nepal	<i>Dilip R. Panthee*, Khushi R. Tiwari, Bal K. Joshi, and Kalidas Subedi</i>
14	Policies for Livestock Sector Development in Nepal: Status, Gaps and Challenges	<i>Surendra Karki* and Santosh Dhakal</i>
15	कृषि उद्यमशीलताको आवश्यकता र अवसरहरू (Ag Entrepreneurship: Opportunities and Policy Needs)	<i>Rajaram Thapa</i>
16	कृषि सञ्चार सुधारका बाटाहरू (Nepali Ag. Media: Challenges and Policy Needs)	<i>Manoj Shrestha</i>
17	Agribusiness and Supply Chain Management Policies in Nepal: A Temporal Dynamics	<i>Rajendra P.Mishra* and Indra H. Paudel</i>
18	Cooperatives as the Pillar of Economy to Improve Agriculture Production & Marketing	<i>Rudra Bhattarai* and Meena Pokhrel</i>
19	Public-private Cooperative Partnerships for Scaling Commercial Maize Production in Nepal: Linking Innovations with Policy	<i>Dyutiman Choudhary*, Narayan P. Khanal, Naba R. Pandit, Dilli KC, and Krishna P. Timsina,</i>
20	Novel Agricultural Policies Formulation on Farm-to-Table Interventions to Improve Food and Nutrition Security/Safety in Nepal: A Unique Interconnecting Ternary Approach	<i>Atul Upadhyay</i>

## Selected Papers ...

SN	Presentation Titles	Author(s)
21	Modeling Food Security in Nepal	<i>Keshav Bhattarai*</i> , <i>Shiva P Gautam</i> , and <i>Buddhi Gyawali</i>
22	Complementing Food and Nutrition Security in Nepal	<i>Sundar Tiwari</i> , <i>Krishna P. Timsina</i> , <i>Subir Singh</i> , <i>Meghnath Dhimal</i> , <i>Durga Poudel</i> , <i>Ravi Kafle</i> , <i>Megha N. Parajulee</i> , <i>Khusi R. Tiwari</i> , <i>Kishor Bhattarai</i> , <i>Dilip Panthee</i> , <i>Bed P. Khatiwada</i> , <i>Krishna Belbase</i> , and <i>Peetambar Dahal*</i>
23	Informing Food Security Policy for Sustainable, Sufficient, Safe, and Healthy Foods in Nepal	<i>Drona P. Rasali*</i> , <i>Prem B. Bhandari</i> , <i>Uma Karki</i> , <i>Megha N. Parajulee</i> , <i>Ram Acharya</i> , <i>Raju Adhikari</i> , and <i>Lila B. Karki</i>
24	Ensuring Food Safety for Food Security: Streamlining Women and Youth Roles on Food Safety in Nepal	<i>Aditya R. Khanal*</i> , <i>Ramhari Timilsina</i> , and <i>Rita Gurung</i>
25	Research and Technology Innovation Policy Provisions, Gaps, and Issues in Nepalese Agriculture	<i>Krishna P. Timsina</i> , <i>Devendra Gauchan</i> , <i>Sabin Basi</i> , and <i>Mahesh Jaishi</i>
26	Research-Policy Interface in the Agriculture Sector of Nepal: Status and Potential	<i>Deepak K. Khadka*</i> , <i>Sabin Basi</i> , and <i>Uttam B. Shrestha</i>
27	Strengthening Agricultural R-E-E in Nepal	<i>Ram K. Shrestha</i> and <i>Mahesh Jaishi</i>
28	Land Grant Model of U.S. Universities and Lessons for Revitalizing Nepalese Agricultural Institutions	<i>Megha N. Parajulee*</i> , <i>Lila B. Karki</i> , <i>Uma Karki</i> , and <i>Nanda P. Joshi</i>
29	Policy Options and Pathways for Strengthening Research-Extension-Education Linkages for Sustainable Agri-Food System Transformation in Nepal	<i>Devendra Gauchan*</i> , <i>Krishna P. Timsina</i> , <i>Ram K. Shrestha</i> , and <i>Mahesh Jaishi</i>
30	Integrating Research, Education, and Extension Services Among the Government, Universities, and Stakeholders: Best Practices and Lessons Learned from the USA and Implications for Nepal	<i>Krishna Paudel*</i> , <i>Buddhi Gyawali*</i> , and <i>Nav Ghimire*</i>
31	Current Status and Future Direction of Agricultural Education in Nepal	<i>Arjun K. Shrestha*</i> and <i>Ram Hari Timilsena</i>
32	Water, Energy, Food and Ecosystem (WEFE) River Basin Nexus Policy Paradigm for Multisector Infrastructure Development of Nepal	<i>Gopi Upreti</i>
33	Legalization of Cannabis in Nepal: Regulatory Policy and Economic Development	<i>Niranjana Aryal</i>
34	Digitalization of Agriculture and Food Systems	<i>Ramjee P. Ghimire</i> and <i>Kiran Bamanu</i>
35	Agricultural Policy Coordination between Federal, Provincial, and Local Level	<i>Tek B. Thapa</i> and <i>Niranjana Timilsina</i>
36	Agricultural Policy Coordination between Federal, Provincial, and Local Levels	<i>Tek B. Thapa</i>
37	Local Government Framework for Agriculture Service Delivery at Municipality Level	<i>M. Jaishi*</i> , <i>Govinda P. Sharma</i> , <i>Purna B. Nepali</i> , <i>Devendra Gauchan</i> , <i>Ram K. Shrestha</i> , <i>Krishna P. Timsina</i> , and <i>Huma Neupane</i>
38	Innovations in Agricultural Program Evaluation: What Can We Learn and Adapt?	<i>Sunita Pandey*</i> , <i>Lila K. Khatiwada</i> , <i>Shriniwas Gautam</i> , <i>Ajoy Bista</i> , and <i>Ramjee P. Ghimire</i>

# NAPA Conference 2022: Survey Report

NAPA organized its third international biennial conference from May 27-30, 2022, in Atlanta Georgia in a hybrid mode. NAPA encouraged students to participate in the conference, share their scholarly works, and network with professionals. A significant number of students participated in this conference. Besides the Conference Organizing Committee, NAPA sub-committees, several volunteers, and sponsors contributed to the success of this conference. NAPA would like to extend appreciation for their support and contribution towards the success of the conference.

Scientific oral and poster presentations, sports and literary events, senior corners, panel discussions on agricultural policies, and financial literacy were included in the conference. Presenters were from diverse backgrounds such as students, faculties, government employees, non-profit professionals, and industry employees. One hundred and fifty professionals (60 in-person and 90 virtually) attended the conference. A keynote speech, Annual General Meeting, election of the new executive committee, felicitation of a veteran agriculturalist, awards to the best poster and oral presentations, and essay authors were the other highlights of the conference.

A survey was administered among conference participants as well as NAPA members but who did not participate in the conference, a week after the conference to assess the conference's success and solicit feedback for future events. This report highlights the results of that survey. The majority (97%) of the 35 respondents to the survey were those who attended the conference. More than half (59%) out of 34 respondents indicated they participated in the conference virtually (Figure 1).

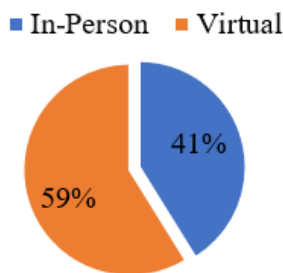


Figure 1. Mode of conference attendance.

More than half of the respondents were NAPA members and the remaining 50% of non-members were interested in joining NAPA (Figure 2). Most of the respondents attended the second day followed by the third day and only 30% indicated they attended the first day of the conference (Figure not presented).

■ Yes ■ No ■ No but interested

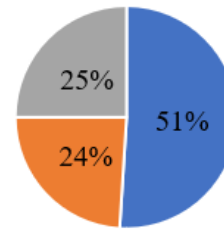


Figure 2. Membership stature of conference participants.

The overwhelming number of the respondents (80%) indicated the keynote speech on “Sustainable Agriculture Intensification Under Changing Climate” was very effective or effective or moderately effective, while 64% of the respondents said so for “Navigating Your Career in Industry: An Agriculture Industry Perspective” (Figures 3 and 4).

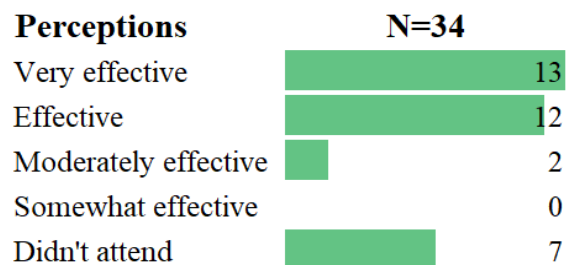


Figure 3. Survey participants’ view for keynote speech on “Sustainable Agriculture Intensification Under Changing Climate.”

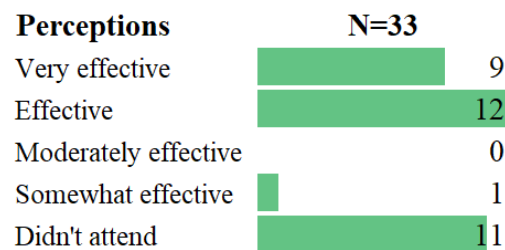


Figure 4. Survey participants’ view for keynote speech on “Navigating Your Career in Industry: An Agriculture Industry Perspective.”

Seven in every ten respondents (70%) indicated that the amount of information they received about the conference was sufficient.

When asked, various aspects of the conference theme are indicated to be excellent by over 70% of the respondents followed by oral presentations by 61%, conference hall by 50%, and poster sessions by 47%. Only 17% gave an excellent rating to social and cultural events, then to scheduling and timing (27%) (Figure 5).



# NAPA Conference ...

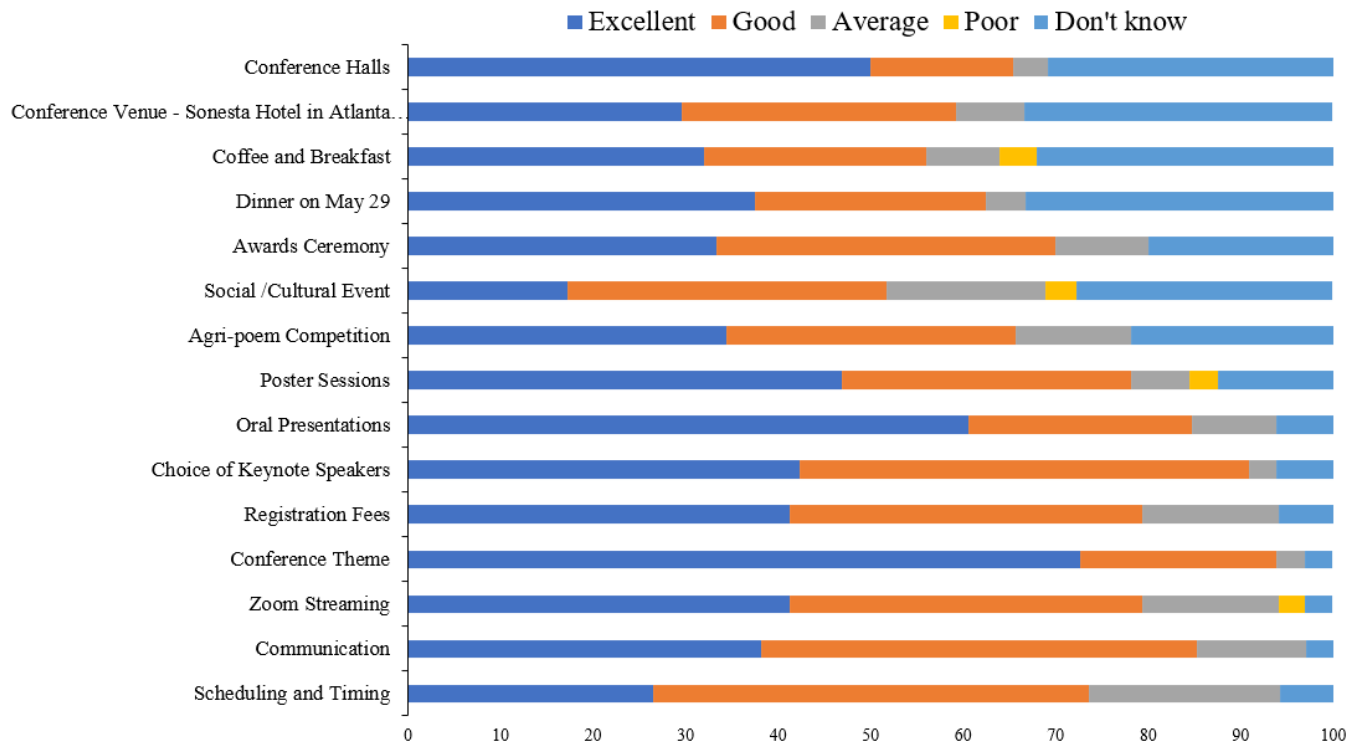


Figure 5. Perceptions on various aspects of the conference.

The NAPA website (62%) and email (56%) were the key sources of information for the respondents to know about the conference (Figure 5).

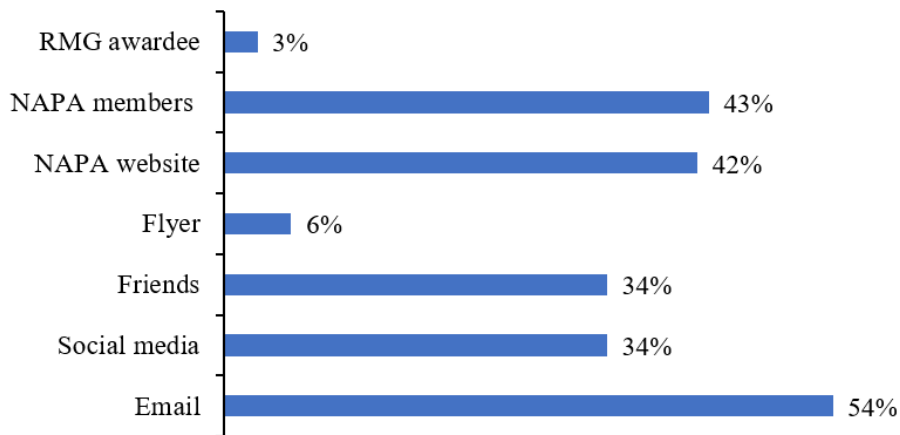


Figure 6. Source of information about the conference (participants selected more than one option)

Overall, the conference was perceived well by respondents. Out of the 33 respondents who participated in the post conference evaluation survey, 30% felt the conference was excellent, 52% indicated it very good and 18% gave a good rating. None rated fair and poor (Figure 7).

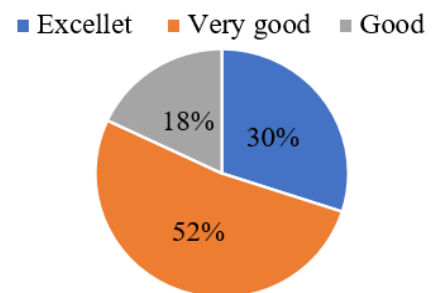


Figure 7. Conference rating by the survey participants.

## NAPA Conference 2022: Survey ...

For a deeper understanding of how the conference attendees found various aspects of the conference such as organization of the conference, schedule of the conference, what were their most liked and least liked parts of the conference, how was their experience of using the Zoom, what events they would want to see included in the future conferences, and what suggestions they would offer to improve future conferences, seven open-ended questions were asked to them. NAPA has received several important suggestions from the conference participants. Those suggestions will be used for the internal review and program evaluation, and necessary improvements will be assured in the future events.

### Conclusions

Overall, the conference was received and perceived very well by respondents. The respondents highlighted issues and challenges such as difficulty coping with the time zone difference, not being provided with the program agenda on time, social and cultural program being s not organized well, no or limited provision of foods/coffee to participants, conflict of schedule among major events such as agri-poem and RMG presentations. Their suggestions to address these issues and host career fairs, organize city tours and encourage more in-person participation are very timely and genuine. Also, suggestions to schedule additional professional sessions such as about research methods targeting student participants and organizing livelier and more fulfilled social-cultural events are highly appreciated, and it is hoped that new executive committees would consider addressing these suggestions in future conferences.

(This report is prepared by Dr. Ramjee Ghimire, NAPA Vice-President).

NAPA President Dr. Pardeep Wagle donating blood in Oklahoma City on the occasion of NAPA DAY 2023!



## Please contribute to NAPA Endowment Fund

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**Memo:** Write 'NAPA endowment fund.'

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

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

## Research Mini-Grant 2022-2023

The Research Mini-Grant (RMG) is one of the flagship programs of NAPA supporting students in Nepal pursuing degrees in agriculture and allied sciences. The program provides financial as well as mentorship support necessary to undertake the research. The Research and Capacity Building Committee (RCBC) has been administering this program for the last four years. The RCBC has successfully completed its two grant cycles supporting students and early-career researchers through a total of 33 research projects initiated in 2017 and 2019. The RCBC worked closely with the research teams comprising the student researchers, local academic advisors (usually, university faculty), and advisors from NAPA to boost the research skills of students enabling them to excel in higher education and professional careers. The RCBC announced its third call for proposals in late November 2022. The call was specifically for students from post-secondary academic and vocational institutions in Nepal to continue their research in 2023. Continuing the legacy of the past high-quality proposals, NAPA received many proposals to address knowledge

gaps and contribute to innovations toward the development of economically viable, socially just, and environmentally sustainable plant and animal-based agricultural systems and natural resource management. A total of 69 research proposals have been received from the students at Tribhuvan University, Agriculture and Forestry University, Far-Western University, and Purbanchal University. Branch campuses within a university were also well represented in this submission. The majority of the submissions were from the colleges in Bardibas (Mahottari), Bhairahawa (Rupandehi), Gauradaha (Jhapa), Rampur (Chitwan), Sundarbazar (Lamjung), Tikapur (Kailali), and Lamahi (Dang). We have received proposals in a wide range of subjects, including agronomy, crop science, horticulture, entomology, plant pathology, animal science, and other allied disciplines. Currently, review of proposals is underway with the help of subject experts. The RCBC ranks received proposals through blind review process and awards the selected proposals based on their quality and merits.

## Do you know NAPA Publishes a Journal?

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PROCEEDINGS**



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## Socio-Economic and Cultural Committee (SECC)

NAPA launches diverse research, outreach and collaborative activities in agriculture and allied disciplines through various specialized committees in pursuit of its objectives. Socio-Economic and Cultural Committee is one of the committees contributing to those objectives.

### Vision

Socio-economic well-being and cultural pride amongst members for Social Harmony.

### Mission

To promote cultural values and socio-economic vitality in the community for innovation, discourse, knowledge sharing, capacity building, and charitable services.

### Prospective Activities

1. Financial Literacy Programs
2. Literary contributions to Agri-Connection
3. NAPA Day Celebration (Blood Donation, Poem Competition, Cultural Program, etc.)
4. Charitable Activities
5. Cultural Promotion
6. Relief Program
7. Identity Protection
8. Sports

### Committee Members

#### Chair

Mr. Dol P. Dhakal

#### Members

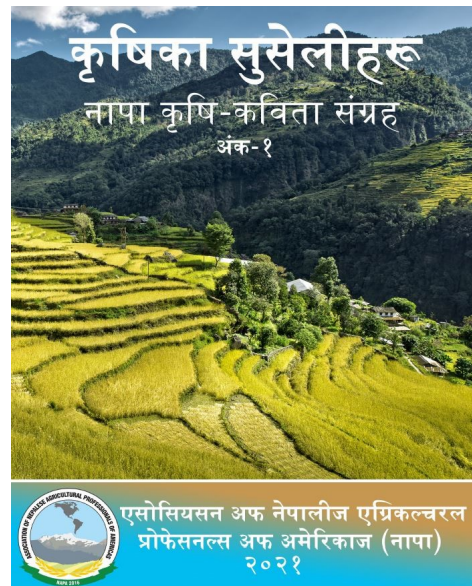
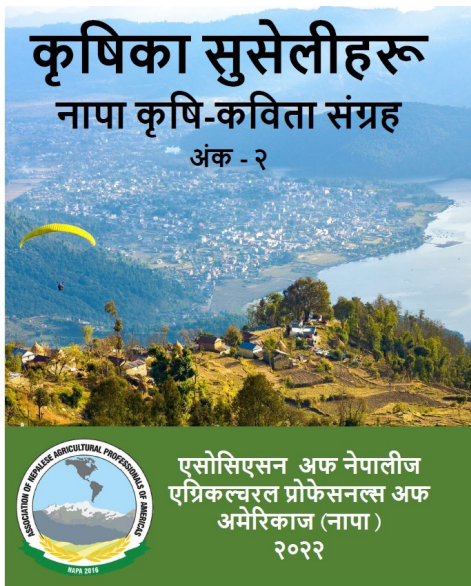
Ms. Ambika Tiwari

Dr. Bharat Shrestha

Mr. Govinda Baral

Ms. Kemika Bhandari

Mr. Ramesh Pandit



## Membership Drive Committee (MDC)

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

Table 1. Membership fees and eligibility.

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

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

# Webinar Series-32: Transformative Pathway towards Food Sovereignty, Circular Economy, and Agroecosystems Health - Dr. Nityananda Khanal

The Webinar Committee (WC) hosted the 32nd Webinar from NAPA General Secretary Dr. Nityananda Khanal on October 31, 2022. Here, we briefly summarize the key highlights from Dr. Khanal's presentation.

The talk covered the current global scenario on existing food production and distribution systems, agroecosystem diversity and health, and socio-economic aspects including the associated problems, threats, and challenges. The core ideas presented were outlined as:

## Current development leading to ecological and social breakdowns

- Overshoot planetary boundaries
- Loss of biodiversity
- Global greenhouse gas emissions
- Global climatic tipping points
- Limits to growth
- Socio-economic issues
- Food safety and security issues

## Paradigm shift towards sustainable agriculture and food security

- Earth for all
- Healthy ecosystems for healthy economies
- Circular economy
- Transformative agroecology
- Local food networks: profitable for farmers; affordable & healthy for consumers
- Food sovereignty

## Sustainable agricultural strategies

- Eight pillars (8-S elements) of sustainable agroecosystems

The concept of planetary boundaries (Figure 1) is key in understanding the scope and limits on the utilization of the earth's resources and system processes. The concept provides an overview of planetary boundaries on such aspects above with delineated zones at safe, increasing, and high-risk boundaries. In the process of development of mankind, pressure on such boundaries will no doubt result in significant, abrupt, or irreversible changes, detrimental to the earth's life-supporting process and cycle in non-sustainable ways. To a greater extent, a crisis of an ecological collapse is being triggered or already brought up as the consequence of human activities overshooting the planetary boundaries.

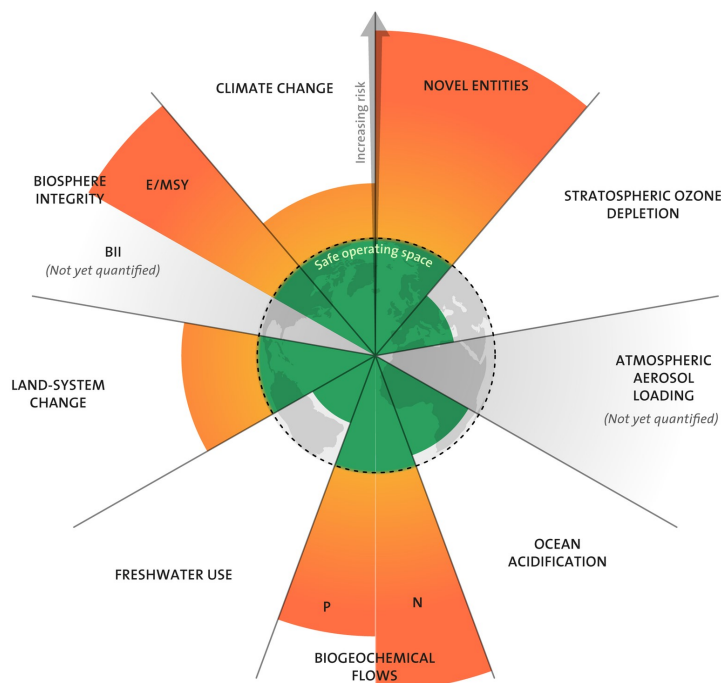


Figure 1. Elements and Concept of Planetary Boundary. (Source: Steffen et al., 2015)

The extraction of resources at excess amounts and rates is an alarming situation leading to the crisis of overshooting of planetary boundaries. Even more, the notable point is the share of the leading global economic and industrial countries such as the USA, EU/UK, other develop countries, and China are responsible for 27%, 25%, 24%, and 15%, respectively of resource use and/or exploitation at a global scale. Such data reveals the tremendous lack of equitable and sustainable distribution and use of the available resources. The consequence leads to losses in biodiversity and extinctions of living species at unprecedented rates, greenhouse gas (GHG) emissions, climate change, insecure food production, access, and supply system, and socio-economic disparities. For instance, the International Union for the Conservation of Nature (IUCN) shows perilous conditions in biodiversity loss and the extinction of several flora and fauna species. Likewise, GHG emissions relating to human activity stand as an ever-increasing issue for the future existence of mankind. Agriculture, forestry, and other land use (24%); industry (21%); and electricity/heat generation (25%) related activities are major contributors to GHG emissions. In recent times, the agriculture sector has succumbed to widespread criticism responsible towards GHG emissions. A recent study (Figure 2) shows that global GHG emissions from

## Webinar Series-32 ...

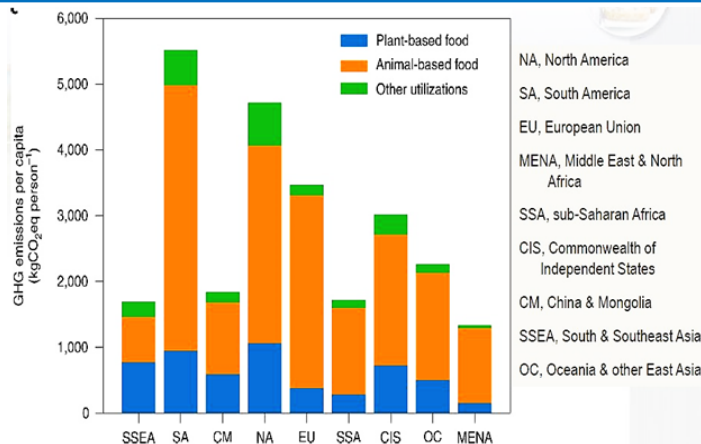


Figure 2. GHG emissions from plant- and animal-based food production systems, including other utilizations.

animal-based food than plant-based food and other utilizations are considerably high in North America, South America, and Europe. In country rankings based on a food production system, the leading GHG emitters of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O combined are China, India, USA, and Brazil. In a broad overview, concern over climate tipping points (CTPs) is developing on the levels of scientific, political, and public levels. Potentially, the CTPs take place when large-scale climate change-also referred to as tipping elements-becomes self-sustaining above a warming threshold (Figure 4). The study demonstrates that even the Paris Agreement's target of keeping global warming well below 2°C and ideally at 1.5°C is unsafe as a rise to 1.5°C and above runs the danger of triggering several tipping points.

The limits to the growth of mankind's development The socioeconomic dimensions of the model include the richest 1% getting an increased share of the total country's population income intensifying the income inequalities, and the existing world food system becoming fragile and risky. For instance, globally and or regionally human population has witnessed frequent encounters with risks and threats to food systems ever more than before, if not the risk for themselves. Examples of the recently seen problems and threat to the food system and human welfare includes Bovine Coronavirus (BCoV) on European Dairy Farms; Nano-plastics in the food chain; Bovine spongiform encephalopathy (BSE) disease; African swine fever; Bird Flue through Asia and Europe; COVID-19 pandemic; and likely more others in the future.

In the background of the agonizing ongoing scenario described above, however, there is still hope for solutions and a better future. There have been several innovations, initiatives, and movements of hope bringing positives out from the social tipping point. Understanding the earth for all, a simple thought but, yet so complicated by human actions, includes the understanding

of the current economic system destabilizing people and planet. Also, it is important to acknowledge potential increased social tensions by the destructive levels of inequality, ecological emergencies, and climate change, anticipated with a catastrophic 2.5°C average global temperature rise by the end of the 21<sup>st</sup> century. However, a safer world for all is possible, and the faster we act the better. The socio-ecological transformation is affordable and can be achieved with calculative and rational practices and human efforts.

Most importantly, global consumption patterns need to shift towards circular and regenerative models. A circular economy reduces food loss, and social and environmental costs via the sustainable cycle of make-use-reuse-remake- and recycle. Actions need to be undertaken to restore, conserve, and enhance the ecosystem for the benefit of human health and progress. Moreover, efforts should be put in for an agroecological pathway toward food, sustainable agriculture, and sovereignty. Further, the pillars of sustainable agriculture strategies, including spatial bioengineering (e.g., adaptive modification of physical and vegetal landscape tailored to the constraints presented by climatic, geographic, and soil conditions); species diversification (e.g., strategic selection and allocation of crop species by time and space created through spatial bioengineering and activities to restore the soil nutrients); seed management (e.g., seed sovereignty - on-farm seed saving of locally adapted cultivars and conserve landraces for specific niches and usage); stressors' management (e.g., use of stress-resistant cultivars and integrated pest management involving diverse eco-friendly measures with adaptive adjustments in pre-existing bio-engineering, species diversification, seed enhancement, and soil augmentation processes); systems integration (e.g., agroforestry, crop-livestock system, integrated multitrophic aquaculture, and agrotourism); and socioeconomic objectivity (e.g., revitalize, incentivize, and advance the integrated systems by abolishing policy-bias, power asymmetry and subsidizing only for public goods) needs to be practiced actively and comprehensively.

For this, what it takes is a paradigm shift from linear to circular, sly to sharing, trickery to technology, exploitation to stewardship, greed to generosity, and nepotism to egalitarianism. Each one of us needs to hold a belief that a safer world for all is possible if we tackle the current economic system that is destabilizing people and a sole-habitable planet -earth.

*(This report is prepared by Webinar Committee Members Dr. Rajan Shrestha and Ms. Sujata Bogati. Dr. Shrestha is a Post-doctoral Research Associate at Texas A&M AgriLife Research and Ms. Bogati is a Ph.D. Student at Purdue University).*

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#### Members

Dr. Dilip Panthee

Dr. Rajan Shrestha

Ms. Sujata Bogati



## Photographs in Action



**Picture #1:** NAPA founding president, Dr. Lila B. Karki, along with Honorary Consul of Nepal to the USA, Mr. Prem Raja Mahat presented NAPA's seminal book on Food Security to the writer of a book 'Sathi,' - The Street dog from Kathmandu, Nepal, and a frequent traveler to Nepal, Julu (Ms. Julie Palais) at the street festival in Towson, Maryland organized by Baltimore Association of Nepalese in America (BANA) in September 2022.

**Picture # 2:** Ms. Kemika Bhandari, NAPA life member and the NAPA Golf, Coordinator and Community Specialist for the project on *Increasing Efficiency and Decision-Making Capability of Small, Socially Disadvantaged, and Minority Farmers*, University of Maryland Eastern Shore (UMES), UMES Extension showcasing NAPA's seminal book at the street festival in Towson, Maryland organized by Baltimore Association of Nepalese in America (BANA) in September 2022.



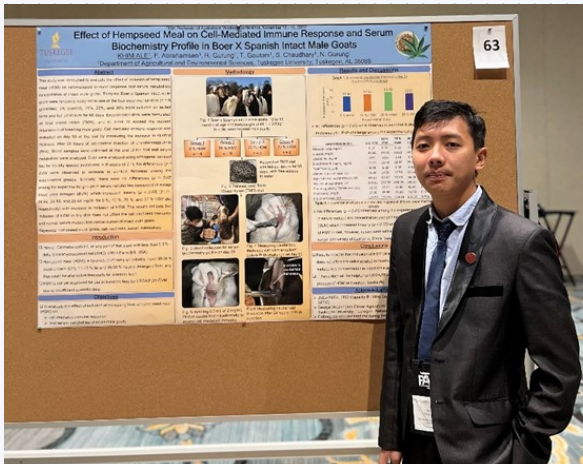
**Picture #3:** NAPA founding president, Dr. Lila B. Karki, presented NAPA's seminal book on Food Security to Dr. Harry Bhandari at the street festival in Towson, Maryland, organized by BANA (Baltimore Association of Nepalese in America) in September 2022. Dr. Bhandari is from The Maryland House of Delegates, Legislative District 8, from Baltimore County.

**Picture #4:** NAPA founding president, Dr. Lila B. Karki, had a wonderful meeting with Dr. Chakra Budathoki, NAPA life member and the editor of NAPA's Global Journal of Agricultural and Applied Science (GJAAS) after 38 years of IAAS Rampur life, along with his beloved wife, Ms. Rina Budhathoki at the street festival in Towson, Maryland, organized by BANA (Baltimore Association of Nepalese in America) in September 2022.



Source: Dr. Lila B. Karki, NAPA Founding President

# Congratulations



## Congratulations Mr. Ale

Congratulations to Mr. Khim Ale on Winning 2nd Position in the Graduate Students Poster Competition at 80th Professional Agricultural Workers Conference held on November 13-15, 2022 at Renaissance Montgomery Hotel and Spa, Montgomery, Alabama. The topic of his poster was "Effect of Hempseed Meal on Cell-Mediated Immune Response and Serum Biochemistry Profile in Boer × Spanish Intact Male Goats".

## Congratulations Dr. Poudel

Congratulations to Dr. Sanjok Poudel on Winning 2nd Position in the Emerging Scientist Competition at 2023 American Forage and Grassland Council Annual Meeting held on January 8-11, 2023 at Winston-Salem, NC. The topic of his presentation was "Hair Cortisol as a Measure of Chronic Stress in Ewes Grazing Hardwood Silvopasture Versus Open Pasture."

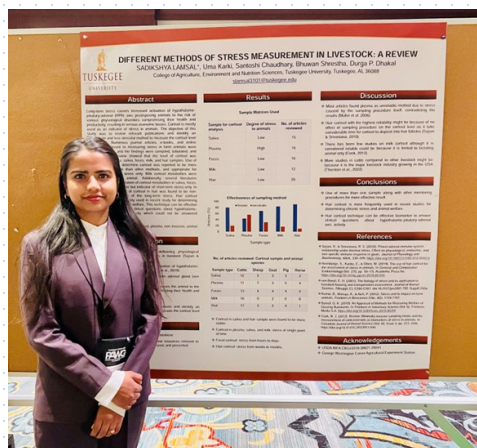


## Congratulations Mr. Sapkota

Congratulations to Mr. Sanjib Sapkota, a PhD candidate at Simon Fraser University (SFU), Burnaby, BC, on receiving the 2020 Storkan-Hanes-McCaslin Research Foundation Award (\$10,000) from the American Phytopathological Society (APS). The foundation will also cover the cost of his travel and accommodation costs to attend APS meeting and award ceremony. The foundation award is provided to recognize his outstanding research on soil-borne diseases of plants.

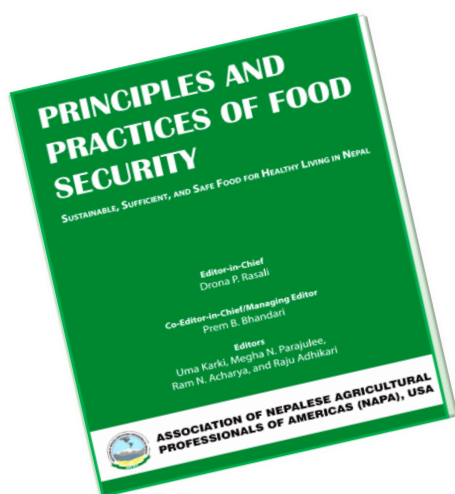
Mr. Sapkota also received 2022 John Yorston Graduate Student Scholarship (\$1,500) from the Canadian Phytopathological Society (CPS). He works with Dr. Rishi Burlakoti, NAPA life member.

# Congratulations



## Congratulations Ms. Lamsal

Congratulations to Ms. Sadikshya Lamsal on Winning 1st Position in the Graduate Student Poster Competition at 80th Professional Agricultural Workers Conference held on November 13-15, 2022, at Renaissance Montgomery Hotel and Spa, Montgomery, Alabama. The topic of her poster was "Different Methods of Stress Measurement in Livestock: A Review."



## NAPA has published a book entitled:

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

**Please save your copy today!**

Contact NAPA if you need further information.

[napa@napaamericas.org](mailto:napa@napaamericas.org)

### Please find the information about NAPA conferences:

**The Third Conference (2022)** : [https://napaamericas.org/conference2022/NAPA2022\\_programs\\_outline.pdf](https://napaamericas.org/conference2022/NAPA2022_programs_outline.pdf)

**The Second Conference (2020)**: <https://napaamericas.org/conference-2020.php>

**The First Conference (2018)**: <https://napaamericas.org/conference2018/index.php>

## Appeal to Support NAPA Initiatives

- **Research Mini-Grant:** <https://www.napaamericas.org/donate.php>
- **Scholarship Fund:** <http://napaamericas.org/napa-scholarships-sponsors.php>
- **Endowment Fund:** <https://napaamericas.org/endowment.php>

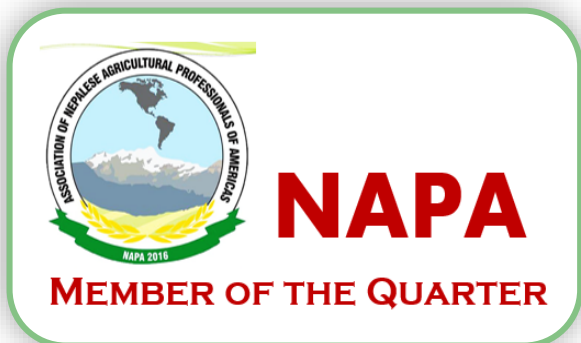
## Member of the Quarter (October - December, 2022)



# Congratulations!



## Dr. Bharat Shrestha



Dr. Bharat Shrestha is the Biology Study Lead at Soil Health and Fertility Development, Agriculture and Agri-Food Canada (AAFC)'s Beaverlodge Research Station, Alberta, Canada. He is a life member of NAPA. Dr. Shrestha has contributed to different scientific and general activities of NAPA. He played a notable role by editing the *Krishika Sushelihar* (agriculture poem compendium) issue #1 in 2020 as a member of the Editorial Committee and issue#2, in 2022 as the Chief Editor. He is also an active member of the Research and Capacity Building Committee (RCBC) since 2020. Dr. Shrestha reviewed proposals related to soil and crop sciences submitted by students in NAPA's Mini Grant call in 2020/2021. He has been editing articles for Agri-Connection as a guest editor. Dr. Shrestha has contributed NAPA's mini grant fund as well as brought sponsors for prizes for Agri-Poem competition in 2022. He chaired the Agri-poem Competition 2022 Organizing Committee and delivered a talk on climate issues in grazing management during the NAPA's third International Scientific Conference-2022 in Atlanta.

Dr. Shrestha is originally from Ashrang, Gorkha, Nepal. He earned his Ph.D. in Soil Science from the Norwegian University of Life Sciences in Ås, Norway in 2007. He came to Canada as a postdoctoral researcher at the Lakehead University in Thun-

der Bay, Ontario in 2008 and has worked at different institutions. During these years, he has developed an extended network of experts in soil, crop and livestock sciences. Dr. Shrestha has a track record of scientific publications on soil carbon and greenhouse gas dynamics in natural and agroecosystems in the context of climate change. He is currently leading the Peace Region Living Lab, which recognizes producers' role in climate change mitigation through better management practices.

Dr. Shrestha is involved in different social and professional organizations, such as the founding chairperson of Himalayan Conservation Group, Pokhara Nepal; the founding director of the International Nepali Literary Society (INLS), Ottawa, Canada; Knowledge and Technology Transfer Initiative (KTTI) Coordinator of Canada Foundation for Nepal (CFFN); Life member of NRNA-Canada, Calgary Nepalese Community Association (CNCA), and the Newah Society of Calgary (NSC). He is also a member of the Alberta Institute of Agri-ologists (AIA), Canadian Society of Soil Science (CSSS), and Soil Science Society of America (SSSA).

# Membership Update (December 31, 2022)

Member Category	Members
Founding life member	5
Life member	155
Student member	115
Associate member	42
Regular member	17



Student Member	Affiliation
Anjan Dhungana	Kentucky State University
Durga Prasad Dhakal	Tuskegee University
Rudra Baral	Kansas State University
Niranjan Pokhrel	Oklahoma State University
Pritika Devkota	North Dakota State University
Sabita Ranabhat	Kansas State University
Samjhana Khanal	University of Caloifornia Davis
Santosh Chaudary	Tuskegee University
Santosh Lamichhane	Michigan State University
Sanjib Sapkota	Agriculture and Agri-Food Canada
Kusum Raj Tamang	Lincoln University

Life Member	Affiliation
Dr. Raju Pokharel	Michigan State University
Dr. Suraj Upadhaya	Iowa State University
Dr. Keshav Bhattarai	University of Central Missouri

# Welcome New NAPA Members on Board!

## Appeal to Join/Renew NAPA Membership

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

### **A few reasons to join/renew NAPA membership:**

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

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

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



Thank you.

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

**BECOME A  
MEMBER**  
JOIN TODAY!

**Renew now**  


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

## KidsZone

# Biography of George Washington

Sushan Thapa  
Grade 4, Missouri



Did you know that George Washington went to school for a short period of time? How did he become the first president of the United States? Read this informational report and you will learn about his life.



George Washington was born in 1732 in Virginia. He was taught at home by his father and older brother. His favorite subject was math. Sadly, when George Washington was 20, his brother died. George Washington decided to join the army.

When he was 17 years old, he worked as a surveyor. It was his job to keep track of people's land. In 1759, he married Martha Custis. George Washington set many precedents for future presidents to follow. He helped start the United States. He led soldiers to fight against the French army. During his presidency, the states passed the Bill of Rights. George Washington was a very popular president. In December 1799, he got sick with a bad sore throat. He was 67 years old when he died. In summary, George Washington was a great leader and an excellent president.

## 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!

## 10-Year-Old Prasm Ghimire Publishes a Book

Author: Prasm Ghimire  
Book title : Journey Into the Odds  
Date of publication: January 2023

Prasm Ghimire, currently living in Clovis, New Mexico, USA, wrote a book from his imagination and interests. He always had a certain love for reading, and his teachers said that he always relished reading. So finally, in the last couple of summers, he decided to write a book of his own called: Journey into the odds.

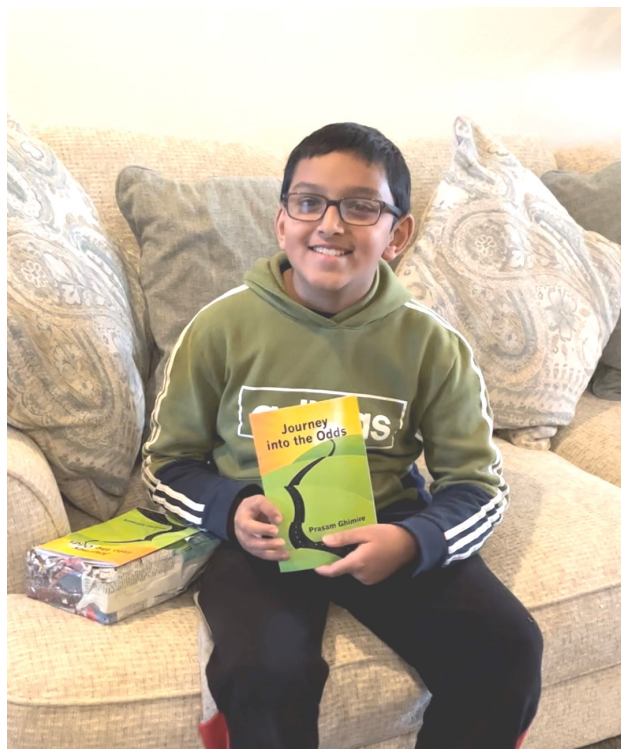
Prasm says it's a book for young science fiction readers. He got inspiration from other series like George's secret key© series and the Geronimo Stilton© series.

The book has six chapters, each with its own plot. The first chapter is about how young Astro Audacio goes in a portal to the future and sees his future self and family even though they don't know, but along the way, many dangers follow. In chapter 2, he falls in a portal (again) and ends up in a spaceship in space, but even unluckier, he lands in a ... BLACK HOLE. He tries to steer it out, but it is as stuck as a mouse in a mousetrap. He finally gets out, only to face more adventures.

In the third chapter, on a fine day, young Astro was studying things he found in the previous chapters; he ended up in the human body and rumbled in stomach acid. In chapter 4, it gets even crazier, and poor Astro ends up with the dinos. In chapter five, Astro goes on a vacation to Hawaii, but of course, something goes wrong; his plane crashes, and he ends up in the ocean. In the final chapter, if it couldn't get any crazier, he gets called to the future to save the universe from a multidimensional apocalypse. The book ends when the universe is finally fixed, and a hooded figure tells him that "many more adventures are to come yet."

"This book was never meant to be a book," says the author. It was just a little summer break project to get

the boredom out. He adds, "I am so happy we could publish it. He plans to write more if he has time, or you never know, "maybe another summer."



**Congratulations  
Prasm!**

"If you want your children to be intelligent, read them fairy tales. If you want them to be more intelligent, read them more fairy tales."

- Albert Einstein

Please send your articles:

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



# Advancing Agriculture for Global Food Security and Prosperity

Sagar Bhandari

Agriculture and Forestry University, Rampur, Chitwan, Nepal

Email: [sagarbhandari88484@gmail.com](mailto:sagarbhandari88484@gmail.com)



Agriculture plays a vital role in reducing poverty and improving food security for 80% of the world's poor people (World Bank, 2021). Nevertheless, global food security is still a big challenge. The world population is expected to increase by one-third by 2050 (FAO, 2009); in contrast, crop yield is predicted to decrease by 5% to 30% from 2050 onwards (Cruz et al., 2007).

Climate change is hitting hard on the agriculture sector. Increase in global temperature, erratic rainfall, extreme weather conditions, drought, and many other biotic and abiotic factors have limited crop and livestock production. It is necessary to consider the impacts of climate change while thinking about advancements in agriculture. Thus, for global food security and prosperity, technological advancement in agriculture is indispensable but at the same time, advanced technology should be climate resilient and be able to strengthen the regenerative capacity of nature.

The major approaches for advancing agriculture to ensure sustainable global food security and prosperity in a changing world are described below.

## 1. Precision Agriculture (PA)

Precision agriculture allows farmers to apply the right input, in the right amount, to the right place, at the right time, and in the right manner (Zimmerman, 2008). It relies on advanced technologies such as satellite imagery, the global positioning system (GPS), and information technology (IT). There may be variations within a same field in terms of organic matter content, moisture content, soil pH level, temperature, pest infestation, etc. The number of resources required may be different even in a small area of land. In this regard, precision agriculture is the most promising option for the optimization of inputs for better production and resource conservation.

## 2. Nanotechnology

Nanotechnology refers to the use of nanoparticles as fertilizers, growth regulators, antimicrobials, and pesticides. This technology is related to the materials, systems, and processes that operate at a scale of 100 nanometers (nm) or less (Mousavi, 2011). The large sur-

face area offered by tiny nanoparticles has a more efficient function than other chemical pesticides. The use of nanosensor technology helps in increasing resource use efficiency in agriculture.

## 3. Farming with intelligent automation

Intelligent automation is one of the greatest technological advancements in agriculture. This technique combines Robotic Process Automation (RPA), Artificial Intelligence (AI), and Machine Learning (MI) (Calarco, 2021). Smart sensors are now being used in soil, drones, and other agricultural equipment to monitor and measure the condition of the field (Calarco, 2021). Internet of things (IoT) technology can be used in agriculture for the efficient flow of information. Such advanced technologies help to reduce the widespread problem of labor shortage and save time.

## 4. Genetically modified crops

Genetically modified crops have desirable traits which are derived through genetic engineering. It may include increased resistance to pests and diseases, resistance to herbicides, better nutritional value, improved shelf life, increased yield, and abiotic stress tolerance. *Bacillus thuringiensis* (Bt) cotton, Bt corn, and Bt soybean are the major genetically modified crops. Fruit Growers Supply (2022) revealed that GMOs have reduced the use of pesticides by up to 8.2% and increased corn yield by 22% over the last 20 years. Thus, GMOs show the potential to provide global food security.

## 5. Aeroponics and hydroponics

Due to the rapid increase in population and urbanization, per capita demand for food is increasing but the arable land is on decreasing trend. There is a need for such technology so that we can obtain maximum production from a minimum area. Hydroponics and aeroponics can be suitable alternatives in this regard. These techniques enable crop production without using soil. We can apply vertical farming systems and high-density planting systems through these techniques. There will be optimization of resources and thus, it is cost-effective in long run. Furthermore, there is better control of pests and diseases and no need to control weeds.

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### 6. Integrated pest and disease management (IPDM)

Integrated pest and disease management refers application of all the available cultural, physical, mechanical, biological, legislative, and at last chemical methods for the sustainable management of pests and diseases. Indiscriminate use of chemicals in the name of intensive agriculture has brought many environmental and human health hazards (Bhandari et al., 2021). In this regard, IPM and IDM can be viable approaches for the sustainable management of crop pests and diseases. It is also economical and ensures the use of indigenous techniques and materials. For organic farming, such an approach can be of great importance.

### 7. Agro-tourism

This approach provides a dual source of income to the farmers through crop production and tourism thus helping them in economic stability. Horti-tourism refers to visiting horticultural farms for recreation, enjoyment, research, and/or being involved in the cultivation practices like planting, harvesting, and so on (Kuchi and Kabir, 2017). In this dynamic world, people feel bored with their hectic schedule, city pollution, and stress and seek peace and recreation in a natural environment (Kuchi and Kabir, 2017). It also prevents the risk of complete enterprise failure.

### 8. Direct-seeded rice (DSR)

Direct-seeded rice (DSR) refers to the process of establishing rice crops directly from seed rather than transplanting seedlings (Farooq et al, 2011). The traditional puddled-transplanting system requires a large quantity of labor and irrigation water. Moreover, it destroys capillary pores and soil aggregates, forms a hard pan, and creates a problem for the establishment of successive crops. Puddled transplanting system is also time-consuming which delays wheat planting and ultimately reduces wheat yield in the rice-wheat cropping system. In this regard, direct-seeded rice can be the major approach for sustainable rice production.

### 9. Regenerative agriculture (RA)

In the name of intensive farming, natural resources are gradually exhausting. If this condition continues, resources will deplete, and productivity will decline. To compensate for this, a greater quantity of input is required which ultimately increases the cost of production. Regenerative agriculture can be a major alternative to overcome this problem. It refers to sustainable holistic design which builds soil ecosystem, increases biodiversity, improves soil health, and ensures better management of the resources. Even if advanced technologies are discovered in agriculture, we can't simply overlook the concept of regenerative agriculture to obtain sustainable production. Some of the major forms of re-

generative agriculture are described below.

#### 9.1. No-till farming

The use of heavy machinery is increasing in intensive agriculture. Such heavy machinery destroys the structure, aggregate stability, and porosity of the soil. It forms a hard pan at the subsurface layer of soil which limits infiltration and proper growth of plant roots. The frequency and intensity of tillage are directly proportional to the emission of greenhouse gas. Intensive tillage also destroys the beneficial soil microbes which in turn slows down the rate of conversion of organic matter in the soil. Thus, no-till farming will be the best alternative from a soil conservation and sustainable production point of view.



#### 9.2. Cover crop and organic mulching

Cover crops refer to those plants that are grown especially for soil conservation, weed suppression and pest management. They prevent the direct impact of raindrops on the soil surface which in turn maintains aggregate stability and minimizes leaching. Leguminous cover crops like cowpea and clover contain rhizobium which helps to fix atmospheric nitrogen into plant available form. Similarly, the mulching of organic residues also plays a great role in soil conservation and enriching soil fertility. Organic mulching prevents soil erosion, restricts weed growth, maintain a microclimate favorable for plants and microorganisms in the soil, and adds organic matter to the soil after its decomposition. Thus, we should incorporate plant residues into the soil rather than burning it. In a nutshell, this practice auto-regenerates soil fertility.

#### 9.3. Agroforestry

Agroforestry is a sustainable land use system that intentionally integrates trees, crops, and/or livestock intensively under a common management unit. It can help generate multiple outputs from the same land base thus resulting in an economically viable operation. Along with diversifying farm income, agroforestry is ecologically sound as it can sequester atmospheric carbon and

## Advancing Agriculture for...

help reverse climate change. A study by Kumar et al (1998) revealed that a five-year-silvopastoral system-a form of an agroforestry system that integrates trees, livestock, and forages in Kerela, India sequestered 6.55 Mg/ha carbon annually.

### Conclusions

The world's population is increasing at an alarming rate, but agricultural productivity is not yet satisfactory. Many farmers and their families are shifting towards non-agricultural work. In this situation, there is a necessity for technological advancements in agriculture that are convenient to the farmers and at the same time climate resilient. The use of nanotechnology, intelligent automation, aeroponics/hydroponics, agro-tourism, integrated disease and pest management and precision farming techniques could be potential approaches for optimizing resources and making farming convenient and resilient to climate change.

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This is a concise version of the essay that won the Third Place Award in the Student Writing Contest organized by NAPA during the Third Biennial International Scientific Conference, 2022 in Atlanta.

**Congratulations  
Sagar Bhandari!**

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**Editorial Board**

# विषादी रहित खेती सम्भव छ

चन्द्र प्रसाद अधिकारी, अगुवा कृषक

भरतपुर-१८, फुलबारी, चितवन



श्री चन्द्र प्रसाद अधिकारी, चितवन जिल्लाका एक नमूना कृषक हुनुहुन्छ। विक्रम संवत् २०३० देखि निरन्तर कृषिकर्ममा संलग्न उहाँ, पछिल्लो करिब तीन दशकदेखि प्राङ्गारिक खेती (Organic farming) अङ्गाल्दै हुनुहुन्छ। आफ्नै घर वरपरको करिव ५ बिघा जमिन प्रयोग गरेर उहाँले, गाईपालन, माछापालन, कुखुरापालन, गड्यौला मल उत्पादनका साथसाथै, तरकारी र अन्नबाली उत्पादन गर्नुभएको छ। हालै उहाँले एक नयाँ प्रयोग अन्तर्गत, भान्साजन्य एवम् अन्य प्राङ्गारिक फोहोर खाने कालो झिँगा (Black Soldier Fly) पालन पनि सुरु गर्नुभएको छ। रामपुर क्याम्पस र महाविर पुनको राष्ट्रिय आविष्कार केन्द्रको सहयोगमा यो सम्भव भएको उहाँ बताउनुहुन्छ। यो झिँगाले वातावरणमा दुर्गन्ध फैलाउने (प्राङ्गारिक र सङ्नेगल्ने) पदार्थ खाने हुनाले, शहरी फोहोर व्यवस्थापनमा विशेष टेवा पुऱ्याउने देखिन्छ। सय किलोग्राम फोहोरबाट १० किलोग्राम जति राम्रो मल उत्पादन हुन्छ। त्यसैगरी सय किलोग्राम फोहोरबाट २०-३० किलोग्राम प्यूपा (किरा) उत्पादन हुने र सो प्रोटीनजन्य किरा कुखुरा, माछा, कुकुर, बिरालो, बंगुर लगायतलाई दाना हुने भएकोले, यस कालो झिँगाले धेरै सम्भावना बोकेको छ।

## बिगतका दिनको स्मरण

बिगतका दिन स्मरण गर्दै उहाँले भन्नुभयो, २०३० सालमा ५० ग्राम गाजरको बीउ बाट व्यवसायिक कृषि सुरु गरें। चितवनको माटो गाजरको लागि उपयुक्त भएता पनि बजारमा माग नभएकाले समस्यामा थियो। चार मुठा बजारमा लग्दा दुई मुठा फर्काउनुपर्ने

अवस्था थियो। तर बजार विकाससँगै उपभोक्ताको माग बढेकाले अहिले अवस्था बदलिएको छ। सिकदै जाँदा पर्माकल्चर (Permaculture) सम्मको तालिम लिएर दिगो कृषितर्फ अग्रसर अधिकारीले सुरुका दिनमा व्यवसायिक कृषि गर्छु भन्दा मानिसहरू हाँसेको बताउनुभयो। कृषिले मात्र कसरी जिविकोपार्जन हुन्छ, भन्थे। पछि निरन्तर काम गर्दै गएपछि मानिसहरूले प्रश्न गर्न छोडे, उहाँले सुनाउनुभयो। पर्माकल्चरमा हामी "एक वस्तु धेरै काम, अनि धेरै कामका लागि एक वस्तु" भन्ने सिद्धान्तको पालना गर्छौं। हामी कुनै पनि वस्तु खेर नजाओस् र सबै वस्तुको पुनः प्रयोग गर्न पाईयोस् भन्ने कुरामा सचेत रहन्छौं। घरबाट निस्कने फोहोरजन्य वस्तुबाटै मूनाफा गरेमात्र दिगो रूपमा कृषिकार्य सम्भव रहन्छ। मलदेखि सबैकुरा किनेर खेती दिगो हुँदैन, उहाँले भन्नुभयो। ५ बिघा जमिनमा आफ्नै गोठेमल र गड्यौला मल प्रयोग गर्ने उहाँ, केही अपुग भएमा अन्य कृषकले उत्पादन गरेको प्राङ्गारिक मल नै प्रयोग गर्नुहुन्छ जसले गर्दा बोटबिरुवाले यथेष्ट नाईट्रोजन, फोस्फोरस, पोटाससँगसँगै अन्य शुक्ष्म खाद्यतत्व पनि प्राप्त गर्छन्। यसले गर्दा बालीमा रोगकिराको प्रकोप कम भएको र बालीको सहनशक्ति पनि बढेको उहाँको अनुभव छ।

## प्राङ्गारिक कृषिको व्यवस्थापन

प्राङ्गारिक कृषिलाई सवल बनाउन माटोमा पानी र खाद्यतत्वको व्यवस्थापन अपरिहार्य रहेको उहाँको प्रयोगले देखाउँछ। उहाँ गाईवस्तुले नखाने जडिबुटीको जैविक मल बनाउनुहुन्छ जसले किरा नियन्त्रणमा

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जैविक मल बनाउनुहुन्छ जसले किरा नियन्त्रणमा ठूलो सहयोग गरेको छ। वर्षाको मिहिनेत एवम् अनुभवले निखारिनुभएका अधिकारी, मिश्रित बालीद्वारा तरकारीमा लाही लगायतका किरा र रोग नियन्त्रण गर्नुहुन्छ। आफ्नो एक प्रयोगमा गहुँ र केराउको मिश्रित बालीले राम्रो उत्पादन दिएको उहाँले पाउनुभयो। त्यसैगरी झार नियन्त्रणमा छापो (mulch) गर्दा किरा पनि कम लाग्ने र पानी पनि माटोमा रहिरहने भएकाले तरकारी उत्पादन राम्रो रहेको अनुभव सुनाउनुभयो। जाडोमा प्लाष्टिकको, र गर्मीमा सुख्खा छापो उचित हुने उहाँको बुझाई छ। धान खेतमा कमन कार्प नामक माछापालन गरेर अधिकारीले किरा नियन्त्रणका साथसाथै माछा उत्पादन समेत गर्नुभएको छ। एक कट्ठा १५० वटासम्म कमन कार्प र १० वटासम्म ग्रास कार्प पाल्न सकिन्छ। प्रति कट्ठा १० भन्दा बढी ग्रास कार्प भएमा धानमा क्षति हुन्छ। उचित मात्रा मिलाएर खेती गर्न सके दोहोरो फाईदा लिन सकिन्छ, उहाँ बताउनुहुन्छ।

उहाँ आफ्नो खेतीमा केवल प्राङ्गारिक मल एवम् वनस्पतिजन्य जैविक विषादीको प्रयोग गर्नुहुन्छ। झोलमल नामक वनस्पतिजन्य विषादी बनाउन स्थानिय स्रोतसाधनको प्रयोग गर्नुहुन्छ। २ भाग वनस्पतिका पात र १ भाग गौमूत्रको प्रयोगले सहज रूपमा झोलमल बनाउन सकिन्छ। उपलब्ध भएमा १ किलो गोबर, २ किलो खरानी र केही चम्चा मोही पनि थप्न सकिन्छ। वनस्पतिको छनोट गर्दा तितो, पिरो, टर्सी खाले पात छनोट गरेर, बन्द भाँडो (जस्तै ड्रम) मा, गर्मीमा ७-१० दिन र जाडोमा १५-२० दिन कुह्याएमा (फर्मेन्ट गरेमा) यो तयार हुन्छ। बिको खोलेर हेर्दा पातको सबै हरियोपना हराएको भए झोलमल प्रयोगको लागि तयार हुन्छ। साना वोटमा १

भाग झोलमललाई ८ भाग पानी र छिप्पिन लागेका बोटमा १ भाग झोलमलमा ४ भाग पानी मिसाएर छरेमा राम्रो हुन्छ। सकभर यसको प्रयोग उत्पादन लिनुभन्दा एक हप्ता अगाडीसम्म मात्र गरे, तरकारी लगायतका उत्पादनमा गन्ध आउँदैन, उहाँले बताउनुभयो। झोलमलले किरा नियन्त्रण, बोटलाई खाद्यतत्व प्रदान गर्नुका साथसाथै केही रोग समेत नियन्त्रण गरेको उहाँको अनुभव छ। राजमाको फेद कुहिने रोगमा झोलमल पानीमा (१:४) राखेर दुईपटक प्रयोग गर्दा यसको प्रकोप शून्य भयो, उहाँले भन्नुभयो। पछिल्लो केही समय घरयासी प्रयोगले लाही पुरै नियन्त्रण गर्न सफल अधिकारी, यो विषादी बनाउन, २५ ग्राम अदुवा, १५ ग्राम खुर्सानी, २५-५० ग्राम लसुन, १०० ग्राम पात (निम, बकाईनो, पाती, असुरो, खिर्रो) र ५ मिलिलिटर मट्टीतेल प्रयोग गर्नुहुन्छ।



चित्र न. १. प्राङ्गारिक फार्मको एक झलक।

### विषादी औषधि होइन

वि. सं. २०१३ सालमा नेपालमा रासायनिक विषादी भित्रिएपछि २०२६-२७ सालबाट व्यापक प्रयोग भएको उहाँको बुझाई छ। कृषकहरूले विषादीलाई औषधि भन्ने र तिनको प्रयोगलाई सरल रूपमा लिने गरेकाले,

## विषादी रहित खेती सम्भव छ...

सर्वप्रथम भाष्यमा नै सुधार आवश्यक रहेको उहाँ प्रष्ट्याउनुहुन्छ। उहाँको अनुभवमा विषादी प्रयोगबारे कृषकहरूमा ज्ञानको धेरै अभाव छ। कृषकले विषादी चाखेर कडापना पत्ता लगाउन खोज्ने र चितवनमा गर्मीको बेला व्यक्तिगत सुरक्षा उपकरण (Personal Protective Equipment) त परको कुरा, धेरैले न्यूनतम लुगा लगाएरै विषादी छर्ने गरेको उहाँको भनाई छ। धेरै रोग-किरा प्राकृतिक रूपमै व्यवस्थापन हुन्छन्। अनुगमनको क्रममा प्रकोप अत्याधिक भएर आर्थिक क्षति हुनेभए मात्र सुरक्षित रूपमा हरियो लेवल भएका (कम खतराजन्य) विषादी प्रयोग गर्नुपर्दछ। विगत ३० वर्षदेखि मैले आफ्नो खेतीमा एक थोपा विषादी छरेको छैन, आवश्यकता नै पर्दैन, अधिकारीले बताउनुभयो। उहाँ भन्नुहुन्छ, प्रकृतिमा किरासँगसँगै परभक्षी किरापनि हुन्छन्। तिनलाई संरक्षण गर्नसके मात्र पनि रासायनिक विषादीको प्रयोग घटाउन सकिन्छ। संबादकै क्रममा अधिकारीले किटविज्ञ स्व. डा. फणिन्द्र प्रसाद नेउपानेको उपस्थितिमा गवारो (Helicoverpa) लाइ रासायनिक विषादीमा चुर्लुम्म डुबाउँदापनि निस्केर हिँडेको प्रसङ्ग बताउनु भयो। त्यसपछिका दिनहरूमा रासायनिक विषादीले मानव स्वास्थ्य एवम् वातावरणमा पार्ने असरबारे झनै बहस भएको उहाँको बुझाई छ।

### फरक सोच, धेरै योगदान

व्यक्तिगत चेतना र लगनले निर्देशित उहाँको देन धानको जातिय संरक्षणमा पनि रहेको छ। विभिन्न जिल्लाको भ्रमण गर्ने क्रममा उहाँले ११४ स्थानीय धानका जात सङ्कलन समेत गर्नुभएको थियो। पछि व्यक्तिगत पहलमा संरक्षण गर्न प्राविधिक जटिलता हुनेभएर उहाँले नेपाल जीनबैंकलाई ११० जात हस्तान्तरण गर्नुभयो। यो कार्यको महत्व, धान बालीको सुधारका बेला, अझै प्रष्ट हुनेछ। एकसन एड



चित्र न. २. कलेजमा अध्ययनरत विद्यार्थीहरूलाई आफ्नो आनुभव सुनाउँदै श्री अधिकारी।

(Action Aid) नेपालसँग मिलेर अधिकारीले कृषि र वातावरण नामक महत्वपूर्ण ग्रन्थ प्रकाशन गर्नुभएको छ। कालो झिंगा बारे पनि उहाँको लेख प्रकाशित छ। पेशागत कृषि र त्यसमाथि प्राङ्गारिक खेती मार्फत राम्रो आम्दानी र सहज जीवनयापन गरिरहनुभएका अधिकारीको कार्यशैलीले धेरैलाई लोभ्याएको छ। जिल्ला प्राङ्गारिक संघ चितवनका संस्थापक, उहाँ, सालिन एवम् भद्र स्वभावको हुनुहुन्छ। आफ्नो निष्ठा अटल र प्रतिबद्धता अधिकारी, हिजोआज अन्य कृषकवर्ग एवम् विद्यार्थीहरूलाई पनि आफूले सिकेका विषयवस्तुबारे ज्ञान बाँड्न तल्लिन देखिनुहुन्छ। विषादीरहित एवम् निर्यातमुखी कृषिको आशा राख्ने उहाँ, अधिकांश कृषकवर्गमा यथेष्ट चाहना र ज्ञान भए, यो सबै छिटै सम्भव हुने देख्नुहुन्छ।

(रामपुर क्याम्पसमा कृषि स्नातक तहमा अध्ययनरत अमृत शर्मांले चन्द्रप्रसाद अधिकारीसँग गरेको संवादमा आधारित।)

विषादी औषधि होइन, विष हो,  
यसको प्रायोग सकेसम्म कम गरौं।

# कृषि कविता

(नापाको तेस्रो द्वैवार्षिक बैज्ञानिक सम्मेलन-२०२२ अन्तरगत आयोजित कृषि कविता प्रतियोगितामा द्वितीय स्थान हासिल गर्न सफल कविता, बधाई छ रोशन पुन)



## मझदारको जिन्दगी

रोशन पुन  
हिरोसिमा विश्वविद्यालय, जापान

म ब्युझन्छु  
अनि व्युझन्छ विहान  
ब्युझाउँछु हलो र जुवा

उज्यालो बोकेर  
जब पुग्छु खेतको ढोका  
हुर्कदै गरेका मकैका घोगाहरू मुस्कुराउँछन्  
अधिपत्य जमाउन उद्दत झारहरू मुझाउँछन्

माटोको वक्षस्थलमा  
जसै सल्बलाउछन्  
हलोका औंलाहरू  
गड्यौलाहरू फेरि पुरिइजान्छन् कि भनेर  
चराहरू मलाई पछ्याउँछन्

आफ्नो समय बाँचिसकेका तरकारीहरू  
कसैको भान्सामा पुग्ने  
वा कुनै पसलको छिँडीमा बसेर  
ग्राहक कुर्ने हतारोमा छन्  
आफन्तकोमा उपहार भएर जान वा  
कसैको भोकको प्यास निभाउन तयार छन् अम्बाहरू  
नानी बाबुसँगै स्कूल जाने दौडमा छन् सुन्तलाहरू

यति रंगिन इन्द्रेणी बोकेर पनि  
किन श्याम श्वेत छ मेरो जिन्दगीको क्यानभास?

जस्तो कि  
ननिदाउँ भने

खेत भरी लहलह धानले बयेली खेलिरहेछ  
निदाउँ भने  
पोहोर जस्तै  
झरीसँगै बगी जाने पो हो कि  
वर्षभरी जोगाएको, हुर्काएको पसिनाको पहाड

श्रमको भाउ पाउँछु कि पाउँदिन?  
चिन्ता छ  
बिरुवाले मागेको बखत  
दिन सकिन भने मल  
विरोधमा  
सुकिजाला भन्ने खतरा छ  
खडेरी त जसो तसो अँचो-पँचोमा टरिजाला  
माटोले मागेको बेला  
बीउकै खडेरी भयो भने कसो गरूला?

धानको सिक्की हेरेर रमाइरहेको सरकारलाई  
ऋणको सिक्कीले बाँधिएको मेरो व्यथा  
सुनाउँ कि नसुनाउँ?

कोदालीको अक्षरले  
कोरुँ कि नकोरुँ  
म र मेरो परिवारको गन्तब्य  
वा सुरु गरुँ  
कैहिल्यै नगरेको, नजानेको नयाँ काम  
अथवा हालुँ  
राहदानीको दरखास्त!

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