

# Status and Way Forward on Potato and Tuber Crops Seeds in Nepal

**Januka Pandit**

Ministry of Agriculture and Livestock Development

Corresponding Author: [januaec@gmail.com](mailto:januaec@gmail.com)

## Abstract

Potato is cultivated in all geography and in all four seasons in Nepal, and is a high value crop. Total area of potato production in Nepal is 203812 ha, and the production is 3487816 mt, with 17.11 mt/ha productivity, and Bhaktapur district has the highest productivity of potato (23.4 mt/ha). During the twenty years of time period, area has been increased by 1.88% annually, whereas production has been increased by 4.04% annually and productivity has been increased by 2.12% annually. Import of seed potato is the very negligible. There are 21 varieties of potato which are registered/released in Nepal, among them three varieties are suitable for industrial purposes. Productivity of potato varieties ranges from 10 to 39.4 metric tons per hectare. Altogether, there are eight organizations having license for Pre-Basic Seed production in Nepal, where two are government and six are private organizations. Annually, the demand of PBS in Nepal is 0.8 to 1.0 million, whereas annual PBS production is around 0.8 million. There are two varieties of sweet potato registered, and different genotypes has been conserved, vines are the planting materials for sweet potato. Quality deterioration of parental lines of True Potato Seed (TPS), difficulty to maintain the seed cycle of potato, varietal development, requiring highly technical skill to produce TPS and PBS are the major challenges in seed potato in Nepal, whereas the cultivation in marginal land, unorganized markets, inadequate post-harvest technology are the major problems in other tuber crops in Nepal. To make Nepal self-sufficient in potato, efforts have to be given for either productivity increasement or area expansion. For both, the seed cycle has to be maintained for using certified seed by the farmers to increase production of potato in Nepal.

**Keywords:** Post Harvest, Pre-Basic Seed, Productivity, Seed Cycle, Varietal Development.

## Introduction

Agriculture is the foundation for income, employment and livelihood of the people in Nepal (MoF, 2023). Contribution of agriculture to Gross Domestic Product (GDP) is 24% and around 62% households are engaging in agriculture as major occupation for their livelihood (MoF, 2024). Potato is one of the important crops which occupies 4% area among the major agricultural commodities in Nepal, and it is cultivated in all geography of Nepal, i.e. from terai to hill and high hills (MoALD, 2024). In comparison with paddy, wheat and maize; potato occupies 4<sup>th</sup> position in area and 2<sup>nd</sup> position in production (MoALD, 2024). Contribution of potato to agriculture GDP is 6.35% (MoALD, 2023). It is cultivated in all four seasons of the country: winter; early spring; late spring and autumn. It is a high value crop having nutritional value, environmental value and consumption value. It is rich source of nutrients having many vitamins and minerals (Navarre et al, 2009; Wijesinha-Bettoni and Mouillé, 2019). Potato requires less water compared to rice, wheat and maize (Adhikari et al, 2025; Devi et al, 2020), and this crop can contribute to food security with low requirement of water indicating its environmental value. Potato is consumed in diversified ways like it is suitable to all vegetables for culinary purposes, and also it is used as industrial products (Giampiccoli et al, 2013; Booyesen, 2010).

## Status of Potato

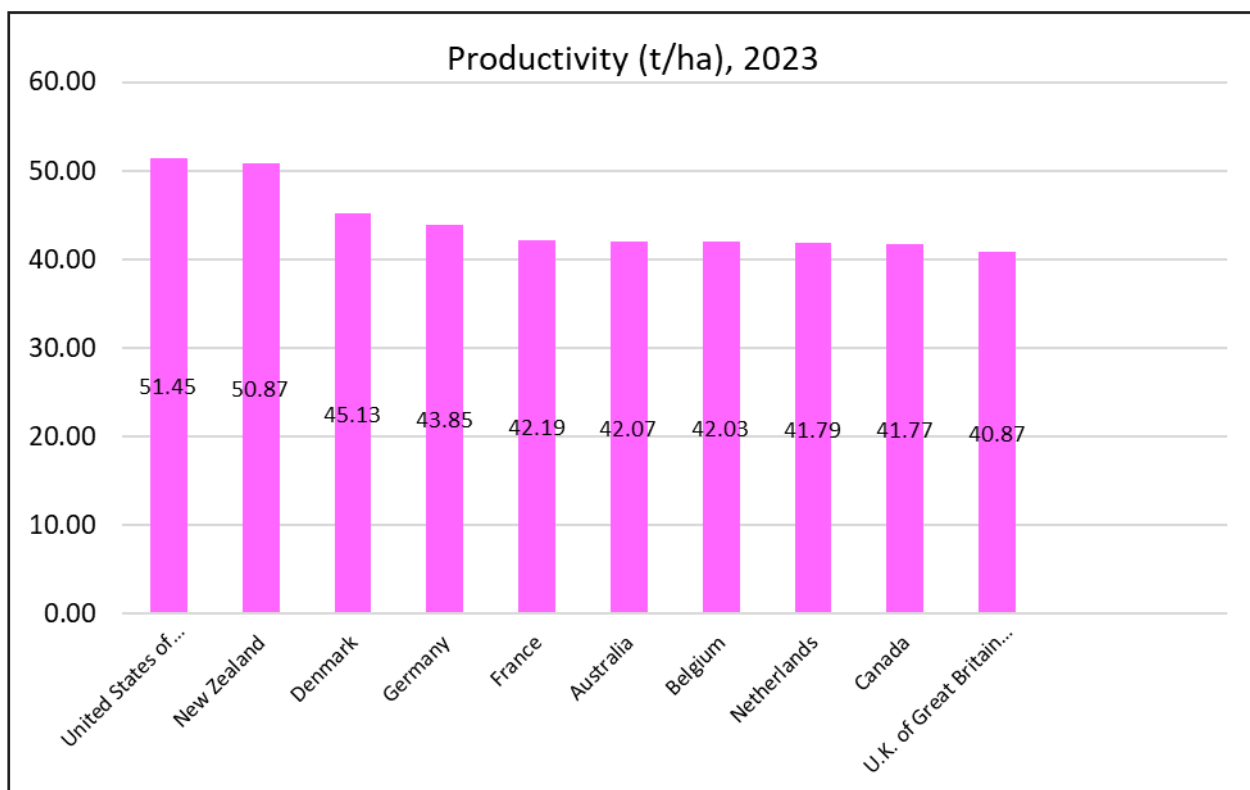
### 1. Status of potato in the world

According to FAOSTAT 2025, total potato harvesting area and total production of potato in the world is 16799111 hectare (ha) and 383082607.37 tons (t), respectively. In the world, 153 countries are producing potatoes, where China and India are the top first and second countries in area and production of potato. Nepal occupies 15<sup>th</sup> position in area and 22<sup>nd</sup> position in production of potato in the world. In case of productivity, United States of America and New Zealand are the top first and second countries, where their productivities are 51.45 tons per ha (t/ha) and 50.87 t/ha, respectively (figure 1). Similarly, Nepal occupies 95<sup>th</sup> position in the world. The average productivity of potato of the world is 21.40 mt/ha (FAOSTAT, 2025).

**Table 1:** Top potato producers in the world, 2023

SN	Country	Production (tons)
1	China	93491819
2	India	60142000
3	Ukraine	21358630
4	United States of America	19992090
5	Russian Federation	19374441
6	Germany	11607300
7	Bangladesh	10431736
8	France	8606490
9	Pakistan	8319767
10	Egypt	6869331

Source: FAOSTAT, 2025

**Potato Producers having highest productivity, 2023**

Source: FAOSTAT, 2025

**Figure 1:** Potato Producers with Top Productivity, 2023

## 2. Status of Potato in Nepal

### 2.1 Area, Production and Productivity of Potato in Nepal

Total area, production and productivity of potato in Nepal are 203812 ha, 3487816 mt and 17.11 mt/ha. Among all districts of Nepal, Jhapa has highest area of potato crops (15792 ha), Jhapa has highest production of potato (258357 mt), and Bhaktapur has the highest productivity of potato (23.4 mt/ha) (MoALD, 2024).

Figure 2 depicts the area, production and productivity of potato from 2003/04 to 2022/23. The figure shows that the area has been increased by 1.88% annually, whereas production has been increased by 4.04% annually and productivity has been increased by 2.12% annually (MoAD, 2017; MoALD, 2024). Increase in area, production and productivity may be due to promotional program of government of Nepal in potato crops, by means of technology transfer, capacity building, research in varietal development and other ways.

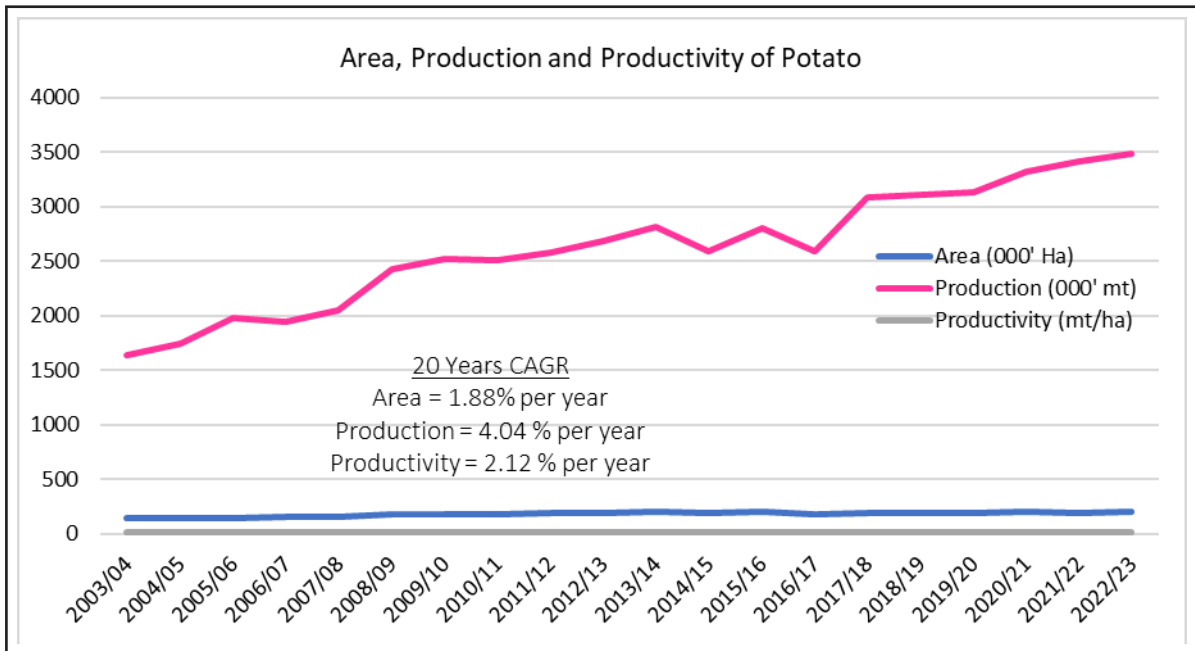


Figure 2: Area, Production and Productivity of Potato in Nepal, 2003/04-2022/23

Source: MoAD, 2017; MoALD 2024

Figure 3 explains the potato production areas occupied by seven provinces of Nepal in 2022/23. Koshi province has the highest area compared to other percentages, where Koshi alone occupies 30% area followed by Madhesh (15%), and Bagmati (20%). Sudurpaschim province has low percentage of potato production area, which is 7% only. Similarly, figure 4 shows the potato production occupancy of seven provinces in percentages. In production aspect of potato, Koshi is top (30%) followed by Madhesh (14%), and Bagmati (22%) whereas the Sudurpaschim province has only 7% occupancy in production of potato among all provinces in Nepal. Figure 5 shows the productivity of potato in mt/ha in all seven provinces in 2022/23 of Nepal. Bagmati has highest productivity of potato (19.09 mt/ha) followed by Gandaki (17.49 mt/ha) and Karnali (17.20 mt/ha). Lumbini has the lowest productivity of potato (15.57 mt/ha). In the area and production, the position of three provinces is same, and the Sudarpaschim has low share in area and production, however in productivity the figure is different, where Bagmati occupy first position. The differences in figures may be due to effects of many factors like inputs, technology, climatic variations and others.

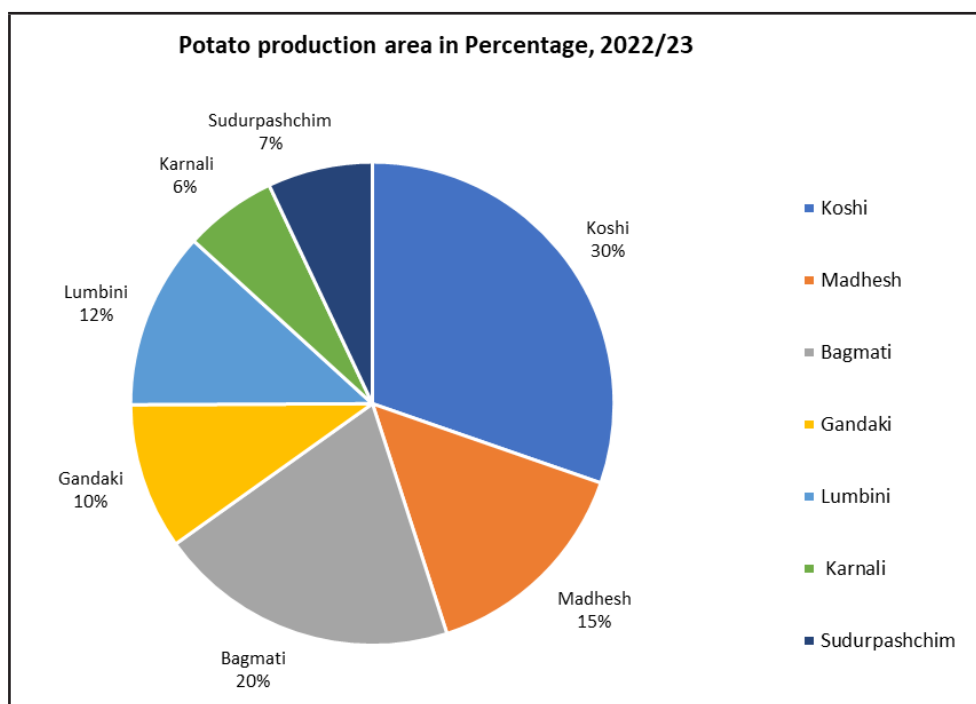
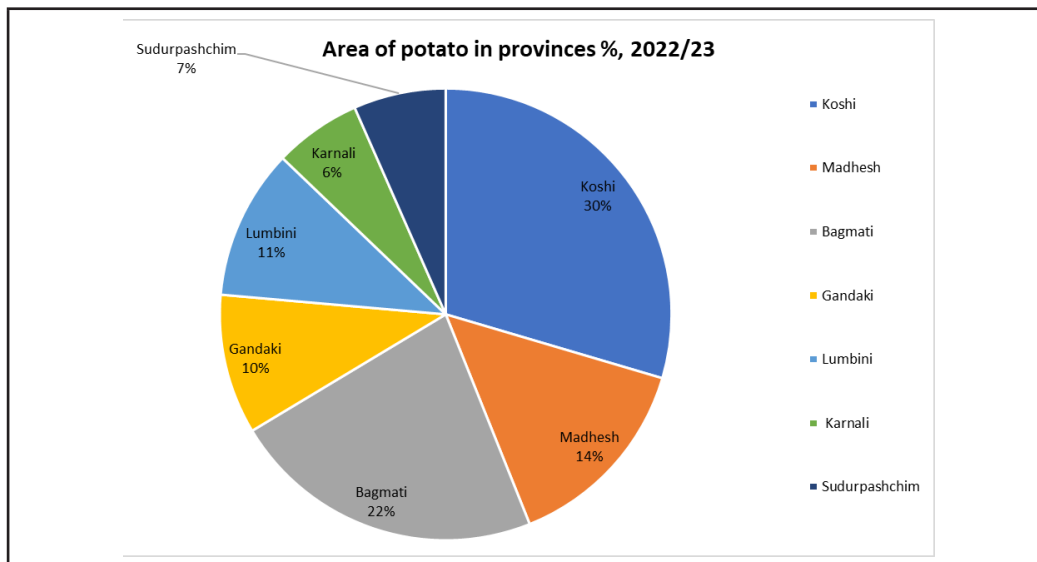


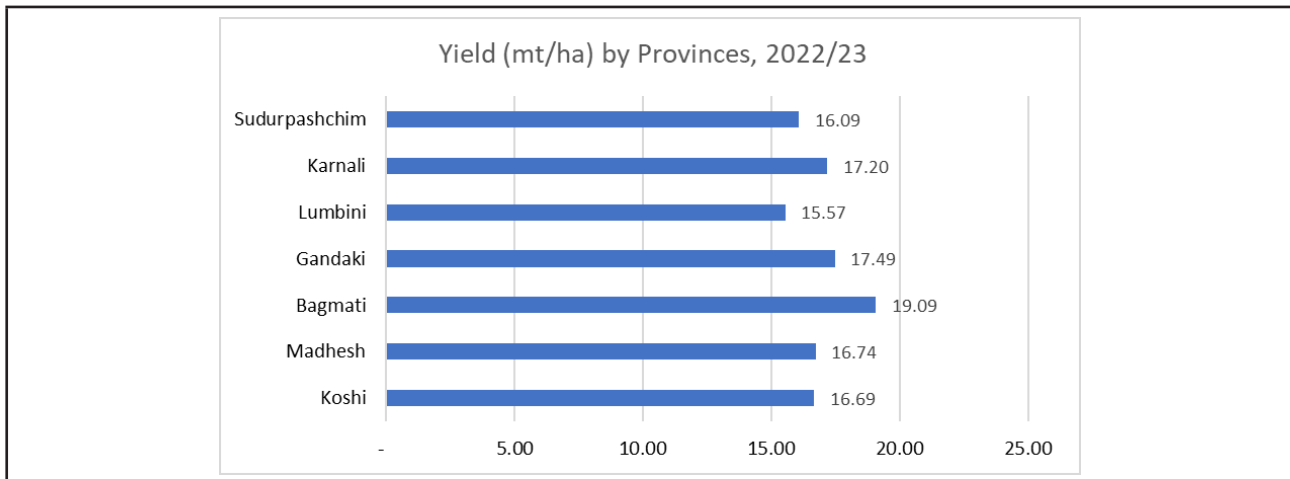
Figure 3: Potato production area (%) in seven provinces

Source: MoALD, 2024



Source: MoALD, 2024

Figure 4: Potato production (%) in seven provinces



Source: MoALD, 2024

Figure 5: Productivity of potato (mt/ha) in seven provinces

## 2.2 Export-Import Status of Potato

Nepal has exported potato and its industrial products to Australia, Japan, Italy and Seychelles where the export value is NPR 7347 (000' NPR). Nepal has imported potato and its industrial products from India, Bangladesh, China, Indonesia, United States, United Kingdom, Australia, Hong Kong, and Korea, where the import value is NPR 6711542 (000' NPR). However, the share of seed potato is very negligible (0.0015% of the total import value of potato and its industrial products), and the import of seed potato is only from India (DoC, 2024).

## Varieties of potato in Nepal

Altogether, there are 21 varieties of potato which are registered/released in Nepal. Table 2 explains the registered/released varieties of potato in Nepal; these 18 varieties are suitable for table purposes. Productivity of these varieties ranges from 10 to 39.4 metric tons per hectare. For T.P.S., the productivity ranges from 30 to 40 metric tons per hectare. The data justifies that there are prominent varieties for potato production, national average productivity of potato is 17.11 metric tons/hectare, however the productivity gap may be due to management practices in potato.

Similarly, there are three varieties of potato which are for suitable for industrial purposes (table 3).

**Table 2:** Registered/Released Varieties of Potato in Nepal

SN	Variety	Recommended Area	Productivity (mt/ha)	Duration (Days)
1	Kufri Jyoti	hills and high-hills	23	110
2	Kufri Sinduri	terai and low-hills	23	110-120

3	Desire	terai, low-hills, mid-hills and high-hills	18	90-120
4	Janakdev	mid-hills and high-hills	39.4	110
5	Khumal Seto 1	mid-hills and high-hills	38.7	110
6	Khumal Rato 2	Terai	36.2	95
7	Khumal Laxmi	mid-hills and high-hills	24-28	120-140
8	I.P.Y. 8	Terai	25-27	110-120
9	Khumal Ujjawal	mid-hills and high-hills	25	100-120
10	Khumal Upahar	terai and mid-hills	24	100-120
11	T.P.S. 1	terai and mid-hills	35-40	110-120
12	T.P.S. 2	terai and mid-hills	30-35	110-120
13	Khumal Bikash	mid-hills and high-hills	25.75	100-110
14	Cardinal	terai and hills	18-30	80-110
15	Rojita	high-hills	10-14	120-140
16	M.S. 42.3	terai and hills	10-24	100-120
17	Khumal Rato -4	mid-hills and high-hills	27.84	110
18	Khumal Seto – 3	terai and mid-hills	29.91	115

Source: SQCC, 2024

**Table 3:** Industrial varieties of potato

Variety	Recommended Area	Productivity (mt/ha)	Duration (days)
Averstone Russet	Terai, Mid-hill (Bagmati, Gandaki, Lumbini)	26.37	90-120
Innovator		20.02	<90
Sagitta		29.94	<90

Source: SQCC, 2024

Similarly, there are many local varieties of potato like Kathmandu local, Jumli local, Bajhang local, Tharu local, Chingand local, Bung local and many more, however the registration/release of these local varieties has to be done.

### Seed production status of potato and othe tuber crops

Altogether, there are eight institutions working for Pre-Basic Seed (PBS) potato production in Nepal, where six are private organizations and two are government organizations. Annually, the demand of PBS in Nepal is 0.8 to 1.0 million, whereas annual PBS production is around 0.8 million (NCPVSCD, 2023). Capacity of the PBS producing organizations in total is 1.4 million PBS. This figure reveals that Nepal can export the PBS by fulfilling the domestic demand. For this, the gaps between production of PBS and potentiality of its production amount have to be assessed. These all institutions have received license for producing PBS in Nepal. Private organizations had started to produce PBS by receiving license since after the implementation of Potato Pre-Basic (PBS) Seed Production and Certification Standard for Private, Government and Non-Government Sector (SQCC, 2024). Similarly, the annual demand of True Potato Seed (TPS) is 40-50 Kg (NCPVSCD, 2023). This demand has been raised since few years back due to the true to the type of the seed and free from virus as compared to other types of seeds. Potato Development Program (Nigale) is producing the TPS in the farm and has been taken to the farmers of Dang, Pyuthan and other areas of the country.

There are 2 varieties of sweet potato registered, and 48 different genotypes has been conserved in National Potato Research Program (NPRP) and, vines are the planting materials for sweet potato. In case of other tuber crops, there are local landraces, where the registration process has to be started.

### Legal arrangements for potato and tuberr crops

There are many policy documents promoting potato and tuber crops seed sector like Plant Quarantine and Protection act, 2007/Plant Quarantine and protection regulation, 2010, Seed Act 2045; Seed Regulation, 2069, Seed Certification Directives, 2017, Potato Pre-Basic (PBS) Seed Production and Certification Standard for Private, Government and Non-Government Sector, 2022, Hybrid Seed Production and Certification Standard, 2021 etc.

Ministry of Agriculture and Livestock Development (MoALD) has the overall responsibility of growth and

development of agriculture and livestock sector. National Center for Potato, Vegetables and Spice Crops Development (NCPVSCD) has the mandate of working as focal center on potato like technical backstopping, and others.

The Seed Quality Control Center has been established to be involved in seed development, formulate seed policies and programs, and check the quality of seeds provided to farmers by various agencies, verify seeds, determine quality, and control them.

NCPVSCD has the overall responsibility of providing technical expertism and supporting to policy formulation regarding potato, vegetable and spice crops in the country. It has four satellite farm centers located in different geography of the country. Among four farm centers under NCPVSCD, Potato Development Centre (PDC), Nigale, is responsible for quality potato seed production – Pre-Basic Seed, Basic Seed and True Potato Seed for Nepal. Similarly, PDC, Nigale is working in germplasm conservation of potato, action research, providing technical services to the local levels and farmers. Large Cardamom Development Centre, Fikkal, Illam is also producing PBS, however the production quantity is low compared to PDC, Nigale.

Similarly National Potato Research Program (NPRM), Nepal Agricultural Research Council (NARC) has the leading role in research aspects of potato and potato sector Potato and sweet potato. NPRM is working on research aspects of potato like: varietal improvement, seed production, soil fertility and agro-techniques, insect-pest, disease and weed management, organic potato production, post-harvest, and socio-economic research. Seed Quality Control Center (SQCC) has the role of quality regulation of seed, to ensure the farmers for using quality seeds.

Ministry of Agriculture and Livestock Development (MoALD) has been implementing various programs to seed sector of potato by its under organizations like NCPVSCD, SQCC, projects and federal conditional budget transferring to provincial and local levels These programs are capacity buildup, seed cycle maintenance, varietal development, collection and conservation of varieties including local varieties, insurance to potato. Projects are also supporting to both table potato and seed potato, like Prime Minister Agriculture Modernization Program (PMAMP), Food and Nutrition Security Project (FANSEP), and others. Potato is one of the national priority agriculture commodities of PMAMP, where there are two Superzones (in Kavre and in Dadeldhura) and twenty Zones. For the Superzones, areas have to be. In the Superzones, one is in Kavre district and another is in Dadeldhura district of Nepal.

Potato zones are implementing in Okhaldhunga, Ramechhap, Rasuwa, Nuwakot, Bhaktapur, Kathmandu, Baglung, Dailekh, Bajhang, Achham, Panchthar, Dolkha, Gorkha, Manang, Myagdi, Rolpa, Rukum East, Mustang, Rupandehi, Jumla districts of Nepal. The productivity of potato production area of PMAMP is 23.28 mt/ha. Programs focused to potato are technology transfer – production package (seed, micronutrients, plant protection, technology). To promote seed certification, DAS-ELISA testing protocol for six virus testing, is under implementation; and the minimum infrastructure standard required for the production of foundation/basic seed has been started.

## **Problems and Challenges**

### **Seed potato**

The problems and challenges in seed potato in Nepal are enlisted herewith:

- True Potato Seed (TPS)
  - Quality of parental lines of TPS (parental lines TPS67, TPS7, MF2) has been deteriorated.
  - There is limited market for TPS
  - Production of TPS demands highly technical skill.
- Pre-Basic Seed
  - There is inadequate storage facility for long time
  - Highly technical skill is required to produce PBS
  - There is marketing problem in PBS
  - There is remaining yield gap
  - There is difficulty to maintain the seed cycle of potato seed and which results difficulty in seed certification system potato
  - There is no insurance during cold storage of PBS

### **Other tuber crops**

Similarly, there are problems in seed of other tuber crops which are low quality planting materials; insufficient or poor technology; inadequate or poor post-harvest handling technology; unorganized markets; and cultivation in marginal land

## Way Forward

In the present condition, to be self-sufficient in potato, there are two options like productivity enhancement or area expansion. In case of productivity increase, it is necessary to raise productivity up to 18.53 mt/ha. Or if self-sufficiency will be met by area expansion, the area of potato has to be raised up to 17,898 Ha.

Focusing either one option productivity or area, the seed cycle maintenance and seed certification, and varietal development are mandatory for achieving self-sufficiency. Similarly, strengthening of the prevailing organizations which have license for producing PBS is necessary. Development of varieties having high productivity, stress resistance, varieties need for industrial sector and biofortified varieties, will be other steps to be done in potato sector. Coordination has to be done with International Potato Center for receiving new parental lines for TPS (TPS67, TPS7, MF2). There is need to develop technical know-how for TPS and PBS production. Farmers have to be encouraged for storing the PBS in cold storage by providing subsidy to the farmers. Nepal is rich in agrobiodiversity, and in potato there are many local germplasm, so the conservation and utilization of local and indigenous germplasm of potato have to be focused by our programs and policies. Branding of potato in producing in specific geographical regimes will be next step to promote our local potato like mude ko alu may one brand and many other brands can be created in potato based on geographical locations.

## Conclusion and Recommendation

Potato can be a strategic commodity for food security in Nepal. By using quality seeds, the productivity can be enhanced as well as the program for area expansion can be launched to move to self-sufficiency programs ahead. However, the seed cycle maintenance, certification, varietal development, conservation of local germplasm has to be done by the government of Nepal.

## References

- Adhikari, T., A. Bhusal, R. Bhatta, M. Singh Chaudhary Dhami and S. Hamal, 2025. Estimation of Crop Water and Irrigation Requirement for Major Cereals and Vegetable Crops Using FAO CROPWAT 8.0 Model in the Terai Region of Nepal. *Far Western Review*, Volume-3, Issue-1, June 2025, 287-300.
- Booyesen, L., 2010. Comparison of the eating quality of selected potato cultivars from two production regions in South Africa and a proposed classification system for the consumer (Doctoral dissertation, University of Pretoria).
- Devi, U.M, M.D. Reddy, A. Mani, D.V. Mahalakshmi and O. Bhavani. 2020. Water Use and Productivity of Different Agricultural and Horticultural Crops and Rice and Maize-based Cropping Systems in an Intensively Cultivated Sub-watershed of Peninsular India. *International Journal of Current Microbiology and Applied Sciences*, Volume 9 Number 10.
- DoC, 2024. Statics 2024. Department of Customs, Kathmandu.
- Giampiccoli, A., Mnguni, E. M., Dłużewska, A., and Mtapuri, O., 2023. Potatoes: Food tourism and beyond. *Cogent Social Sciences*, 9(1), 2172789.
- MoALD, 2017. Statistical Information on Nepalese Agriculture 2072/73 (2015/16). Ministry of Agricultural Development, Singhdurbar, Kathmandu
- MoALD, 2023. Selected Indicators of Nepalese Agriculture. Government of Nepal, Ministry of Agriculture and Livestock Development, Singhdurbar, Kathmandu
- MoALD, 2024. Statistical Information on Nepalese Agriculture 2079/80 (2022/23). Government of Nepal. Ministry of Agriculture and Livestock Development, Singhdurbar, Kathmandu
- MoF, 2023. Economic Survey, 2079/80. Ministry of Finance, Singhdurbar, Kathmandu.
- MoF, 2024. Economic Survey, 2080/81. Ministry of Finance, Singhdurbar, Kathmandu
- Navarre, D. A., Goyer, A., and Shakya, R., 2009. Nutritional value of potatoes: vitamin, phytonutrient, and mineral content. *Advances in potato chemistry and technology* (pp. 395-424). Academic Press.
- SQCC, 2024. Notified or Denotified Varieties, Updated 2081-07-23. Seed Quality Control Center, Ministry of Agriculture and Livestock Development, Singhdurbar, Kathmandu.
- SQCC, 2024. Potato Pre-Basic (PBS) Seed Production and Certification Standard for Private, Government and Non-Government Sector, 2022. Seed Quality Control Center, Ministry of Agriculture and Livestock Development Center, Singhdurbar, Kathmandu.
- Wijesinha-Bettoni, R. and B. Mouillé. 2019. The Contribution of Potatoes to Global Food Security, Nutrition and Healthy Diets. *American Journal of Potato Research*, volume 96, page 139–149.