Vegetable Seed Production in Nepal: Status, Issues and Challenges

Benu Prasad Prasai[1*] and Bikash Kharel[2]
[1]Seed Quality Control Center, Harihar Bhawan, Lalitpur
[2]National Center for Potato, Vegetable and Spice Crops Development (NCPVSCD), Kirtipur, Kathmandu
[*]Corresponding Author: benuprasai200@gmail.com

Abstract

To meet the need of ever-increasing population, the breeders are continuously making the efforts by developing new varieties. High-quality seeds alone can improve crop yield by 20–25%, contributing to better water and nutrient use, disease resistance, and climate resilience. Despite being in a prime geographic location, Nepal lacks sufficient domestic capacity to meet seed demands, relying heavily on imports. By registering varieties, the national catalogues of commercial varieties can be diversified, and varieties which are better adopted to particular local environments can be promoted and commercialized by a wider range of actors. The process involves applications, review by technical committees, release/registration decisions, and notification in the Nepal Gazette or website of Ministry of Agriculture and Livestock Development. All the imported varieties of vegetables will be registered by one season trail in farmer's field by importers themselves.

Keywords: National Seed board, Notification, Registration, Release

Introduction

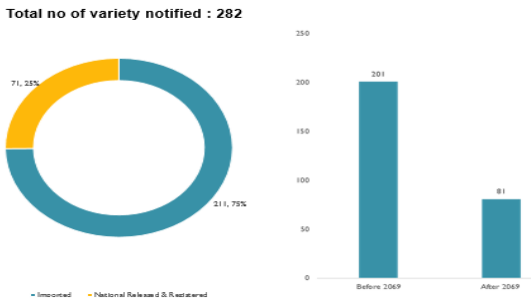
High-quality seeds alone can improve crop yield by 20–25%, contributing to better water and nutrient use, disease resistance, and climate resilience. This is essential given global pressures such as climate change, urbanization, and food security demands. Population growth rate high in developing and least developed countries whereas rural population is stagnant and rapid growth of urban population is about 50-70% (Sun et al., 2017). World depends on agriculture for food, feed and fiber. Must need to increase productivity and further, challenged by climate change, increasing demand of feed and fodder as well as increased used of biofuel.

Global and National Seed Market

The global seed market reached $53.95 billion in 2022, expected to rise to $82.04 billion by 2031. Vegetables account for $12.80 billion. Despite being in a prime geographic location, Nepal lacks sufficient domestic capacity to meet seed demands, relying heavily on imports. Nepal is in fastest growing region and sandwiched between second and fifth largest seed market in world, but neither have the domestic capacity to produce quality vegetable seed nor facilitate to avail the global competitive variety without compromising the quarantine system.

Status of Vegetable's Variety Notification till Date

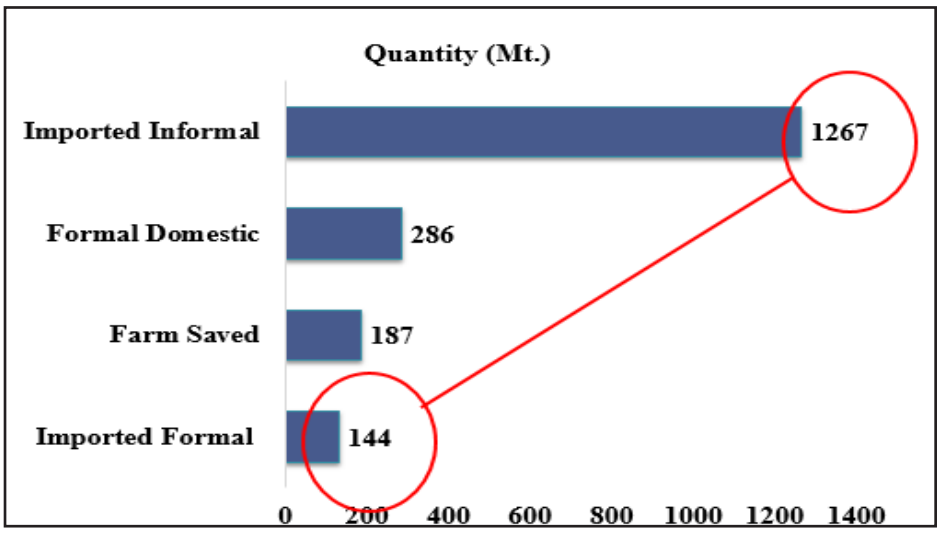
Till now 282 vegetables varieties have been notified. However 201 varieties have been registered before 2069 B.S. and only 81 varieties have been notified after 2069 B.S. Out of total varieties, only 25% of National varieties have been notified and remaining 75% varieties of imported ones. (SQCC, 2024).



Seed Import Status

In recent years, Nepal has become heavily reliant on imported vegetable seeds, particularly hybrid varieties, due to inadequate domestic production and increasing demand for high-quality, high-yielding seeds. During the fiscal year 2080/81, the country formally imported 569 metric tons (MT) of vegetable seeds, valued at approximately NPR 90 crore. The imports were dominated by different crop categories, with legume crops accounting for the highest volume of open-pollinated (OP) seeds at 337.2 MT. Meanwhile, crucifer crops contributed 33.53 MT of hybrid seeds, cucurbitaceae crops made up 93.81 MT of hybrid seeds, and solanaceous crops accounted for 17.6 MT of hybrid seeds. This dependence on imports highlights the

need for strengthening domestic seed production to meet the growing agricultural demands of the country. Nepal's seed sector must strengthen **local production, quality control, and research** to reduce this dependency and support sustainable agricultural growth.



Informal Seed trade of vegetable seed

Illegal import of vegetable seeds into Nepal is a **significant challenge** to national seed policy enforcement and agricultural sustainability. The informal vegetable seed trade in Nepal has significant implications, undermining both the agricultural sector and governance. One major concern is the loss of government revenue and critical data, as informal transactions escape taxation and prevent institutions from tracking seed usage and distribution. This unregulated trade also distorts market dynamics, often leading to price hikes due to a lack of oversight. Additionally, the formal seed import sector is dominated by a few players, fostering monopolistic practices that stifle competition and transparency. High-tech producers face technical constraints, as they struggle to access reliable, certified seeds through informal channels. Farmers relying on uncertified seeds are further disadvantaged, as they are often ineligible for crop insurance or soft loans. Bureaucratic obstacles, such as cumbersome No Objection Letter (NOL) requirements, discourage legal seed trade while failing to curb informal flows. Moreover, informal seed distribution bypasses certified varieties, preventing farmers from benefiting from improved plant breeding advancements. Compounding these issues is the disconnect between existing laws and their enforcement, which weakens the overall integrity of Nepal's seed system and hampers agricultural development.

Problems of Vegetable Seed Production in Nepal

Vegetable seed production in Nepal faces multiple challenges that hinder its growth and sustainability. One major issue is the limited access to elite germplasm and weak institutional support for seed research and development. The absence of certified breeder seeds and the deterioration of source seed quality—due to a lack of maintenance breeding and proper seed cycles—further compromise production. There is also a significant gap between demand and supply, with the market largely requiring hybrid seeds while domestic production remains dominated by open-pollinated varieties. The absence of a structured variety deployment plan exacerbates this mismatch. Additionally, seed production is scattered across small-scale operations, leading to high costs and inefficiencies. Stringent policies, regulations, and bureaucratic directives create further obstacles for producers. While improved road access has enhanced enterprise profitability, the lack of incentives for domestic seed producers discourages investment in the sector. Informal seed trade across porous borders, along with unreliable contracts and frequent contract breaches, undermines formal seed systems. Finally, limited technical expertise and inconsistent seed quality restrict the sector's potential, leaving Nepal heavily dependent on imported seeds despite its agricultural potential.

Legal provision of variety notification or registration in Nepal

Seed Act, 2045 (Second Amendment, 2079)

Structural arrangements for release and registration of different varieties

- National Seed Board (NSB)
- Secretariat: Seed Quality Control Center

- Provincial Seed Board (PSB): Gandaki and Bagmati province already form the Provincial Seed Board

Legal provisions for notification of varieties

Arrangements for Notification by Federal:

Release variety: Ministry can notified variety by publishing a notice in Nepal Gazette after consultation with National Seed Board.

Local and Imported variety

- Registered after decision from National Seed Board
- No need to published in Nepal Gazette
- Published in Ministry website or other medium

Arrangements for Notification by Province

- Notify within the domain of province except imported varieties
- Provincial Ministry can notified variety by publishing a notice in Province Gazette after consultation with PSB.
- Provincial Ministry should consult with NSB before variety notification or registration

Section 11.6 of the Seed Act, 2045

The process of notifying or registering the variety of seeds shall be as prescribed and the process accordingly. According to the nature of certain crops, process of registering variety can be specified in different ways.

In Section 15(d) of the Seed Act, 2045

License Provision for Variety Development and Maintenance

- National Seed Board can issue license but Nepal government should approve for variety development and maintenance license
- Permits can be given to individuals or organizations by making provincial laws in accordance with the quality and standards set by National Seed Board

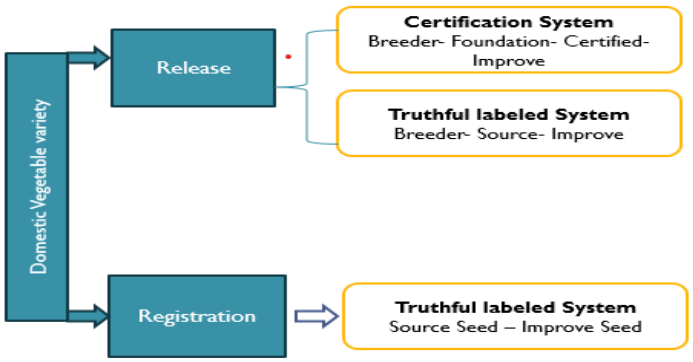
Seed Regulation, 2069

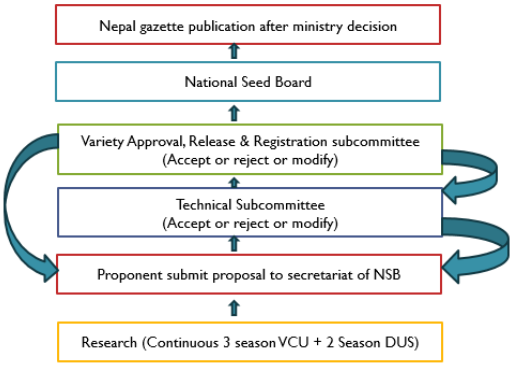
National Seed Board (NSB) has three sub-committee to assist National Seed Board for variety notification and registration. Out of three, one is Variety approval, release and registration sub-committee (VARRSC) under the chairmanship of Director General of Department of Agriculture.

Variety can be notified and there are four ways which are listed here under:

- Schedule A: Release of National variety
- Schedule B: Registration of National variety
- Schedule C: Registration of imported variety
- Schedule D: Registration of Land race and Local crop

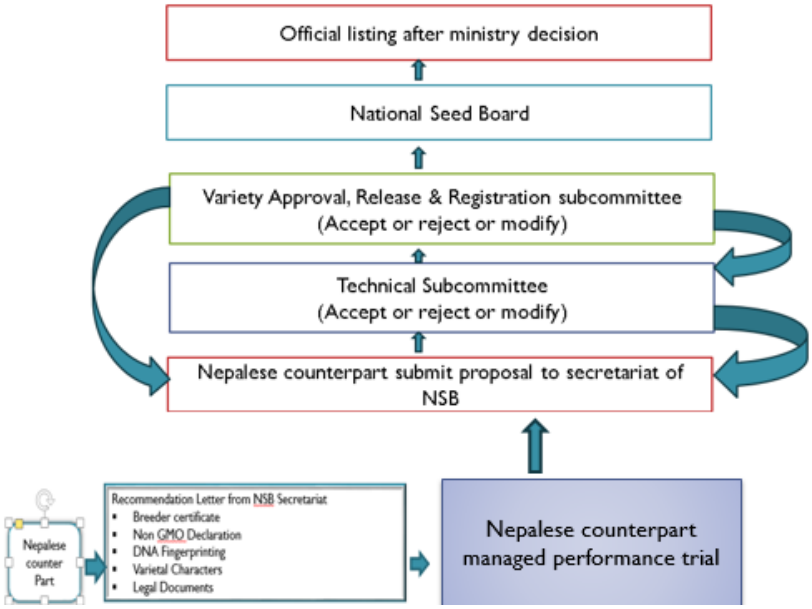
Notification of Domestic Vegetable Varieties and Quality Control System





Notification of Domestic Vegetable Varieties and Quality Control System

Procedure of Notification of Exotic Vegetable Varieties



New Opportunity to Produce Vegetable Seed: Custom Seed Production

Custom seed production presents a promising new opportunity for Nepal to enhance its vegetable seed sector, offering a pathway to reduce dependency on imports while catering to the growing demand for high-quality seeds. The country's favorable agro-climatic conditions, long winter seasons (ideal for seed storage and crop cycles), and availability of affordable labor create a strong foundation for this venture. Additionally, the high market demand for seeds and farmers' willingness to pay for quality varieties further strengthen the case for custom seed production. This model could also streamline the seed registration process, making it more efficient and farmer-friendly.

However, several challenges must be addressed to realize this potential. Ensuring the safety and security of parent seed material is critical, as is the need for accredited laboratory services to maintain quality standards. Strict pest risk assessments and quarantine measures are necessary to prevent disease outbreaks, along with clear regulations for production zones. Investment in seed production research is essential to develop locally adapted, high-yielding varieties. Another major hurdle is the risk of contract breaching, which can undermine trust between seed producers and buyers. Addressing these challenges through policy support, institutional strengthening, and private-sector engagement will be key to unlocking the full benefits of custom seed production in Nepal.

Horticultural Crops Registration System in Neighboring Countries

Horticultural Crops Variety Registration in India

The National Seed Policy, 2002 of India, regulate the sale, import and export of seeds and planting materials of agriculture crops including fodder, green manure and horticulture and supply of quality seeds and planting materials to farmers throughout the country.

All varieties, both domestic and imported varieties that are placed on the market for sale and distribution of seeds and planting materials will be registered under the Seeds Act. However, for vegetable and ornamental crops a simple system of varietal registration based on "breeder's declaration" is adopted in India. Registration of varieties will be granted for a fixed period on the basis of multi-locational trials to determine Value for Cultivation and Use (VCU) over minimum period of three seasons, or as otherwise prescribed as in the case of long duration crops and horticultural crops. Samples of the material for registration will be sent to the NBPGR for retention in the National Gene Bank.

Horticultural Crops Variety Registration in Bangladesh

In the National Seed Policy,1993 of Bangladesh, for new varieties of wheat, rice, jute, potato and sugarcane developed by private or public agencies will be subject to notification by the National Seed Board of Bangladesh. Varieties of all other crops developed by public research agencies will be subject to an internal review and approval by each respective agency and must be registered with NSB before being released. Varieties of crops, other than

rice, wheat, jute, potato and sugarcane that are imported or locally developed by a private person, company or agency must be registered with the NSB giving prescribed cultivar descriptions, but will not be subject to any other restrictions.

The crops and notification procedure for controlled crops before commercial purpose in Bangladesh:

- The National Seed Board (NSB) shall designate kinds and varieties of crops that are to be notified. Initially, rice, wheat, jute, potato and sugarcane will be the only notified crops.
- Release of the varieties of notified crops will be subject to evaluation and testing by the Technical Committee on Seeds.
- Varieties of all other crops will have to be registered prior to being sold, but there will be no requirement for prior testing and approval.
- Any variety, whether imported or developed in Bangladesh, must registered with the National Seed Board. Except for controlled or notified crops, registration will not involve testing or any other procedure.

Requirements in Bangladesh for non controlled crops

- Proposed Name – Scientific, English, Bangla
- Company and Dealer Profile
- Ecological demand
- Breeder details
- Agronomical demands (seed rate, PoPs,)
- Disease and Insect trial and reaction details.
- Description of variety – Identification and other special features
- Description of Initial Yield Trial (IYT), Multi Location Trials (MLT), Yield Trial on Farmers Field and Agronomic Trial

Data to be Recorded for Release and Registration of Varieties in Nepal

The crop, botanical name, old name before registration, new name after registration, parents of the new variety, country of origin, source and accession number should include in the proposal. Agronomical characters like days to 50% flowering, days to maturity from seeding, plant height, fruit weight, yield and multi-location data of initial evaluation trial (IET) and coordinated varietal trial (CVT) data should be taken from at least three location. Morphological traits like seed shape, seed color, seed size, flower color, leaf shape, petiole wing, growth habits, branching, foliage color and plant height etc should be measured and incorporate in proposal.

Response of Stress like as biotic, abiotic and nutritional quality such as protein %, carbohydrate %, minerals, and vitamins should be included in proposal. Beside that recommendation domain, time of planting, seed rate and sowing distance, reasons for recommendation, distinctness of variety, disease scoring (at least 2 consecutive year), insect scoring (at least 2 consecutive year), stability test, testing location at least 3 location and picture and video clips of farmers response should be submitted during submission of proposal in National Seed Board Secretariat

Key Challenges in Domestic Seed Production and Registration

The seed production and distribution sector faces several critical challenges that hinder its effectiveness and growth. One major issue is the **low access to elite germplasm and inadequate institutional support**, which limits the development of high-yielding and resilient crop varieties. This problem is further exacerbated by the **lack of certified breeder seeds and the poor quality of source seeds**, leading to inconsistencies in crop performance and farmer dissatisfaction. Moreover, there is a significant **gap in the supply-demand chain, particularly concerning hybrid seeds**, which are often in high demand but not readily available due to inefficiencies in production and distribution systems. Another pressing concern is the **absence of a coherent variety deployment plan**. Without a strategic approach to introducing and promoting specific crop varieties in suitable agro-ecological zones, farmers are left with mismatched or underperforming options. In addition, **seed production practices are scattered and often come with high costs**, making it difficult for smallholder farmers and seed producers to scale up operations sustainably. Compounding these challenges are **porous borders and frequent violations of seed production contracts**, which undermine the integrity of seed systems and open the door to counterfeit or substandard seeds

entering the market. Finally, **weak policy enforcement and a lack of technical know-how** across the seed value chain limit the implementation of best practices and regulatory compliance, further stalling progress in improving seed quality and availability. Addressing these interconnected issues requires coordinated efforts from both public and private stakeholders, alongside robust policies, capacity building, and investment in research and infrastructure.

Nepalese variety notification and registration process of vegetable crops by one season farmers trail by importers whereas in the neighboring countries where direct registration of horticultural crops was already started is another challenge for our country. Characterization of genotypes, spot examination and development and approval of Plant Variety Protection and Farmers Right (PVPFR), incentives to breeder involved in variety development and strengthen to private sector Research and Development are issues in variety registration of vegetable registration in Nepal.

Conclusion

The vegetable seed sector in Nepal holds strong potential for rural economic growth, yet faces structural challenges in terms of production, distribution, and policy alignment. For the registration of vegetable seeds. The government has developed official guidelines for the registration process, which include documentation of varietal traits and performance, and field trials to ensure genetic purity and identity.

Despite these efforts, coordination issues, weak enforcement, and lack of awareness among farmers and seed producers slow down effective implementation. Overall, while Nepal has laid the groundwork for a functional seed registration system, improving institutional support, training, and streamlined procedures is critical for maximizing the potential of its vegetable seed sector.

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