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NGB-59/2025

Monitoring and Traveling Seminar: Agrobiodiversity in Bara and Parsa

A Report of Monitoring, Orientation/Observation and Traveling Seminar on Banking AGRs (MOTSBAGR) in DoAR, Parwanipur; NARP, Parwanipur; AIRS, Birgunj; NSRP, Jeetpur; CSB, Kachorwa and Gadhimai Temple, Bara

Focus area: Conservation science, agrobiodiversity science (conservation and utilization of native agrobiodiversity), food, nutrition, health, business and environment security

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Sited monitored and visited

SN	Office name	Adress
1	Directorate of Agricultural Research (DOAR), Madesh Pardesh	Parwanipur, Bara
2	National Avian Research Program	Parwanipur, Bara
3	Agriculture Implement Research Station (AIRS)	Birgunj, Parsa,
4	National Sugarcane Research Program	Jitpur, Birgunj
5	Kachorwa Community Seed Bank,	Bara,
6	Mahagadhimai Manupalicy	Bariyarpur, Bara
7	Gadhimai Temple	Mahagadhimai, Bara

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banking AGRs. NARC is highly acknowledged for allocating budget to monitor, visit and organize traveling seminar. This program is named as monitoring, orientation/observation and traveling seminar on banking AGRs (MOTSBAGR). National Genebank organizes this program regularly. Drivers, Bikas Maharjan and Pancha Maharjan were with us for smoothly and timely travel set.

Citation

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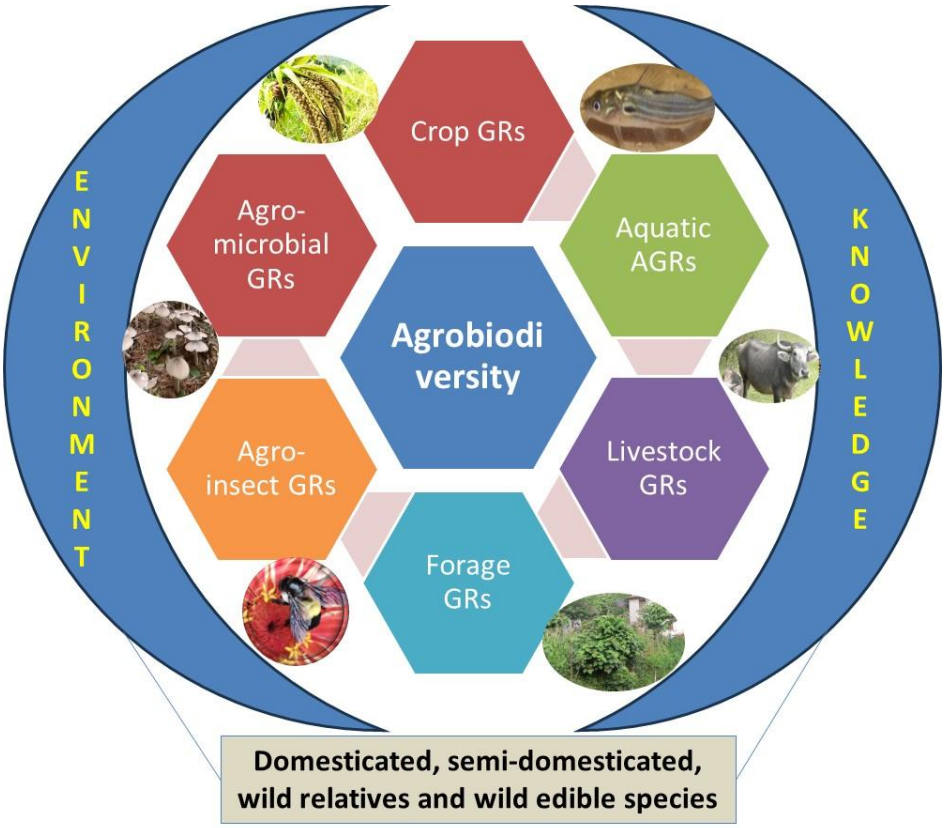
Contents

Introduction

Under the leadership of the National Agriculture Genetic Resources Centre (NAGRC, National Genebank), NARC has initiated the systematic banking of Agricultural Genetic Resources (AGRs). The National Genebank also coordinates and collaborates with relevant stakeholders, including local communities and farmers, to enhance the conservation and sustainable utilization of agrobiodiversity.

To ensure effective management, it is essential to update the conservation status of AGRs across all NARC cost centers (Centers, Programs, Stations, Directorates, and Institutes) and other stakeholders while providing them with necessary technical support. Additionally, a foundational understanding of genebank principles, agrobiodiversity status, conservation approaches, and utilization strategies is crucial. Regular stakeholder interactions help generate innovative ideas and promote best practices in agrobiodiversity management. AGRs encompass six key components of agrobiodiversity (CALFI): Crop, Aquatic Agricultural Genetic Resources, Livestock, Forage, Agri-insect and Microbial Genetic Resources. Additionally, they include four sub-components (DSWW): Domesticated, Semi-domesticated, Wild relatives, Wild edible species (see figure below).

NAGRC has proposed establishing specialized banks across various NARC stations, offices, communities, and other relevant locations. These banks will maintain passport data, status reports, and diversity monitoring within their respective areas. Furthermore, all production fields, research fields, and facilities should adopt insect, microbe-, and bird-friendly practices to support biodiversity conservation.



Types of banks for AGRs conservation

- Field genebank (फिल्ड जीन बैंक), school field genebank: For non-orthodox types of crop and plant genetic resources.
- Crop specific park (बालि विशेष पार्क): Only for non-orthodox types
- Forages field genebank (घाँस बालि फिल्ड जीन बैंक): Only for non-orthodox types of forage (both grasses, trees, shrub, etc) species, and landraces
- Aqua pond genebank (जलीय कुण्ड जीन बैंक): For aquatic agricultural animals/fishes and plant species
- Livestock farm genebank (पशुपंक्षी फार्म जीन बैंक): For agricultural animals/ livestock species, breeds
- Livestock specific farm genebank (पशुपंक्षी विशेष फ़ार्म जीन बैंक): For specific species along with their different genotypes
- Agro-insect field genebank (कृषि किरा फिल्ड जीन बैंक): For agricultural insects (also called farmer insects or agro insect) ie economical, beneficial insects and farmable insects
- Agro-microbial field genebank (कृषि सूक्ष्म जीवाणु फिल्ड जीन बैंक): For agricultural microorganisms, (also called agro-microorganisms) ie economical, beneficial and cultivable microorganisms. Also includes mushroom park
- Agro gene sanctuary (कृषि वंशाणु आरक्ष स्थि): All types of crops, plants, animals, insects, microbes which all AGRs are mixed and grown together. Suitable around the temple/ secret places
- Office garden (कार्यालय बगैचा): Conservation through beatification): For ornamental species
- Raithaane nursery: Nursery of native APGRs for distribution, as gift, agro-planation etc

Objectives

- To monitor and observe the banking of agricultural genetic resources
- To document status, issues and problems
- To share and support technical conservation strategies and good practices
- To orient technical aspects, to make awareness and accelerate the conservation and utilization of native AGRs
- To discuss possible plans for future works
- To share publication and guidelines related to conservation and utilization of AGRs

Specific objectives of the visit

1. To monitor the status and effectiveness of field gene banks and community seed banks in Bara and Parsa districts.
2. To assess institutional understanding and implementation of agricultural genetic resource conservation practices and policies at NARC stations.
3. To explore challenges and sustainability issues in NARC stations and community-led conservation initiatives, particularly at the Kachorwa Community Seed Bank.
4. To explore the potential for utilizing the spaces in the premises of Gadhimai Temple for conserving agricultural genetic resources.

Methodology

- Prepared check list and format for monitoring, orientation, travel seminar and interaction
- Discussed and planned among the team within Genebank
- Prepared necessary presentations, compile publications and other necessary items
- Reviewed annual report and other publication of target stations and offices
- Notified target office about MOTSBAGR and send checklist and format
- Visited banks and shared/ discussed technical progress, guidelines (organization of travelling seminar along with visit)
- Documented status, issues, achievements etc and took photos
- Organized meeting (orientation and interaction) in target office and shared publications
- Explored wild/ local unique genetic resources at the areas and along the travel route
- Prepared brief note and shared among team, staff of target stations and social media (facebook, twitter, youtube)
- Listed potential species and activities for banking AGRs
- Collected important AGRs for conservation and plantation in Genebank, Khumaltar along with passport data
- Wrote report along with suggestions and shared

Key references for team

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Team members and site visited

Table 1. Team members

SN	Name	Designation	Office	Travel Duration
1.	Bindesh Man Sakha	Principle Scientist (S-5), Crop and Horticulture Director	Head Office, NARC	5.5 days
2.	Dr. Bal Krishna Joshi	Senior Scientist (S-4), Chief, Genebank	National Gene Bank	5.5 days
3.	Dr. Tek Prasad Gotame	Senior Scientist (S-4), Planning Chief	Head Office NARC	5.5 days
4.	Dr. Biseswar Prasad Yadav	Senior Scientist (S-4), DOAR, Prawanipur, Masesh Pardesh	Directorate of Agricultural Research, Parwanipur, Bara	2.5 days
5.	Dr. Bibek Sapkota	Scientist (S-4), Monitoring and Evaluation Division	Head Office NARC	3.5 days
6.	Mr. Bhoj Raj Pokhrel	Technical Officer (T-6)	National Livestock Breeding and Genetics Center	5.5 days
7.	Mr. Bikash Bhusal	Technical Officer (T-6)	National Gene Bank	5.5 days
8.	Mr. Sitaram Ojha	Administrator Officer (A-6)	National Gene Bank	6.5 days

Table 2. Place(s) / Office(s) visited

SN	Office name	Adress
1	Directorate of Agricultural Research (DoAR), Madesh Pardesh	Parwanipur, Bara
2	National Avian Research Program	Parwanipur, Bara
3	Agriculture Implement Research Station (AIRS)	Birgunj, Parsa,
4	National Sugarcane Research Program	Jitpur, Birgunj
5	Kachorwa Community Seed Bank,	Bara,
6	Mahagadhimai Manupalicy	Bariyarpur, Bara
7	Gadhimai Temple	Mahagadhimai, Bara

Major Activities Undertaken

1. **Monitoring and Assessment of Conservation Sites**
   Visited and assessed the condition and functioning of field gene banks and community seed banks located in Bara and Parsa districts, focusing on conservation practices, infrastructure, and germplasm diversity.
2. **Institutional Engagement and Technical Review**
   Conducted interactions with officials at various NARC research to understand their current involvement in genetic resource conservation and identify capacity gaps and ambiguities in implementation.
3. **Farmer and Community Interaction**
   Engaged with local farmers and community members at the Kachorwa Community Seed Bank to understand their role in conserving local genetic resources, challenges they face, and sustainability concerns due to declining external support and generational interest.

4. **Site Assessment for Future Conservation Potential**
   Explored the feasibility of utilising spaces within the premises of Gadhimai Temple for future conservation of agricultural genetic resources, assessing land availability and suitability.
5. **Identification of Gaps and Policy Needs**
   Identified key institutional and policy-level gaps, such as the absence of standard protocols, lack of inventories, unclear definitions of local germplasm, and the need for conservation targets in annual planning and reporting.
6. **Recommendations for Sustainability and Policy Improvement**
   Proposed actionable recommendations to strengthen conservation efforts, including youth engagement, local government involvement, conservation financing mechanisms, and integration of conservation goals into institutional systems.

Agricultural Genetic Resource Conservation Activities at NARC Stations

During the monitoring visit, it was observed that there exists a lack of clarity among staff at NARC research stations regarding the scope and implementation of agricultural genetic resource conservation activities. Many officials appear uncertain about what qualifies as agricultural genetic resources for reporting and conservation purposes. For example, confusion exists over whether ornamental plants or flowers grown within office premises, or seed production plots of different crop varieties, should be formally included as part of conservation efforts. This indicates a critical need for the development and dissemination of a clear, standardised protocol that defines the components and criteria of agricultural genetic resource conservation. Such a protocol would ensure uniform understanding and implementation across all NARC stations.

Moreover, the visit highlighted the limited awareness among technical staff regarding the classification of local versus exotic germplasm. Specifically, the understanding of how long an exotic variety must be cultivated in Nepal to be considered ‘local’ under the agricultural biodiversity conservation policy is weak. For instance, while an exotic annual crop grown continuously for over 60 years may be deemed local, this does not apply to long-lived tree species like mango that propagate vegetatively and do not go through regular reproductive cycles. This important distinction highlights the necessity for targeted awareness programs and capacity-building activities to enhance staff understanding of legal and scientific definitions related to genetic resources.

Additionally, it was found that there is currently no system in place for setting annual targets related to genetic resource conservation and utilisation, nor is there an integrated reporting mechanism within the institutional M&E framework. The absence of such a system limits the ability to track progress, allocate resources efficiently, and demonstrate accountability. It is therefore recommended that the Planning Division at NARC Head Office establish clear conservation-related targets as part of the institution’s annual work plan, and that the Monitoring and Evaluation Division incorporate progress reporting on these targets into its regular monitoring cycle.

Finally, a major gap identified was the absence of an inventory or documentary record indicating the type and extent of genetic resources maintained at each NARC office or research station. Agricultural genetic resources, land, infrastructure, and human resources are fundamental assets of the institution and must be managed accordingly. It is strongly recommended that the National Agriculture Technology Information Centre (NATIC) be tasked for including agricultural genetic resources inventory in the NARC website. This would support transparency, resource sharing, and strategic planning for long-term conservation.

Monitoring, orientation/observation and travelling seminar on banking AGRs

A travelling seminar was jointly organized by the National Agriculture Genetic Research Centre and participated from the Directorate of Crop and Horticulture (NARC), the Planning Division, the Monitoring and Evaluation Division, and the National Animal Breeding and Genetics Research Centre. The primary objective of this program was to assess and highlight the status, challenges, and potential of indigenous genetic resources in Nepal, particularly in the livestock and poultry sectors.

One of the key concerns discussed during the seminar was the alarming decline in indigenous agricultural commodities—especially native livestock and poultry species. Over the years, the traditional practice of rearing indigenous animals has steadily decreased. This trend can be attributed to several factors, most notably the increasing adoption of exotic breeds that offer higher productivity. As the demand for animal-based food products grows both locally and globally, farming systems have increasingly shifted toward commercial and cross-bred animals, which are perceived to be more profitable.

Government support in the form of production, trade, and marketing incentives has further accelerated the expansion of commercial livestock and poultry industries. Unfortunately, this has led to reduced attention on indigenous breeds, which are now maintained only by a small segment of the farming population.

1. Directorate of Agricultural Research (DOAR), Madesh Pardesh Parwanipur, Bara

Table 3. Participant list during monitoring, observation, and discussion on DOAR

From Monitoring and traveling seminar:	From DoAR Madesh Pardesh Parwanipur, Bara
• Bindesh Man Sakha • Dr Bal Krishna Joshi • Dr Tek Prasad Gotame • Dr Bibek Sapkota • Bhoj Raj Pokhrel • Bikash Bhusal • Sitaram Ojha	• Dr. Biseswar Prasad Yadav • Mohan Prasad Yadav

Observation and discussion

The Monitoring and traveling seminar visited DOAR Madesh Pardesh Parwanipur, Bara, for monitoring, orientation, and a traveling seminar focused on the banking of agricultural genetic resources (AGRs), particularly crop species, Aqua pound field genebank, Agri insect, livestock and forage. A discussion meeting was held at the office, with staff in attendance. The Station Chief presented an overview of AGR conservation and utilization activities, guided by the checklist and format provided by the team. Key topics discussed included gaps and targets in AGR conservation, steps for maintaining and utilizing genetic diversity, and specific areas such as fruits field genebanks, mango and Jackfruits diversity, associated biodiversity, exploration and collection efforts, diversity in fruits and vegetable species, fish Species, passport and documentation processes, analog site experiments for multiplication, evaluation, regeneration, and characterization (ASE-MERC). Other subjects included orthodox seed management,

accessioning, conservation initiatives, registration of native landraces, diversity mapping, AGR identification and profiling, a list of conserved materials with associated data, publications, and diversity assessments.

The team also provided checklists, formats, and guidelines, along with discussions on fundamental concepts such as park and field genebanks and aspects of duplicate management. While the station has conserved numerous AGRs, only a limited number of accessions and native crop genetic resources have been utilized. Following the meeting, the team visited all farm areas and engaged with key staff members to assess technical issues and the diversity status. The station was found to have high diversity, but better maintenance, proper recording, and some additional measures were recommended. Suggestions included documenting collection details such as date, source, and farmer information, and prioritizing native AGRs for conservation and utilization. Plans to register landraces of several native AGRs were also discussed.

The mandate of this station encompasses the collection, conservation, and utilization of native and local forage species and cultivars. Despite the management of many agro-field genebank in DOAR, the richness of fruits species and cultivars remains underexplored. Efforts in Fruits should prioritize associated biodiversity, ensuring its preservation and sustainable utilization. A separate project has been initiated to promote and evaluate native crop cultivars, highlighting the significance of this genetic resource. However, many critical native crop genetic resources in the area are not included in current research efforts, with some even facing the risk of endangerment. For effective conservation and research, it is crucial to focus on all available crop genetic resources (CGRs) and associated genetic materials in the locality. The collection and conservation of wild relatives and wild crop species are equally important, emphasizing their domestication alongside preservation efforts.

AGRs and conservation banks

A formal fruit field genebank has not yet been established, but 25 different Landres of mango and more than 5 of jack fruits and 12 Landres were conserved and researchers are not sufficiently familiar with the concept of banking agricultural genetic resources (AGRs). Similarly, habitat for agro -insect were created because on non-removing dead plant. Currently, priority is often given to exotic cultivars and fish, despite the presence of many locally adapted and climate-smart crop species. Recognizing this gap, researchers have decided to establish a Agro-Genetic Sanctuary. This initiative aims to collect and conserve local forage species while systematically documenting them with comprehensive passport data, ensuring the preservation and sustainable utilization of these valuable genetic resources.

Some issues

- Very limited human resources specially project activity leader.
- Communication gap among the researchers.
- Very few research was conducted on native AGRs.
- Target species is only one but eco-friends concept should be included. Many AGRs are there and they should be the property of Station
- List of important genetic resources are not well documented and well known
- Many areas, buildings not properly used

Suggestions

- In list and publish Article regarding diversity of Native in Research center.
- Establishment diversity block of paddy genotype conserved in Kachorwa Community

Seed Bank.

- Many associated biodiversity has been conserved along with providing habitat for AGRs. This provision should be recognized at national level
- Registration of Avin species and landraces should be started
- Assess diversity at species, landrace and genotype level
- Develop database and start using passport app developed by Genebank
- AGRs available in Station should be documented and considered as property of the Station
- Integrated farming research is needed. Even if other species are not under mandated species, the concept of just single species should be modified.
- Establish Avin sanctuary
- Add AGR on website.
- Replication of conserved Avin on other research station.
- Need to establish livestock farm genebank, forage field genebank, agro-insect field genebank and agro-microbial field genebank, etc
- Promote aqua pond genebank, field genebank, agro gene sanctuary along with label and database
- Better to establish raithane nursery
- Collect native AGRs

Functional images

Photos during Directorate of Agricultural Research (DoAR), Parwanipur, Bara visit

Photo 1. Monitoring team and DOAR chief in DOAR

Photo 2. Monitoring team and DOAR project activity leader

Photo 4. Fish hatchery on DOAR

Photo 5. Agro-pound monitoring with DOAR Team

Photo 6. Monitoring, and DOAR Aquaculture team discussion farmer

Photo 7. Monitoring fruits orchard of DOAR

Photo 8. Monitoring different genotypes of mango on DOAR

Photo 9. Raithane jackfruit fruit cultivated in DOAR

Photo 10. Dry plant conservation for insect habitat on fruits orchar

Photo 11. Insect habitat found on dry plant on fruits orchar

2. National Avian Research Program, Parwanipur, Bara

Table 4. Participant list during monitoring, observation, and discussion on National Avian Research Program

From Monitoring and traveling seminar: • Bindesh Man Sakha • Dr Bal Krishna Joshi • Dr Tek Prasad Gotame • Dr Bibek Sapkota • Bhoj Raj Pokhrel • Bikash Bhusal • Sitaram Ojha	From **National Avian Research Program** • Chief • Purna Badhur Chapagai • Dr. Anil Kumar Ojha

Observation and discussion

As part of the seminar, monitoring visits were conducted at the National Avian Research Program (NARP), Parwanipur, Bara, where a significant effort is being made to conserve poultry genetic diversity. NARP Parwanipur maintains a rich collection of both exotic and indigenous poultry breeds.

AGRs and conservation banks

Chickens

- Exotic Chickens: New Hampshire, Australorp, Cornish, Giriraja, Kadaknath
- Indigenous Chickens: Sakini, (Collected Chitwan, Rasuwa, and Tanahu), Ghanti Khuile (Collected from Khumaltar), Pwank Ulte

Other Poultry Species:

- Quail: Japanese quail
- Turkey: Black, White
- Guinea fowl: Black, White

Total species: 4
Total breeds recorded: 13
(Note: Two species—Turkey and Guinea fowl—are not further specified by sub-breed.)

Fodder Diversity Observed
In addition to poultry, the site also showcased a range of fodder species important for livestock feeding. These native fodder species play a critical role in supporting sustainable livestock farming systems and maintaining agro-biodiversity.

The following examples of fodder diversity were recorded:

- Bethuwa (Goosefoot)
- Dubo (Bermuda grass)
- Bodi (Cowpea)
- Siru (Imperata grass)

Some issues

- Very limited human resources and infrastructure.
- Feed cost high
- Budget is not enough to smoothly carry the research
- Target species is only one but eco-friends concept should be included. Many AGRs are there and they should be the property of Station
- List of important genetic resources are not well documented and well known

Suggestions

- In list and publish Article regarding diversity of Native Avin in Nepal.
- Develop New local Avin breed.
- Many associated biodiversity has been conserved along with providing habitat for AGRs. This

provision should be recognized at national level

- Registration of Avin species and landraces should be started
- Assess diversity at species, landrace and genotype level
- Develop database and start using passport app developed by Genebank
- AGRs available in Station should be documented and considered as property of the Station
- Integrated farming research is needed. Even if other species are not under mandated species, the concept of just single species should be modified.
- Establish Avin sanctuary or poultry farm genebank
- Add AGRs on website.
- Replication of conserved Avin on other research station is needed
- Forage species used for poultry should be conserved and used

Functional images

Photos during National Avian Research Program (NARP), Parwanipur, Bara

Photo 12. Monitoring team discussion with NARP team on NAPR

Photo 13. Chicken rearing on NARP

Photo 14. Ghatikhuile hen in NARP

Photo 15 Pwank Ulte hen in NARP

Photo 16. Sakhani hen in NARP

Photo 17. Hen rearing by grass grazing method

Photo 18. Constriction of new model hen rearing cage

Photo 19. Briefing about NARP and hen by NARP Chief

Photo 20. Guinea fowl on NARP

3. Implement Research Station (AIRS), Ranighat

Table 5. Participant list during monitoring, observation, and discussion on National Avian Research Program

From Monitoring and traveling seminar: • Bindesh Man Sakha • Dr Bal Krishna Joshi • Dr. Teak Prasad Gotame • Dr. Biseswar Prasad Yadav • Dr. Bibek Sapkota • Bhoj Raj Pokherel • Bikash Bhusal • Sitaram Ojha	From: Implement Research Station • AIRS Chief: Sachin Mishra • Sunil Sahani • Ashok Kumar Sha • Sugrib Lal Mandal

Observation and discussion

Barasamase aap plant was found as different spp of mango. Which can harvest 3 time (Bhadra-ashoj, Ashoj-Kartik and Kartik – Mangshir). The document outlines the establishment of an implement museum at the Research Station. The museum aims to showcase farm machinery, tools, and implements developed at AIRC, Ranighat, and elsewhere. The purpose is to improve agricultural practices, educate stakeholders, and provide a space for proper maintenance and understanding of these tools. The museum was created by renovating an existing space, organizing various tools and implements, and arranging them in a systematic manner. It also provides information to farmers, students, and other stakeholders.

The list of implements, tools and machines that were placed in the museum is given below

1. Different types of animal-drawn Ploughs (viz. Country Plough, Mould Board Plough, Kasual Plough, Ashami Plough, Marham Plough, Kisan Plough, Punjabi Plough etc.)
2. Hand/Wheel Hoe
3. Bullock-drawn Rake
4. Hand Rake
5. Yoke
6. Long Spade (for hilly areas)
7. Khurpi
8. Sickle
9. Bullock-drawn Bed Former
10. Tractor-drawn Bed Former
11. Animal-drawn 3-tine cultivator
12. Different types of animal-drawn Harrow (Satfarwa)
13. Power Tiller-drawn Disc Harrow
14. Different types of animal-drawn Puddler
15. Power Tiller-drawn Puddler
16. Animal-drawn Dhaincha Chopper
17. Hand Chopper
18. Different types of Nursery Planter/ Earth Auger

19. Animal-drawn Leveler
20. Power Tiller-drawn Leveler
21. Hand Weeder (for dry condition in rice field)
22. Hand Weeder (for wet condition in rice field)
23. Animal-drawn Single row Maize Planter
24. Manual Maize Planter
25. Different types of Corn Sheller
26. Manual Rice Transplanter (6-rows, 4-rows)
27. Power Operated Rice Transplanter (2-rows, Japanese)
28. Power Operated Lawn Mower
29. Water Pump Set
30. Sprinkler
31. Peanut Sheller
32. Briquet Machine
33. Paddle grain Cleaner
34. Hand grain Cleaner
35. Different types of Winnowing Fans (Hand winnower, Bicycle winnower)
36. Different types of Drum Seeder
37. Rice Husk Stove
38. Paddle Paddy Thresher
39. Bullock-drawn Minimum-till Seed cum Fertilizer Drill Machine
40. Animal-drawn ZTD Seed cum Fertilizer Drill Machine (3-rows)
41. Animal-drawn Seed Drill Machine
42. Power Tiller-drawn Seed cum Fertilizer Drill Machine
43. Power Tiller-drawn Reaper.

AGRs Found on Implement Research Station (AIRS)

1. Barse mase Aap
2. Gauva
3. Neem
4. Litchi
5. Sital chini
6. Amala
7. Jack fruits
8. Lemon
9. Banana

Some issues

- Very limited human resources and infrastructure.
- Few research on indigenous tools
- Budget is not enough to smoothly carry the research
- Conservation through use and beautification concept not considered
- Database not prepared

Suggestions

- In list and publish Article regarding local tools and equipment used by farmer of Nepal.

- Develop New equipment on farmer need basis (example finger millet planter) with water saving technology.
- Many associated biodiversity has been conserved along with providing habitat for AGRs. This provision should be recognized at national level
- Registration local mechanics and equipment.
- Develop data format for local and indigenous tools used on agriculture.
- Assess diversity at species, landrace and genotype level
- Develop database and start using passport app developed by Genebank
- AGRs available in Station should be documented and considered as property of the Station
- Integrated farming research is needed. Even if other species are not under mandated species, the concept of just single species should be modified.
- Conservation through beatification need to promote

Photos during Implement Research Station (AIRS), Ranighat visit

Photo 21. Monitoring team and AIRS team

Photo 22. Baramase mango on AIRS

Photo 23. AIRS chief briefing about museum on AIRS

Photo 24. Monkey pushing equipment developed by AIRS

Photo 25. Group photo of monitoring team and AIRS team

4. National Sugarcane Research Program (NSRP), Jeetpur

Table 6. Participant list during monitoring, observation, and discussion on National Avian Research Program

From Monitoring and traveling seminar:	From National Sugarcane Research Program
• Bindesh Man Sakha • Dr Bal Krishna Joshi • Dr. Tek Prasad Gotame • Dr. Biseswar Prasad Yadav • Dr. Bibek Sapkota • Bhoj Raj Pokhrel • Bikash Bhusal • Sitaram Ojha	• AIRS Chief: Dr Dil Raj Yadav • Dinesh Chaudary

Observation and discussion

In Nepal, sugarcane (*Saccharum officinarum* L.) is one of the largest cash and industrial crop that plays a pivotal role in national economy. Under Nepal Agricultural Research Council (NARC), National Sugarcane Research Program, (NSRP) is the only sugarcane research institution in Nepal which has mandate to increase the production and productivity of sugarcane through the generation of sustainable, environmental friendly and economically viable technologies. Currently, we are working on farmers need based sugarcane research activities like varietal selection for different maturity groups, pest management, crop cultural practices, soil management and mechanization in sugarcane cultivation. Currently, there are fourteen sugar factories running at their full capacity in the country.

The sugarcane field genebank was maintained with 148 planted genotypes. According to the chief, after establishing the field genebank, the conservation of sugarcane became much easier, as did knowledge transfer to farmers. Badare genotype collected from Gulmi distic was much tallest sugarcane. Currently, tissue culture propagation has been successfully applied to eight genotypes. We monitor both the field genebank and the tissue-cultured seedlings, which have shown vigorous growth. Flood irrigation posed challenges due to waterlogging, while stem borers and red rot emerged as the primary insect pest and disease affecting sugarcane. Additionally, research on natural harvesting methods has been initiated to explore sustainable practices.

AGRs and conservation banks

1. Wild cucumber
2. Mango
3. Drumstick plant
4. Rose
5. Coconut
6. Jamun
7. Litchi
8. Gurjo
9. Makhamali ful
10. Gauva

11. Neem
12. Litchi
13. Sital chini
14. Amala
15. Jack fruits
16. Lemon
17. Banana

Some issues

- Very limited human resources and infrastructure.
- Few research on indigenous genotype.
- Coordination is required
- Replication of sugarcane conservation is required.
- Flood irrigation posed challenges due to waterlogging.
- Stem borers and red rot emerged as the primary insect pest and disease affecting sugarcane.
- Training on field genebank management is required.
- Budget is not enough to smoothly carry the research

Suggestions

- Collection, list and publish article regarding local sugarcane genotype.
- Many associated biodiversity has been conserved along with providing habitat for AGRs. This provision should be recognized at national level
- Registration of local sugarcane genotype.
- Fill Passport data format for local and indigenous genotype.
- Assess diversity at species, landrace and genotype level
- Develop database and start using passport app developed by Genebank
- AGRs available in Station should be documented and considered as property of the Station
- Integrated farming research is needed. Even if other species are not under mandated species, the concept of just single species should be modified.
- Promote natural and diversity farming
- Give priority to utilize native landraces
- Can consider sugarcane park
- Conservation through utilization should be promoted including wild sugarcane
- Different species for hedge row and living fences using native landraces should be promoted
- Need to consider and use associated biodiversity

Table 7. National Sugarcane Research program, Jeetpur,Bara

Field Gene Bank - 2081-82

SN	Genotype	SN	Genotype	SN	Genotype	SN	Genotype	SN	Genotype
1	Bo-91	31	Co-97020	61	Cose-92426	91	UP-0097	121	Cose-13038
2	Bo-99	32	Co-98029	62	Cose-92430	92	Coh-152	122	Co-13035
3	Bo-110	33	Co-0238	63	Cos-08432	93	CoJ-85	123	J.S-4
4	Bo-113	34	Cose-98259	64	Cos-88230	94	coJ-64	124	Co-0124
5	Bo-120	35	Cose-96236	65	Cos-767	95	CoJ-88	125	J.S.S-2079
6	Bo-126	36	Cose-96436	66	Cose-07250	96	Colk-94184	126	Malaysian
7	Bo-128	37	Cose-95436	67	Cis-08279	97	Saptari	127	Co-09232
8	Bo-130	38	Cose-95422	68	Cos-08276	98	Bo-150	128	Cose-17231
9	Bo-131	39	Cose-98235	69	cos-08432	99	UP-9530	129	Jitpur-4
10	Bo-134	40	Cose-97263	70	Cos-13231	100	Dharan	130	SPM
11	Bo-135	41	Cose-92440	71	cos-96268	101	UP-9742	131	CoH-160
12	Bo-136	42	Cose-98231	72	cos-08436	102	Co-0118	132	Cose-12232
13	Bo-137	43	Cose-97232	73	Cos-88230	103	MS-10001	133	Co-16233
14	Bo-138	44	Cose-92270	74	CoS-08272	104	Gulmi-2	134	Cos-1145
15	Bo-139	45	CoSe-9601	75	Cop-92186	105	Pantsara	135	Cop-9301
16	Bo-141	46	Cose-93234	76	cop-96181	106	Co-0232	136	Thorgali koshero
17	Bo- 146	47	Cose-99233	77	cop-96181	107	PI-1401	137	Juice ukhu
18	Bo-147	48	Cose-98426	78	cop-97181	108	Hriyana	138	kalo koshero
19	Kamle ukhu	49	Cose-91259	79	Co-9105	109	Rajendra-1	139	seto koshero
20	co-0233	50	Cose-01235	80	cop-93182	110	Co-05011	140	loha singh
21	Uhudi	51	Cose-92234	81	UP-0098	111	Co-86032	141	Copb-92
22	Co-97028	52	Cose-92275	82	Co-98014	112	CoJ-66	142	copb-95
23	Co-0239	53	Cose-92423	83	Cop-2061	113	Co-89003	143	Rajendra-6
24	Co-01424	54	Cose-92237	84	h-70	114	D-phadi	144	Rajendra-5
25	CoS-96068	55	Cose-92270	85	up-05125	115	Rajendr-1	145	Rato koshero
26	Co-98020	56	Cose-94470	86	Cop-9103	116	Colk-14201	146	Badre
27	C0-98020	57	Cose-97020	87	UP-5191	117	Co-05009	147	Co-11015
28	Co-07250	58	Cose-1434	88	co-0232	118	Co-15023	148	Rajendra-3
29	Co-98039	59	Cose-93237	89	Shere Punjab	119	Cos-99233		
30	Co-98028	60	Cose-3234	90	cos-13235	120	Cose-98235		

Functional images

Photos of National Sugarcane Research Program, Jitpur, Birgunj visit

Photo 26. During field observation on NSRP

Photo 27. Wild cucumber in NSRP

Photo 28. Monitoring and NSRP team group photo

Photo 29. During field observation on NSRP

5. Kachorwa Community Seed Bank (KCSB): Nepal's Second Community-Led Genetic Resource Initiative

Table 8. Participant list during monitoring, observation, and discussion on National Avian Research Program

From Monitoring and traveling seminar: • Bindesh Man Sakha • Dr Bal Krishna Joshi • Dr. Tek Prasad Gotame • Dr. Biseswar Prasad Yadav • Dr. Bibek Sapkota • Bhoj Raj Pokhrel • Bikash Bhusal • Sitaram Ojha	From: Kachorwa Community Seed Bank • 18 members from Kachorwa Community Seed Bank

Observation and discussion

The Kachorwa Community Seed Bank (CSB), located in Bara district, stands as a significant example of grassroots-level conservation of agricultural genetic resources in Nepal. Established with the facilitation and support of multiple organisations in its early years, the seed bank has played a critical role in preserving local varieties of crops—particularly rice. As of the time of this visit, the seed bank is independently maintaining 88 local rice germplasms, along with a collection of germplasms of several other crops, showcasing the community's deep commitment to agricultural biodiversity conservation.

During the field visit, direct interaction with the community members managing the CSB provided valuable insights into both the achievements and the pressing challenges of this initiative. One of the most notable strengths is the community's continued operation of the seed bank despite the withdrawal of external support. The custodians of the seed bank have been allocating their own land, labour, and resources to maintain the germplasm collections, with a clear understanding of the cultural and ecological value of these resources.

However, two major sustainability concerns were raised by the farmers during the interaction. First, the core group involved in the conservation efforts is aging, and there is a noticeable lack of interest from younger generations in taking up agricultural activities, let alone conservation-oriented ones. This generational gap poses a serious threat to the continuity of the initiative. Second, with the absence of ongoing institutional or financial support, the opportunity cost of land and labour used for conservation is becoming a burden. The farmers highlighted that they could otherwise use these resources for more immediately profitable agricultural practices, such as cultivating high-yielding commercial crops.

To address these sustainability challenges, the field team suggested several practical interventions. These include integrating conservation awareness into school curricula, organising training programs for students and youth, and holding local fairs and exhibitions to showcase the value of local genetic resources. Additionally, the involvement of local government bodies was recommended as a strategic approach to ensure long-term support and funding. Nearby research stations, such as the DOAR Parwanipur, could play a facilitative role by partnering with community efforts, providing technical

guidance, and even replicating the conservation work undertaken by the Kachorwa farmers.

The Kachorwa CSB exemplifies how community-driven initiatives can contribute meaningfully to genetic resource conservation. However, for such models to be sustained and scaled, multi-stakeholder collaboration, supportive policy frameworks, and financial mechanisms—such as conservation financing—must be established. Ensuring the continuity of the Kachorwa Community Seed Bank will require recognising the real costs borne by the community and finding ways to share the responsibility and benefits of conservation more equitably across institutions and society.

AGRs and conservation banks

- Seed Bank: Rice landraces, sponge gourd, ol, finger millets, some grain legumes
- Field genebank: Few species of forages and fruits

Some issues

- Very few young people were involved in CSB.
- Generational gap poses a serious threat to the continuity of the initiative.
- Absence of ongoing institutional or financial support, the opportunity cost of land and labour used for conservation is becoming a burden.
- Budget is not enough to smoothly carry the research
- Focus on only one crop Rice.

Suggestions

- Nearby research stations, such as the DoAR, Parwanipur, could play a facilitative role by partnering with community efforts, providing technical guidance, and even replicating the conservation work undertaken by the Kachorwa farmers.
- Integrating conservation awareness into school curricula, organising training programs for students and youth, and holding local fairs and exhibitions to showcase the value of local genetic resources.
- The involvement of local government bodies was recommended as a strategic approach to ensure long-term support and funding.
- Awareness program should be taken on their own rice variety too.
- Promote household genebank
- Consider associated biodiversity for conservation
- Conduct awareness fare related to raithane rice genotype.

Functional images

Photos during Kachorwa Community Seed Bank visit

Different rice genotype conserve in glass Bootle in KCSB

Different rice genotype conserve in hanging bundles of panicle in KCSB

Photo 30. During monitoring inside bank of KCSB

Photo 31. Traditional seed store made by soil in KCSB

Photo 32. During discussion with members of KCSB

Photo 33. Group photo of monitoring team and KCSB member

6. Exploring the Conservation Potential at Gadhimai Temple Premises

Table 8. Participant list during monitoring, observation, and discussion on Gadhimai Temple Premises

From Monitoring and traveling seminar:	From: Gadhimai Temple
• Bindesh Man Sakha • Dr Bal Krishna Joshi • Dr. Tek Prasad Gotame • Dr. Biseswar Prasad Yadav • Dr. Bibek Sapkota • Bhoj Raj Pokhrel • Bikash Bhusal • Sitaram Ojha	• Aribind lohar • Agriculture Officer • Mahagadhimai Manupalicy Bariyarpur, Bara, 9807277502

Observation and discussion

As part of the field visit, the team explored the potential for utilizing underused spaces within the premises of Gadhimai Temple in Bara district for the conservation of agricultural genetic resources. The temple is one of the most renowned religious sites in Nepal, attracting large numbers of pilgrims and visitors from across the country and India, particularly during the Gadhimai festival held every five years. Beyond its religious significance, the temple occupies a large area of land, much of which remains underutilised outside of major religious events. This makes it a strategically important location to consider for conservation and awareness-raising efforts, especially those related to agrobiodiversity.

The visit team held a meeting with the Agriculture In-Charge of Maha Gadhimai Municipality. During the discussion, the municipal official expressed interest and openness toward supporting conservation initiatives, particularly if they are aligned with local culture, education, and tourism development. The official emphasised that the municipality has a role to play in preserving genetic resources, especially in collaboration with national institutions like NARC and local communities. The municipality also acknowledged the need for technical support, awareness creation, and capacity-building if such an initiative is to be launched and sustained.

Most importantly, any intervention in such a spiritually significant site must be carried out with a deep understanding of local cultural values and symbolic meanings associated with plants. During consultations with local stakeholders, it was highlighted that communities in and around the temple hold strong beliefs regarding the symbolic status of certain plant species. For instance, banana and woodapple (bael) trees are considered sacred and auspicious, often associated with purity, prosperity, and religious rituals. As such, their presence in the temple grounds would be culturally accepted and even welcomed, symbolising harmony between nature and spirituality.

Conversely, certain other species are believed to be signs of bad omens or misfortune, and planting them within or around the temple could offend local sentiments. These symbolic interpretations are deeply rooted in local customs, religious teachings, and traditional ecological knowledge. Therefore, species selection and site planning must take into account these beliefs, ensuring that any conservation activity conducted on temple premises is viewed as a "good symbol" rather than a "bad symbol" by the community.

This understanding presents both a challenge and an opportunity. If handled with sensitivity and inclusiveness, such conservation efforts can create culturally resonant spaces that promote biodiversity while reinforcing spiritual and ethical values linked to environmental stewardship. The initiative could include planting sacred and local varieties, setting up interpretation boards that link biodiversity to cultural values, and engaging local schools, religious leaders, and farmers in planning and implementation. Moreover, nearby NARC institutions, such as the DOAR Parwanipur, could play a facilitative role by offering technical support and helping design suitable conservation layouts while fully respecting cultural boundaries. By doing so, Gadhimai Temple could emerge as a model for integrating religious and cultural heritage with biodiversity conservation, which could be replicated at other temples and spiritual sites across the country.

Finally, the initiative must be rooted in participatory planning with local residents, temple authorities, cultural leaders, and research institutions to ensure legitimacy, sustainability, and acceptance. It is also essential to document community perceptions thoroughly before initiating conservation actions, so that symbolism, sanctity, and science are meaningfully aligned in this unique conservation endeavor.

AGRs and possible conservation banks in Gadhimai Temple

1. Mango
2. Two types of honeybees
3. Habitat for agro-insect
4. Different types of birds
5. Pipal plant
6. Habit for aquatic GRs
7. Rose
8. Jamun

Possible banks are agro-gene sanctuary, aqua pond genebank, forage field genebank, field genebank, raithane nuersery, agro-insect field genebank, agro-microbial field genebank, park, etc.

Functional images

Photos of Gadhimai Temple

Photo 34. Observation potential by monitoring team

Photo 35. Group photo of monitoring team and Agriculture Officer

Photo 36. Seeking different bee species around temple

Photo 37. Group photo of monitoring team and Agriculture Officer

7. Mahagadhimai Municipality Bariyarpur, Bara

Table 9. Participant list during monitoring, observation, and discussion on Mahagadhimai Municipality Bariyarpur, Bara

From Monitoring and traveling seminar:	From Mahagadhimai Manupalicy Bariyarpur, Bara
• Bindesh Man Sakha • Dr Bal Krishna Joshi • Dr. Tek Prasad Gotame • Dr. Biseswar Prasad Yadav • Dr. Bibek Sapkota • Bhoj Raj Pokhrel • Bikash Bhusal • Sitaram Ojha	• Aribind lohar • Agriculture Officer, 9807277502

Observation and discussion

Mahagadhimai Municipality Bariyarpur, Bara is very positive with conservation and utilization. We have discussed with the agriculture office and secured their commitment to establish an agricultural field genebank in every ward. The genebank will primarily include wood apple, jujube, jackfruit, banana, mango, papaya, wild rice, and flood-resistant rice varieties. Once completed, it will be the largest agricultural field genebank in the region.

Some issues and suggestion

- Technical support will be supported by Directorate of Agricultural Research (DoAR), Madesh Pardesh Parwanipur, Bara and National Genebank, Khumaltar Lalitpur
- Orientation is needed before genebank establishment.
- Budget will be allocated from next fiscal year.
- Work plan along with list of AGRs need to document
- Raithane nursery should be established and distributed free of cost
- Native AGRs should be planted along the road sides
- Conservation through beautification should adopted.
- Collection centers, hat bazar, diversity fair and food fairs should be organized regularly.

- Conservation banks should be established and promoted.

Functional image

Photo of Mahagadhimai Municipality Bariyarpur, Bara discussion

Photo 38. During discission with monitoring team and Mahagadhimai Manupalicy Bariyarpur, Agriculture Officer

Conclusion and Recommendations

The field visit to Bara and Parsa districts provided valuable insights into the status, challenges, and opportunities in agricultural genetic resource conservation, both within NARC stations and community-led initiatives. It became evident that while significant efforts are being made on the ground, there is a pressing need for greater clarity, standardization, institutional support, and policy innovation to sustain and scale these efforts. The interaction with community seed banks, local government representatives, and NARC officials highlighted a shared commitment but also revealed knowledge gaps, resource constraints, and coordination challenges. The field observations also revealed the importance of integrating cultural values, youth engagement, and local government involvement in future conservation strategies. To strengthen genetic resource conservation in Nepal, the following recommendations are proposed:

- **Develop and disseminate a standard protocol** for defining and reporting agricultural genetic resources across all NARC stations and partner organisations.
- **Educate and train NARC staff** and stakeholders on key concepts such as the definition of local germplasm, criteria for conservation, and long-term commitments required for genetic resource preservation.
- **Set clear annual targets** for conservation, utilisation, and reporting of agricultural genetic resources through collaboration between the Planning Division and Monitoring and Evaluation Division of NARC.
- **Create a national inventory** of genetic resources available at each NARC station and publish it through the NATIC-managed NARC website to ensure transparency and coordination.
- **Support community seed banks**, such as Kachorwa, by introducing conservation financing mechanisms, youth-targeted awareness campaigns, and involvement of local governments and nearby NARC stations.
- **Explore the use of underutilised public and cultural spaces**, such as Gadhimai Temple, for culturally sensitive conservation initiatives that align biodiversity goals with local traditions.
- **Conduct further research** on ecosystem service valuation and willingness-to-pay studies to inform sustainable conservation financing and policy frameworks.

AGRs along the travel route

Route: Kathmandu- Daxinkali- Bhimfedi- Hetauda- Parwanipur – Jeetpur – Gadhimaai- Kachorwa-Ranighaat – Parwanipur

AGRs observed along the route

Table 10. List of Agriculture Genetic Resources along the road side

1. बैंस (Weeping willow)	2. असिसो (Broom grass)	3.सयपत्री फुल Marigold flower
4. आँप (Mango)	5. किम्बु (Mulberry)	6.केरा banana
7. अम्बा (Guava)	8. तरूल (Edible canna)	9. नास्पाती Pear
10. काफल (Bayberry)	11. कालो कमिला (Arboreal ant hive)	12. जंगली सखर-खण्ड (Wild sweet potato)
13. लिची /(Litchi)	14. अैसेलु (Himalayan raspberry)	15. जङ्गली लट्टे (Wild Amaranth
16. बेल (Wood apple)	17. खुर्पानी (Apricot)	18. अमला (Indian gooseberry)
19. बारमासे फूल (China rose)	20. आरु (Peach)	21. निउरो (Fiddlehead greens)
22. जामुन (Java Plum)	23. रूख टमाटर (Tree tomato)	24. बयेर (Jujube)
25. नरिवल (Coconut)	24. जंगली गिठा (Air patato)	25. तुल्शी (Holy Basil)
26. पुतली (Butterfly)	27. फट्यांग्रा (Grasshopper)	

Photo of Plant Genetic Resources along the road side

Photo 39. Arboreal ant hive

Photo 40. Peach fruits

Photo 41. Discussion during tea time on the way

Photo 42. Observation of Himalayan raspberry

Photo 43. Butterfly

Photo 44. Air potato

Photo 45. Bayberry

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Annex I. General action tracks for better managing and utilizing AGRs

कृषि जैविक विविधता समन्धी महत्वोपूर्ण दिनहरु

१. २०७९ सालदेखी राष्ट्रिय कृषि जैविक विविधता बर्ष २०७९ को रुपमा मनाएको।
२. हरेक बर्ष माघको पहिले साता राष्ट्रिय कृषि जैविक विविधता सप्ताह अन्तर्गत माघ १ गते राष्ट्रीय कृषि जैविक विविधता दिवसको रुपमा मनाउने (२०७९ साल वाट शुरु)।
३. हरेक बर्ष आश्विन २१ गते राष्ट्रिय जिन बैंक तथा रैथाने कृषि दिवसको रुपमा (२०७५ साल देखी) मनाउदै आएको (२०७५ साल देखि नै उक्त दिन कृषि जैविक विविधता दिवसको रुपमा पनि मनाउदै आएकोमा अब २०७९ साल वाट कृषि जैविक विविधता दिवस माघ १ गते हुने)।
४. बालाचतुर्दशी (मार्गशीर्षकृष्ण चतुर्दशी तथा शतबीज छर्ने) दिनलाइ राष्ट्रिय कृषि अनुवांशिक स्रोत संरक्षण दिवस (प्रकृतिलाइ कृषि आनुवंशिक स्रोत) को रुपमा मनाउने (२०७९ साल वाट शुरु) (चतुर्दशी शिवजीको प्रिय तिथि) र यसै दिन बिभिन्न मन्दिर/ पवित्रस्थलहरुमा कृषि वंशाणु आरक्ष स्थल स्थापना गर्ने (२०७५ साल वाट शुरु)।
५. असार १५ : राष्ट्रिय धान दिवस (२०६१ साल वाट)।
६. श्रावण १५ : राष्ट्रिय कोदे दिवस (२०७८ साल वाट)।
७. बैशाख ७ : राष्ट्रिय याक दिवस (२०८२ साल वाट)।

प्रचार प्रसार तथा अभिलेखी कार्यहरु

- विभिन्न संचार माध्यमहरु वाट विभिन्न शिर्षकहरुमा अन्तरक्रिय गर्ने ।
- संचार कर्ताहरुलाई नियमित कृषि जैविक विविधता समन्धित कार्य गर्न लगाउने तथा गर्न सक्षम बनाउने।
- रैथाने कृषि आनुबंशिक स्रोतहरुपरम्परागत ज्ञान र , परिकारहरुको सम्बर्द्धन, प्रबर्द्धन, बजारीकरण, संरक्षण, विकास, अभिलेकिकरण गर्ने।
- जीन बैंकले अगाढी सारेको ८० वटा कृषि जैविक विविधताको संरक्षण र उपयोग समन्धि कार्य तथा असल अभ्यासहरुलाइ प्रकाशन गरि प्रचार प्रसार गर्ने ।
- प्रत्येक जिल्लाको कृषि जैविक विविधता प्रोफाइलको लागि आवश्यक कार्य गर्ने र सबै जिल्लाको कृषि जैविक विविधताको सूचांक (index) तयार गर्ने ।
- नेपालमा कृषि जैविक विविधता संबन्धि किताब प्रकाशन गर्ने ।
- कार्यलय हरुले कृषि जैविक विविधताको सुची साथै सम्पूर्ण कृषि जैविक विविधताको अभिलेख तयार गर्ने । कृषि जैविक विविधता समन्धि शब्दकोष प्रकाशन गर्ने ।
- कृषि जैविक विविधता बारे सम्पूर्ण जानकारी online मार्फत सबैमा पहुँच गराउने ।
- महत्वपूर्ण रैथाने जातहरुलाई सुचिकृत गर्ने ।
- पन्च-गुणीय कृषि उपजलाइ प्रचार प्रसार गर्ने ।

- राष्ट्रिय कृषि जैविक विविधता कार्यशाला गोष्ठीको साथै कृषक स्तर, प्रदेश स्तर र राष्ट्रिय स्तरको तालिम - गोष्ठी संचालन गर्ने।
- लोपन्मुख र दुर्लभ जातहरुको खोज, संकलन तथा अभिलेखीकरण साथै प्रत्येक जिल्लावाट लोपन्मुख रैथाने जातहरु राष्ट्रिय जिन बैंकमा पठाउने व्यवस्था गर्ने ।

संरक्षण कार्यहरु

- जलीय कुण्ड जिन बैंक ,पशुपंक्षी फार्म जिन बैंक,उखु पार्क ,फिल्ड जिन बैंक तथा आलु पार्क , कृषि वंशाणु आरक्ष स्थल किरा ,फिल्ड जीन बैंक, च्याउ पार्क आदिको स्थापन गर्ने ।
- सुन्दरता मार्फत रैथाने फूलहरुको संरक्षण र उपयोग गर्ने साथै जडिबुटी संरक्षण उद्यान स्थापना गर्ने।
- शैक्षिक क्षेत्रहरुमा स्कूल कलेज /फिल्ड तथा जलीय कुण्ड जिन बैंकहरु स्थापना गर्ने ।
- सामुदायिक बिउ बैंक, सामुदायिक फिल्ड जीन बैंक र सामुदायिक जलीय कुण्ड जिन बैंकहरु र घरायसी जीन बैंकहरुको स्थापना तथा प्रबर्द्धन गर्ने साथै पुरानो सार्बजनिक बगैचा जस्तै आपको बगैचालाइ पुनर्जीवित गरि संरक्षण र दिगो उपयोग गर्ने ।
- कृषि वृक्षारोपणको शुरवात गर्ने र पार्क, उधानहरुमा कृषि जैविक स्रोतहरु संरक्षण गर्ने ।
- स्थानीय परिकारहरुलाइ होम-स्टे तथा बजार संग समन्वय गरि प्रबर्द्धन गर्ने, स्थानीय खाध मेला गर्ने।
- ठाउँ बिशेष जात तथा परिकारको कार्यलाइ बिशेष जोड दिने ।
- कृषि जैविक विविधता मेलाहरु संचालन गर्ने ।
- रैथाने विभिन्न कृषि उपजहरुलाई भौगोलिक संकेत चिन्न प्रदान गर्ने ।
- सुन्तलालाइ राष्ट्रिय फलको रुपमा घोषणा गर्ने ।

प्रोत्साहन कार्यहरु

- कृषि जैविक विविधताको संरक्षण र उपयोगमा योगदान गर्ने कृषक, संघ, संस्था, कर्मचारी लाइ पुरस्कार को व्यवस्था गर्ने ।
- कृषि जैविक विविधतासंग जोडिएको संस्कृति र धार्मिक परम्परालाइ बडोवा दिने, र अध्यान अनुसन्धान गर्ने ।
- भ्रमणहरु तथा तालिमहरु संचालन गर्ने। सांस्कृतिक, हिज्जे, नाटक, संगीत ,दोहरी, कविता, आदि कार्य गर्ने।

संरक्षणको लागि आवश्यक वातावरण तथा रणनीति तयारी कार्यहरु

- IMISAP (ITPGRFA-MLS Implementation Strategy and Action Plan) लाई परिमार्जित गर्ने र सोहि अनुरुप कार्य गर्ने ।
- National agrobiodiversity strategy and action plan (NABSAP), ABS for agrobiodiversity including ABS implementation strategy and action plan र कृषि जैविक विविधता संरक्षण तथा उपयोग एन आदि तयार गर्ने ।
- ठुला ठुला परियोजना संचालन गर्दा agrobiodiversity impact assessment (AIA) गर्ने व्यवस्था गर्ने ।
- विकासे जातहरुको विस्तार गर्दा पहिले स्थानीय जातहरुको संकलन गरेर मात्र त्यस स्थानमा विकासे जात लगाउने प्रणालीको ब्यवस्था गर्ने ।

- खाध्य, पोषण र जलवायु समन्धि नीति नियममा कृषि जैविक विविधतालाई केन्द्रमा राखेर समाधान खोज्ने प्रणालीको विकास गर्ने ।
- कृषि जविक विविधता नीति परिमार्जन गर्ने र Red zoning and red listing कार्यलाइ नीतिगत बनाउने।

संरक्षणमा टेवा पुग्ने अन्य कार्यहरु

- बाली, घाँसे बाली, पशुपन्छी तथा माछा बाहेक अन्य जलमा हुने कृषि आनुबंशिक स्रोतहरु र खान हुने र फाइदाजनक किरा र शुक्ष्म जीवाणुहरुलाइ पनि संरक्षण र उपयोगमा ल्याउन सहयोग पुग्ने कार्यहरु गर्न।
- नेपालको केहि स्थानीय जातहरु अन्तरास्ट्रिय सन्धि अनुसार सबैलाई पहुँचको लागि आवश्यक कार्य गर्ने र MLS मा रहेको लाखौ कृषि जैविक स्रोतहरुको प्रयोगमा जोड दिने।

Annex 2. Format/checklist for monitoring, orientation/observation and traveling seminar on conservation and utilization of native agrobiodiversity

Checklist

- Status and approved project/ activities, budget allocation
- Any report, publication, photo, video, presentation from both genebank & target office
- History of banking, diversity status in office premises and command areas
- Diversity in conservation, types of banks and AGRs
- Methodologies of diversity collection and maintenance
- Naming: based on location name (board, accession), name (E,N,S, local, number), collected year and site, collection and accession number
- Passport data and other characterization data (with passport description, pp app)
- Utilization of native landraces (research, production, training, use)
- Any activities out of stations (on-farm conservation)
- Collection, regeneration, characterization, multiplication
- ASE-MERC and collaborative missions, collection mission/ activities
- Office/ temple garden (conservation through beautification), agro gene sanctuary
- And data related to native agrobiodiversity of your command areas
- Diversity block, diversity fair, registration of landraces
- Rescue mission, germplasm for Genebank, any mega project, AIA, natural calamities
- Raithane nursery and raithane gift, collaboration with other organizations
- Problems, issues, plans, and Group photos

Basic information of banked AGRs
Office name:

Address:

Feature	**Types of bank**		
Bank established date			
Area coverage			

Number of species			
Number of varieties/ breeds/ strains/ecotypes			
Origin (name of country/ districts from where AGRs collected)			
Focal person			

List of species and variety/ breed/ strain/ genotype conserved

SN	Number if any, tag	Common name	Nepali name	Variety/ breed/ strain	Scientific name	Collected site/ origin	Year collected	Specific trait	Population size
1.									
2.									
3.									

कृषि जैविक विविधता संरक्षण (सबै स्टेशनहरु बाट यस्तो जानकरी राख्न अनुरोध)

बैंक/ असल अभ्यास	संख्या	स्थापना बर्ष	क्षेत्रफ़ल, बर्ग मि	कैफियत
फिल्ड जिन बैंक				
घाँसे बाली फिल्ड जिन बैंक				
पशुपन्क्षि फार्म जिन बैंक				
जलीय कुण्ड जिन बैंक				
कृषि किरा फिल्ड जिन बैंक				
कृषि किरा जिन बैंक				
कृषि शुक्ष्म जीवाणु फिल्ड जिन बैंक				
एग्रो माइक्रोबायल कल्चर बैंक				
पुष्प/ पुस्पांजलि बगैचा				
डी.एन.ए. बैंक				
तन्तु बैंक/ क्रायो बैंक				
कृषि वंशाणु आरक्ष स्थल				
जडिबुटी/ औषधीय बाली संरक्षण फोकटा				
घर-गोठ खेतिस्थलिया संरक्षण				
जंगली तरकारी/ फलफुल फोकटा				
बिउ बैंक				

कृषि जैविक विविधता संरक्षण प्रगति

कृषि आनुवंशिक स्रोत/ संरक्षित बैंक*	प्रजाति संख्या (species)	संरक्षित (जात वा परिग्रहण), ग्राम/संख्या)	
		गत बर्ष सम्म संरक्षित	यस आ.व. मा थप
बिउ बैंक			
फिल्ड जिनबैंक			
DNA bank			
Conservation and utilization of agro-insects			

मापदण्ड: रैथाने तथा स्थानीय, पासपोर्ट डाटा, बिउ सुकाउन नसकिने, सधै प्राप्त हुन् सक्ने, ट्याग/ बोर्ड राखेको
थप कार्य: प्रोफाइल (चरित्र चित्रण), घरेलुकरण, बासस्थान, डाटाबेस तयारी, वितरण, रैथाने नर्सरी

Annex 3. General guides to agricultural offices, research stations for conservation and utilization of AGRs

Management of agrobiodiversity (ie CALFIM: crop, aquatic, livestock, forage, insect and microbial agricultural genetic resources; and DSWW, domesticated, semi domesticated, wild relative and wild edible)) in all agricultural offices, research stations, centers, school/ colleges, etc is very important for long term sustainability and economic boom. Therefore, National Genebank would like to request to consider the following activities for better management of agrobiodiversity. These are for conservation and sustainable utilization of agricultural genetic resources (AGRs). These helps to assure the availability of all native AGRs that existed in the command areas of office. For further discussion, please contact National Genebank.

1. Publication of detail profile/ catalog of germplasm, genotypes, varieties, breeds, strains, race (all genotypes that office own) and creation of their image bank. After publishing this profile, new entry from the next year in the station can be added each year in annual report (or in other publication) as This Year Collected AGRs.
2. Give priority to native AGRs in research, education, development and business. Make them competent globally and nationally. Native AGRs are for food, nutrition, environment and business.
3. Establishment and maintenance of field genebank, aqua pond genebank, livestock farm genebank, poultry farm genebank, tissue bank, DNA bank, agro gene sanctuary, inset field genebank, microbial field genebank, forage field genebank (for naming these banks, better to start from the name of office location, eg Paripatle Field Genebank, Tarahara Aqua Pond Genebank, etc).
4. Establishment of Raithane Nursery (for agro plantation in different occasions, giving as gift to visitors and local farmers).
5. Establishment of herbal conservation garden (for making herbal tea to staff, guest, conservation and distribution).
6. Label each item (accession / donor number, English name, Nepali name, scientific name, origin, year…)
7. Adopting conservation through beautification (native flowering plants around offices as office garden), and conservation through use.
8. Domestication of wild agricultural genetic resources.

9. Organizing agro-plantation, diversity fairs, germplasm rescue mission at a regular basis
10. Fill up and maintain passport format of all AGRs.
11. Send valuable orthodox crop seeds along with passport data to National Genebank. It is not necessary to invest on orthodox crops/ plants just for conservation.
12. Development of database
13. Registration of native AGRs. Promotion of local food items and product diversification

Annex 4. List of publications shared (also available online)

1. Gauchan D, BK Joshi, B Bhandari, HK Manandhar and DI Jarvis, eds. 2020. Traditional Crop Biodiversity for Mountain Food and Nutrition Security in Nepal. Tools and Research Results of the UNEP GEF Local Crop Project, Nepal. NAGRC, LI-BIRD and the Alliance of Bioversity International and CIAT; Kathmandu, Nepal. https://himalayancrops.org/project/traditional-crop-biodiversity-for-mountain-food-and-nutrition-security-in-nepal/
2. Genebank. 2014. National Agriculture Genetic Resources Center. Khumaltar. Brochure.
3. Gurung R, R Dhakal, N Pudasaini, PB Paneru, S Pant, AR Adhikari, S Gautam, RK Yadav, KH Ghimire, BK Joshi, D Gauchan, S Shrestha and DI Jarvis. 2019. Catalog of Traditional Crop Landraces of Mountain Agriculture in Nepal. LI-BIRD, Pokhara; NARC, Kathmandu and Bioversity International, Nepal. http://himalayancrops.org/project/catalogue-of-traditional-mountain-crop-landraces-in-nepal/
4. Gurung R, SR Sthapit, D Gauchan, BK Joshi and BR Sthapit. 2016. Baseline Survey Report: II. Ghanpokhara, Lamjung. Integrating Traditional Crop Genetic Diversity into Technology: Using a Biodiversity Portfolio Approach to Buffer against Unpredictable Environmental Change in the Nepal Himalayas. LI-BIRD, NARC and Bioversity International, Pokhara, Nepal. https://cgspace.cgiar.org/handle/10568/81039
5. Joshi BK and D Gauchan, eds. 2017. Rebuilding Local Seed System of Native Crops in Earthquake Affected Areas of Nepal. Proceedings of a National Sharingshop, 18 Dec 2017, Kathmandu; NAGRC, Bioversity International and Crop Trust; Kathmandu, Nepal. https://www.bioversityinternational.org/fileadmin/user_upload/Rebuilding_Gauchan_2017.pdf
6. Joshi BK and R Shrestha, eds. 2019. Working Groups of Agricultural Plant Genetic Resources (APGRs) in Nepal. Proceedings of National Workshop, 21-22 June 2018, Kathmandu; NAGRC, NARC, Nepal. https://www.researchgate.net/publication/334052118_Working_Groups_of_Agricultural_Plant_Genetic_Resources_APGRs_in_Nepal_Proceedings_of_National_Workshop_21-22_June_2018_Kathmandu
7. Joshi BK, AK Acharya, D Gauchan and P Chaudhary, eds. 2017. The state of Nepal's biodiversity for food and agriculture. Ministry of Agricultural Development, Kathmandu, Nepal. https://www.researchgate.net/publication/344605863_The_State_of_Nepal%27s_Biodiversity_for_Food_and_Agriculture
8. Joshi BK, D Gauchan and DK Ayer (cpls & eds). 2022. Participatory agrobiodiversity tools and methodologies (PATaM) in Nepal. NAGRC, LI-BIRD and Alliance of Bioversity International and CIAT; Kathmandu, Nepal.
9. Joshi BK, D Gauchan, B Bhandari and D Jarvis, eds. 2020. Good Practices for Agrobiodiversity Management. NAGRC, LI-BIRD and Alliance of Bioversity International and CIAT; Kathmandu, Nepal. https://www.bioversityinternational.org/e-library/publications/detail/good-practices-for-agrobiodiversity-management/

10. Joshi BK, KH Ghimire and SK Shrestha, eds. 2014. AFACI Pan Asia Project (IMPGR): Exploration, regeneration and conservation of endangered cereals, grain legumes from Central Mid and High Hills of Nepal. Project Completion Report and Outcomes. National Agriculture Genetic Resources Centre (Genebank) and Asian Food and Agriculture Cooperation Initiative (AFACI). Khumaltar, Kathmandu, Nepal.
11. Joshi BK, KH Ghimire, D Singh and MN Paduel. 2016. Conservation options, methods and programs for Agricultural Plant Genetic Resources in Nepal. National Agriculture Genetic Resources Center, Khumaltar, Lalitpur. https://www.researchgate.net/publication/321300485_Conservation_options_methods_and_programs_for_Agricultural_Plant_Genetic_Resources_in_Nepal
12. Joshi BK, KH Ghimire, RP Mainali, A Karkee, D Adhikari and A Hussain. 2022. The checklist of agricultural genetic resources in Nepal. NAGRC, Khumaltar, Kathmandu.
13. Joshi BK, MP Acharya and N Pradhan. 2022. Field Genebank, Agro Gene Sanctuary, Aqua Pond Genebank, and Livestock Farm Genebank: Concept, Establishment, and Maintenance. National Agriculture Genetic Resources Center, NARC, Khumaltar, Kathmandu.
14. Joshi BK, MR Bhatta, KH Ghimire, M Khanal, SB Gurung, R Dhakal, and BR Sthapit. 2017. Released and Promising Crop Varieties of Mountain Agriculture in Nepal (1959-2016). LI-BIRD, Pokhara; NARC, Kathmandu and Bioversity International, Pokhara, Nepal. https://www.bioversityinternational.org/fileadmin/user_upload/Released_and_promising_crop_varieties.pdf
15. Joshi BK, P Chaudhary, D Upadhya and R Vernooy (editors). 2016. Implementing the International Treaty on Plant Genetic Resources for Food and Agriculture in Nepal: Achievements and Challenges. Local Initiatives for Biodiversity, Research and Development, Pokhara, Nepal; Nepal Agricultural Research Council and Ministry of Agricultural Development, Kathmandu, Nepal; and Bioversity International, Rome, Italy. https://www.bioversityinternational.org/fileadmin/user_upload/Implementing_the_International_Joshi.pdf
16. Joshi BK, P Shrestha, D Gauchan and R Vernooy, eds. 2018. Community Seed Banks in Nepal. 2nd National Workshop Proceedings, 3-5 May 2018, Kathmandu Nepal; NAGRC, LI-BIRD and Bioversity International; Kathmandu, Nepal. https://cgspace.cgiar.org/handle/10568/99141
17. Joshi BK, R Shrestha, IP Gautam, AP Poudel and TP Gotame. 2019. Neglected and Underutilized Species (NUS), and Future Smart Food (FSF) in Nepal. National Agriculture Genetic Resources Center (NAGRC, National Genebank), NARC, Khumaltar, Kathmandu, Nepal. https://www.researchgate.net/publication/332979036_Neglected_and_Underutilized_Species_NUS_and_Future_Smart_Food_FSF_in_Nepal
18. Joshi BK, S Sapkota, K Poudyal, D Singh, KH Ghimire and MN Paudel. 2016. Bibliography of Agricultural Plant Genetic Resources in Nepal. National Agriculture Genetic Resources Center, Nepal Agricultural Research Council, Khumaltar, Kathmandu. https://www.researchgate.net/publication/321309555_Bibliography_of_Agricultural_Plant_Genetic_Resources_in_Nepal
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20. Joshi BK. 2015. Rice and wheat gene pools in Nepal (1959-2002). National Agriculture Genetic Resources Center, NARC, Khumaltar. https://www.researchgate.net/publication/321309500_Rice_and_wheat_gene_pools_in_Nepal_1959-2002
21. Joshi BK. 2022. Visit route and tech-info in Nepal Genebank, Khumaltar. NAGRC, Khumaltar.

22. Manandhar HK, RD Timila, S Sharma, S Joshi, S Manandhar, SB Gurung, S Sthapit, E Palikhey, A Pandey, BK Joshi, G Manandhar, D Gauchan, DI Jarvis and BR Sthapit. 2016. A field guide for identification and scoring methods of diseases in the mountain crops of Nepal. NARC, DoA, LI-BIRD and Bioversity International, Nepal. https://www.bioversityinternational.org/fileadmin/user_upload/A_field_guide_Manandhar.pdf
23. NAGRC. 2016. National agriculture genetic resources center, Genebank. Fact sheet (BK Joshi). Khumaltar, Lalitpur.
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34. घिमिरे, कृष्णहरि, बालकृष्ण जोशी, देवेन्द्र गौचन र भारत भण्डारी । २०७५ । हिमाली भेगको लागि स्थानीय बालिका उत्कृष्ठ जातहरु । जिन बैंक, नार्क, लिबर्ड र बायोभर्सिटी इन्टरनेसनल; नेपाल । http://himalayancrops.org/project/%e0%a4%b9%e0%a4%bf%e0%a4%ae%e0%a4%be%e0%a4%b2%e0%a5%80-%e0%a4%ad%e0%a5%87%e0%a4%97%e0%a4%95%e0%a5%8b-%e0%a4%b2%e0%a4%be%e0%a4%97%e0%a4%bf-%e0%a4%b8%e0%a5%8d%e0%a4%a5%e0%a4%be%e0%a4%a8%e0%a5%80/

35. जोशी बालकृष्ण र कृष्ण हरि घिमिरे । २०७२ । फापर बालीमा बिबिधता, बिउ छनौट र उत्पादन । राष्ट्रिय जिन बैंक,खुमलटार । https://www.researchgate.net/publication/333640706_phapara_valima_bibidhata_bi%27u_chanauta_ra_utpadana_Buckwheat_Diversity_selection_and_production

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https://www.researchgate.net/publication/333632770_krsi_jaivika_vividhata_sambandhi_melaharu_ra_tinaka_prakara_Agricultural_biodiversity_related_fairs_and_its_types

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https://www.researchgate.net/publication/333640892_kodoko_bi'u_sanraksana_Conservation_of_seeds_of_finger_millet
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https://himalayancrops.org/project/%e0%a4%9c%e0%a4%be%e0%a4%a4%e0%a4%bf%e0%a4%af-%e0%a4%ae%e0%a4%bf%e0%a4%b6%e0%a5%8d%e0%a4%b0%e0%a4%bf%e0%a4%a4-%e0%a4%96%e0%a5%87%e0%a4%a4%e0%a5%80-%e0%a4%9c%e0%a5%8b%e0%a4%96%e0%a4%bf%e0%a4%be/
44. जोशी, बालकृष्ण, देवेन्द्र गौचन, भुवन रत्न स्थापित, रिता गुरुङ, सुकबहादुर गुरुङ र सुभाष गौतम । २०७४ । जातीय मिश्रित खेतीप्रणाली र यसका फाइदाहरू । जानकारी–पत्र, अङ्क ९ । ली–बर्ड, राष्ट्रिय जीन बैंक, कृषि विभाग र बायोभर्सीटी इन्टरनेशनल, नेपाल ।
https://himalayancrops.org/project/%e0%a4%9c%e0%a4%be%e0%a4%a4%e0%a5%80%e0%a4%af-%e0%a4%ae%e0%a4%bf%e0%a4%b6%e0%a5%8d%e0%a4%b0%e0%a4%bf%e0%a4%a4-%e0%a4%96%e0%a5%87%e0%a4%a4%e0%a5%80%e0%a4%aa%e0%a5%8d%e0%a4%b0%e0%a4%a3%e0%a4%be%e0%a4%b2/
45. राष्ट्रिय जीन बैंक र रैथाने एग्रो प्रोडक्स । २०७८ । सामुदायिक जीन बैंक संचालन: परिचायत्मक कार्य बिधि । काठमाडौँ (बालकृष्ण जोशी) ।
46. श्रेष्ठ दिपा र बालकृष्ण जोशी । कृषि जैबिक विविधता संरक्षण तथा उपयोगको लागि फिल्ड जिन बैंकको स्थापना र ब्यबस्थापन प्रबिधि । किताब: उन्नत कृषि प्रबिधि प्यकेजिंग । कृषि प्रसारनिर्देशनालय, कृषि बिभाग, हरिहर भवन, ललितपुर, पेज: १२३-१३९ ।
https://www.researchgate.net/publication/348061262_krsi_jaivika_vividhata_sanraksana_tatha_upayogako_lagi_philda_jina_bainkako_sthapana_ra_vyavasthapana_pravidhi
47. श्रेस्ठ पिताम्बर, बालकृष्ण जोशी, कृष्ण घिमिरे र देवेन्द्र गौचन । २०७५ । संक्षिप्त प्रतिवेदन, सुझाउ र कार्ययोजना, सामुदायिक बीउ बैंक सम्बन्धि दोस्रो राष्ट्रिय कार्यशाला गोष्ठी, बि.सं. २०७५ बैशाख २०-२२ गते, ललितपुर, नेपाल। नेपाल कृषि अनुसन्धान परिषद, जैविक विविधता अनुसन्धान तथा विकासका लागि स्थानीय पहल (ली-बर्ड) र वायोभर्सिटि ईन्टरनेशनल ।
http://www.libird.org/app/publication/view.aspx?record_id=296&origin=results&QS=QS&sortfld_221=Date&reversesearch=true&top_parent=221