

Prospects and Challenges of Vegetable Seed Production and Marketing in Nepal

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Abstract

Quality seeds are of vital importance for increasing productivity of vegetable crops. In Nepal, varietal development, source seed management and seed quality control are done largely by the government sector whereas seed production and marketing is done mostly by the private sector. The comparative advantages bestowed by Nepal's agro-climatic diversity, huge gap in internal demand (1745 Mt) and production (475 Mt) of seed, 'high value low volume' nature of seed business to explore remote pockets and availability of cheap labour provide meaningful prospects of vegetable seed business in Nepal. Despite such prospects and policy/legal backing, vegetable seed production in the country is far behind to meet the demand. Most of vegetable seed requirement in Nepal is met by import. Important and mandatory chain of breeders', foundation and improved seed is found to be detached and there is a weak enforcement of seed quality control mechanism in vegetable seed system in Nepal. Development of competitive and demand oriented varieties is negligible and the state of seed production and marketing infrastructure is poor. A concerted effort by the stakeholders is urgently required to improve vegetable seed sector in Nepal. An emphasis on varietal development, easy access to quality source seed, and investment in seed production and marketing infrastructure is required to revitalize Nepal's vegetable seed sector. Devising sound mechanism of technology dissemination and quality control is crucial especially when the nation is in a federal system. An institutionalization of harmonized buy-back system could be a starting point for a self-sustaining vegetable seed marketing system in Nepal.

Keywords: *Vegetable Seed, Comparative Advantages, Buy-back, Marketing.*

1. INTRODUCTION

1.1 Importance

Seed is a key component among all the inputs which reportedly contributes 20-25 percent more in the productivity from the existing situation with other production factors. Vegetable seed has been prioritized as a high value low volume commodity of remote potential pockets/zones where irrigation facility prevails. The comparative advantages bestowed by the Nepal's agro-climatic diversity, huge gap in demand (1745 Mt) and internal production (478 Mt), availability of cheap labour and increasing awareness of quality issues among its stakeholders provide meaningful prospects for the vegetable seed business in Nepal (Seed Vision, 2013-2025). Gross income (NRs. 183520/ha) as compared to cereal seeds (NRs. 48633/ha) (KUBK, 2017) is more in vegetable seed farming (KUBK, 2019) and gives 3–5 times higher income as compared to alternative cereal crops, enabling farmers to buy at least three times more food as compared to growing traditional food crops on the same land (CEAPRED, 2013). Comparative advantage of vegetable seed production particularly as an important low-volume and high value women's business (IFAD, 2012) indicates that vegetable seed business is a women friendly business, their role being higher >60% (KUBK, 2018) and provides employment opportunity for rural women.

Vegetable sub sector contributes 14.88 percent in the Nepal's AGDP (MoAD, 2015). Its average yield 13.7 Mt/ha (VDD, 2018) is higher as compared to other cash crops within a short span of time providing more opportunities for employment and income generation. Quality seed plays major role to increase the fresh production and productivity to address the present import unbalance and unemployment situation. It is estimated that over half of the seed requirement is fulfilled by domestic

production and the rest of the seeds are imported from India, Japan, Korea, Thailand and other countries (HVAP, 2011). But, at present, the in-country seed production is in decreasing trend and total availability is only 27 percent (unpublished official data of NCPVS, 2020) whereas the fresh vegetable production area (282800 Ha.) is in increasing trend. The demand for quality seed is increasing every year as the farmers' choices are linked with the niche pockets having opportunities for seasonal and off seasonal fresh production. Due to increased public awareness towards food nutrition, tourist in-flows, and development of urban and peri-urban areas in the country, the demand for fresh vegetables is increasing day by day. The development and dissemination of protected vegetable farming in Nepal has created additional demands especially for hybrid seeds which are mostly imported. This scenario should be utilized to produce large amount of vegetable seeds for meeting the internal demand and for export as well. Unfortunately, despite the huge potentiality of the vegetable seed sub-sector in the country, the national plans and policies have not yet considered it as a major economic sector in Nepal.

1.2 Enabling Policies

Seed Act (1988), National Seed Policy (1999), Seed Regulations (2013), and Seed Vision (2013-25) are the Nepal's key policy instruments for creating an enabling environment for seed sector to make the seed business competitive, sustainable and self-sufficient. Seed Vision has identified and recommended the potential vegetables for seed self-sufficiency, for import substitution and export promotion. It has also lucidly conceptualized and identified seed value chain actors including input-output of the seed chain components. These value chain components include varietal development and maintenance, seed multiplication, seed processing and conditioning, seed marketing

and seed use (SQCC, 2013).

The main role of Seed act (1988) is to regulate the quality seed production and marketing. There is a provision of National Seed Board (NSB), an advisory body in Seed Act, for developing seed related policies, rules and regulations. The Seed Regulation (2013) is private sector friendly and has provisions for private seed inspector, laboratory establishment at private sector, seed certification and truthful labeling of seed for quality assurance. National Seed Policy (1999) assumed assurance of quality seed production and supply, export promotion and import substitution and has provisioned foundation seed production at private level. It indicates there is a well enabling policy environment for seed business in Nepal.

1.3 Prospects for vegetable seed business in Nepal

1.3.1 Agro-climatic Conditions

Nepal is blessed with diversified agro-ecological belts from tropical to inner Himalayan temperate to alpine cool climate. Number of niche pockets, plains, foothills, valleys and terai region are suitable for different vegetable seed production. The large amount of seed can be produced for meeting internal demand as well as exporting the quality seed to countries like India, Bangladesh, Pakistan, Sri Lanka and other countries (HVAP, 2011). High-hill region such as Karnali and Mustang is suitable for most of the temperate vegetable crops such as carrot, cabbage, Swiss chard, radish and cauliflower. Mid-hill area is suitable for radish, onion, beans, peas, cucumber, tomato, gourds whereas terai is suitable for egg plants, all cucurbitaceous crops, okra and some tropical radish varieties.

1.3.2 Increasing demand of vegetable seed

There is a big gap between demand and supply of vegetable seeds from formal source

domestically. The estimated seed demand was about 1745 Mt in 2017/18 and total domestic production was only 478 Mt (27 percent) (unpublished official data of NCPVS, 2020). This figure shows that the internal demand is fulfilled by imported and internal informal sources of farmers' saved seed. About 44.78 Mt of seeds including hybrid seeds worth NRs. 546 million was imported in 2019 (unpublished six months record of SQCC, 2020). The formal source supply was only 522.78 Mt and the remaining quantity (1222.22 Mt) was fulfilled by informal source of farmers' saved seeds.

1.3.3 Huge production possibility

National Center for Potato, Vegetable and Spice Crops Development (NCPVS) predicted the present vegetable seed production possibility on the basis of potential production pockets, emerging seed entrepreneurs and increasing capacity of quality control mechanism is about 981 Mt (worth of NRs 4 billion). It indicates the possibility to increase nearly the double of present internal production of 478 Mt.

1.3.4 Cheap labor availability

Although male labor availability in present situation is declining due to high abroad migration but the available ones are cheap as compared to other off-farm activities. Vegetable seed farming is labor intensive and demands more fine hands of female labor mostly in post-harvest handling activities of seed. The present involvement of female farmers in seed business is encouraging (over 60 percent) (KUBK, 2018). So there is good prospect to explore the available human resources for vegetable seed production programs.

2. Status of Vegetable Seed Production

2.1 Area under Fresh Vegetable Production

Seed production is directly related with the expansion of area used for fresh vegetable

production. In the last ten years, the area covered and the productivity of fresh vegetable is in increasing trend (Fig 1.). It shows that every year vegetable seed demand is also increasing while in the last two years (Fig 2) the formal source of in-country supply is declining.

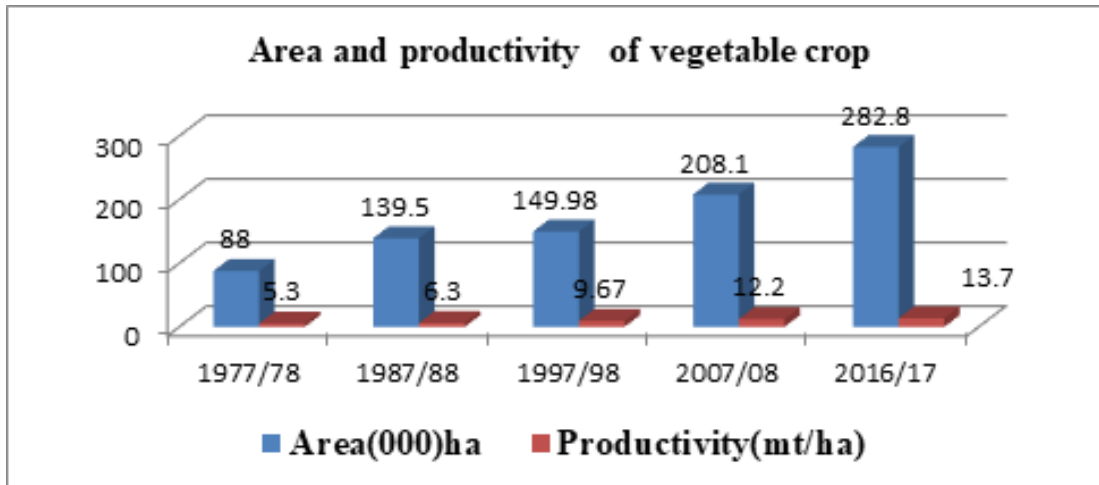


Figure 1: Area and productivity of vegetable crops during the last 39 years at 10 years interval (VDD, 2017)

2.2 Vegetable seed production status

The domestic improved seed production status of last year was 478 Mt (fig 2) (unpublished official data of NCPVS, 2020)). Ten years data reflects the declining trend of domestic seed production since last two years. The detached seed chain in new federal working environment is hindering faster and reliable collection and update of data on seed availability.

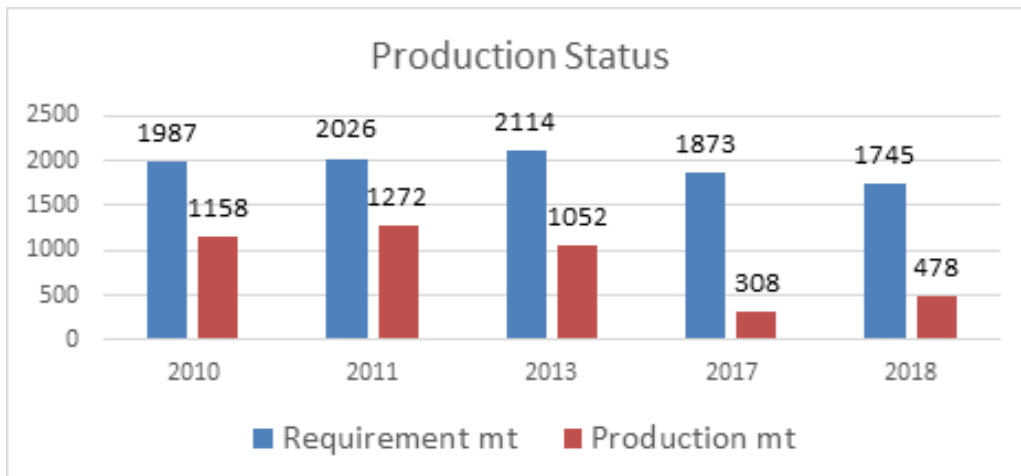


Fig 2. Vegetable seed production status (SQCC, 2017 and unpublished data of NCPVS, 2020)

2.3 Hybrid Seed Production

Seed Vision’s projection was to develop 30 hybrid varieties by the public and private sector by 2025. It should have developed 20 varieties by now. However, only one tomato variety of Srijana is developed so far. Last year’s production of Srijana seed was 71.25 Kg (unpublished data of HRD, NARC, 2019).

2.3 Variety Release and registration

Only 39 open pollinated (OP) varieties released so far out of the total projection of 70 varieties by Seed Vision. Altogether 95 OP and 254 hybrid (exotic) varieties have been registered and notified (SQCC website). These varieties are being used in most of the commercial production pockets. Most common crops of hybrids are

tomato, cabbage, cucumber, cauliflower and sweet pepper. The in-country OP varieties release and screening is not in progress after the termination of fresh vegetable and seed production project. Vegetable research is severely lacking behind the activities of variety development and improvement. Rather, the progress showed the higher number of hybrid variety registration and notification linked to the private interest rather than the public initiation.

2.4 Seed Production Farms and their roles

Representing the various agro-ecological belts of Nepal, since 1960's, a number of horticultural research and production farms/stations were established to conduct the basic research, adaptive trails, maintain the varieties, produce breeder and foundation seeds. These farms were mandated for crop/variety selection, screening, recommendation, seed production and supply of source seeds in those particular command areas. NCPVS recently reviewed Nepal's public sector vegetable seed production system. At present, there are only 14 farms/centers directly operating to manage maintenance of varieties and source seeds. Only 44 varieties of 26 crops are being maintained to produce foundation seed while only 16 (out of 39) varieties of 8 crops are in breeder and foundation seed production

chain. The situation indicates a detached chain of breeder and foundation seeds which ultimately disrupts the chain of improved seed production. A mandatory role and responsibility was assigned to all the farms/centers to maintain the varieties, produce breeder's and foundation seeds and carry out some adaptive research activities in the farms under Department of Agriculture. The tasks of breeder's seed production and maintenance and basic research were mandated to NARC. The farms/ stations under NARC are expected to perform these tasks based on agro-ecological suitability of different regions of Nepal. SQCC is responsible to ensure the quality of seeds produced.

3. Vegetable Seed Import and Export Situation

A total of 44.77 Mt of vegetable seeds (worth NRs. 546 million) was imported in the FY 2076/77 (six months update of SQCC) which included 6.25 Mt of hybrid seeds (worth NRs. 413 million) and 38.25 Mt of OP seeds (worth NRs 133 million) from different countries (SQCC official record, 2020) where as in the last year the total import was 131 Mt (worth NRs. 393 million). The import update of Department of Custom was about 424 Mt (worth NRs 553 million) in FY 2075/76 (Table 1).

F.Y	Import		Export	
	Quantity (Mt)	Value (Lakhs)	Quantity (Mt)	Value (Lakhs)
2072/73	249.99	3750.98		
2073/74	342.33	4166.65	0.345	36.07
2074/75	509.67	4403.17	0.513	17.64
2075/76	424.33	5530.88	0.537	8.96

Source: Department of Customs, MoF (Website)

The import value is in increasing but the volume is in decreasing trend. It indicates the varieties imported are more hybrid. Cauliflower is the number one crop in import by price followed by hot peppers. Similarly Coriander is the number one crop in import by volume followed by Yard Long Bean. The total update of SQCC should come within the department record but there is gap and it reflects that most of the seed companies/traders are not within the frame of SQCC. Similarly, the seed export of last fiscal year was only 0.537 Mt (worth NRs 0.89 million) where volume is in increasing trend but the value is decreasing. Which indicating the fluctuating price value of our seed in international market.

4. Vegetable Seed Marketing

After the emergence of Seed Entrepreneurs' Association of Nepal (SEAN), seed traders/agro-vets started the contract marketing of vegetable seeds with producers or groups in different seed producing pockets. Source seed management was the responsibility of public farms/stations which provided the foundation seed around the command areas of the farms. The government policy encourages the small farmers of remote areas to involve in vegetable seed production programs and it has been prioritized as a low volume high value commodity. At the beginning, the marketing system depended on the individual contact of farmers with seed traders or agro-vets without any formal linkages; there was no any market information with buy-back agreement system. The mutual understanding between the producers and traders was not harmonized and the breaching of contract from both sides was common.

In case of vegetable, the total seed requirement is estimated at 1873 Mt in the FY 2074/75 of which 25 percent (468 Mt) was produced within the country and the rest 75 percent was fulfilled through import (of the total import, 67 percent was through informal sources) (SEAN 2019,

Presentation in Seed Symposium). In the FY year 2075/76, it was about 27 percent (478 Mt) from formal source of in-country production and remaining was fulfilled by formal and informal sources from abroad and farmer saved seeds (NCPVS, 2020). So, the need of an harmonized formal linkage entity has been realized around the seed producing districts. There are 35 seed companies, cooperatives and groups registered and have license to produce foundation seeds (SQCC website) which ultimately promotes to support the farmers' group and entrepreneurs to produce improved seeds. Private laboratories, seed crop inspectors and seed samplers have been developed and mobilized to support the seed quality control mechanism. Buy-back agreements through the multi-stakeholder's platform (MSP) was found appropriate to harmonize and sustain the seed marketing system (KUBK, 2018). The seed processing companies are facing problem to reach the individual producers as the production sites are scattered. So, a commercial entity is necessary in the district to facilitate and make the trade linkages for formal marketing.

5. Major Issues in Vegetable Seed Business

Vegetable seed business is directly related with the food and nutritional security of the people. Due to public awareness the consumption of fresh vegetable is increasing day by day. Quality seed availability at the right time for efficient crop production is a major issue of vegetable seed in Nepal. The private sector is now handling more than 90 percent of seed business but their capacity in terms of quality maintenance, processing, testing and safe marketing has not been up to the mark. In new federal structure, the seed chain is not functioning well in linking value chain actors from central to local governments. The source seed maintaining mechanism is being detached and some of the varieties have

been losing the breeders' seed chain to continue the seed production process. From the reviews, it has been realized that the major bottlenecks around seed business in Nepal are as follows:

- Huge gap in the demand and production of vegetable seeds:

There is a huge gap in demand and in country production to supply the formal seed. In last fiscal year alone, 478 Mt (of demand 1745 Mt) and 44 Mt of seed was available formally from internal and abroad source respectively. It shows that about 70% of seed comes from informal source. Farmer saved seed weighted more in this case and some illegal entry from India due to porous border is common.

- Weak production planning and seed chain for seed production and distribution system:

Seed planning for production with safe disposal mechanism is still primitive. Seed production process and fresh production for the farmers and other stakeholders do not differ in most of the steps except source seed supply. Good Agricultural Practices (GAP) of seed production process is yet to reach to the farmers' field from our extension system. The seed marketing contract and buyback system prevails informally with individual contact and it is not well harmonized and trust worthy.

- Scattered production, low quality and high cost of production:

Scattered production patches are common features in the seed producing areas. Due to this situation, it has been difficult to provide public infrastructure and quality control. It demands high cost of production when source of inputs are not concise in a block or pocket. It also de-motivates the traders and companies to handle marketing from the scattered source of production.

- Deterioration in the genetic and physiological quality of the source seed due to its continuous use without proper maintenance:

Varietal maintenance is a continuous process after the release and recommendation of a variety. This is a mandatory role given to all the farm/centers to maintain the crop/varieties according to the variety developed in the particular ecological belt. It was important to place right persons to implement these mandatory works but it became less attractive job in horticulture farms due to low budget and poor physical facility allocated by the Government since 90's and afterwards. Most of the farms were headed by the junior technical hands without good knowledge on variety development and maintenance process. Consequently, the continuity of these works have been disrupted and also suffered heavily.

- Price fluctuation, quality seed production (varietal purity, germination, viability, genetic stock used, drying, packaging), and demand for hybrid seed are also the major issues related to the vegetable seeds sector in Nepal (Timsina et al, 2018)

There are different issues at different levels from operation to strategic actions. These can be summarized as follows:

Issues raised at production level :

- Quality of source seed produced in the Government Farms
- Limited technical knowledge; limited varietal choices
- Deteriorated varieties for seed production
- Supplying low quality vegetable seeds to the seed users
- Low level of knowledge and capacity at the farm level
- Inadequate technical support services from government offices
- Scattered production, high production cost, low levels of commercial farming
- Limited research on vegetable seeds production,
- Weak production planning based on demand

- Lack of sufficient participatory varietal selection program
- Insufficient skilled manpower
- Post production Issues:
 - Absence of collective marketing (value chain linkages) in full phase
 - Inadequate market information system
 - Low levels of post-harvest knowledge
 - Poor post-harvest handling by transporters in large sized packages
 - Quality and price debate between traders/companies and farmers; trustworthiness and harmonized buy-back system
 - Dependency on middlemen for trading of product, inadequate market supports
 - Most of the people engaged in the seed business are technically weak and do not care about minimum standards of seed quality

Policy Level Issues:

- Price fluctuation in imported seed
- Seed certification of vegetable seeds; locally produced seeds are facing problems of timely inspection, labeling, packaging, branding and marketing (KUBK, 2018).
- Demand based quality source seed production and timely supply
- Imported hybrid seeds are replacing indigenous open-pollinated vegetable seeds; Import of even such OP varieties having high domestic potentiality for seed production (eg. Mino early), thereby discouraging seed producers as well as internal seed markets.
- Illegal import, untrained sellers, no labeled seeds and weak seed inspection
- No or limited capacity of government seed agencies for GMO seed testing
- Poor seed database
- Re-defining/ re-aligning roles and responsibilities of provincial and local governments

6. Future Strategy

The future strategy of vegetable seed sector should be such that it follows strictly the seed vision strategy. Seed vision has envisaged and projected most of the milestones from variety maintenance to hybrid seed production. Number of crop/varieties have been prioritized for sustainable production and import substitution. Due to the new federal structure some issues demand revisit and more coordination for effective implementation. So, the following strategy have been suggested to strengthen the vegetable seed sector in the coming days.

- Strengthening government farms including provincial ones
- Devising and implementing a strong technical coordination mechanism among NCPVS, central and provincial farms
- Regulating imports/registration of Hybrids
- Increased collaboration with NARC for nucleus seed; repairing broken link among breeders', foundation and improved seed
- Stimulating private sectors' and cooperatives' investment in seed sector through investment support, subsidies and tax incentives
- Enabling private sectors in FS production
- Zone/pocket seed production programs with consolidated land management and integrated support of inputs and market linkages
- Supporting infrastructure development such as community seed banks, seed processing plants through direct investment
- Providing extensive services on the proper use of improved seeds as well as production and distribution of certified seeds
- Creating/maintaining/updating vegetable seed database

7. Proposed vegetable seed production implementation mechanism in new Federal Structure

Government	Responsible Institutions	Role
Federal	MoALD/SQCC/NSB/NARC	<ul style="list-style-type: none"> ▪ Variety release and registration ▪ Variety recommendation to particular agri eco zones ▪ Prepare national balance sheet of seed ▪ Formulation of national seed policy and regulations
Province	Provincial Agriculture Ministry	<ul style="list-style-type: none"> ▪ Preparation of Provincial seed balance sheet with coordination of SQCC and Federal Ministry ▪ Implementation of source seed multiplication programme in coordination with NARC ▪ Establishment of seed resource center under Province ▪ Implementation of varietal maintenance plan for each Province as proposed
	Seed Testing Laboratories	<ul style="list-style-type: none"> ▪ Field inspection, seed testing and seed certification ▪ Seed quality regulation at Provincial level
Local	Municipality/Rural Municipality	<ul style="list-style-type: none"> ▪ Facilitation in Land Consolidation, Implementation of seed production programme in potential pockets of concerned local institutions ▪ Assist in marketing of improved seeds in close coordination with seed producers and private seed dealers ▪ Assured seed quality control in coordination with Provincial Ministry/STLs ▪ Regulation of seed quality control and seed marketing in close collaboration with Provincial Ministry/STLs

(Source: Poudel, et.al., 2019)

8. Immediate Action Recommended

- Organizing a conference among DoA, Provincial Directorates of Agriculture, Government farms, NARC and private vegetable seed producers
- MoU for direct technical coordination among DoA and provincial Directorates of Agriculture
- Revive vegetable and vegetable seed data collection and analysis mechanism
- Develop a yearly schedule of source seed production in DoA farms, NARC farms and Provincial farms as before

- Prioritize vegetables and their varieties for varietal maintenance and source seed production; develop a seed production mechanism at all levels
- Prepare a yearly source seed balance sheet and repair broken links among breeders', foundation and improved seed.

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