

# CEAPRED'S EXPERIENCES ON VEGETABLE SEED PRODUCTION AND ECONOMIC GROWTH

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## ABSTRACT

*A high yielding quality seed is the prime technical input for the growth of agriculture. Using the quality seed, 20 to 30 percent crop yield can be increased. Seed is a low volume high value non-perishable commodity. In remote hills where bulky fresh produce cannot be marketed easily, seed is one of the best established options for cash earning and income generation. Vegetable seeds can give 3-5 times higher income as compared to alternative cereal crops. Vegetable seed is now realized as a very potential sub-sector contributing to poverty reduction and enhancing food and nutrition security where other economic opportunities are very limited.*

*It is an established fact that Nepal has two important resources for vegetable seed production: a) agro-climatic variability with four distinct seasons (spring, rainy, autumn and winter), three major ecological belts (mountain, hills and Terai) and several micro-climatic zones and b) large number of agro-biodiversity and genetic variability*

*Despite above comparative advantages Nepal has not been able to develop vegetable seed industry as it should have been done. This may be due to several reasons including technological and policy anomalies, and administrative distortion.*

*In the world scenario, Gene Giants have used intellectual property laws to control the world seed supply. In less than three decades, a handful of multinational corporations have engineered a fast and furious corporate enclosure in the seed chain. The proprietary seed market (brand named seed that is subject to exclusive monopoly in the name of intellectual property) now accounts for 82% of the commercial seed market worldwide. With this advancement the Nepali indigenous vegetable varieties are endangered. Nepali cabbage and cauliflower have almost been replaced by imported hybrids. Similar is the case with tomato, sweet pepper, cucumber and radish. Multinational seed corporate are adapting the strategy that aims to control plant germplasm and maximize profits by eliminating Farmers' Rights.*

*Realizing this overwhelming situation CEAPRED entered into the seed production and marketing activities organizing farmers in groups/cooperatives. During the process CEAPRED has learned and acquired a lot of experiences which this paper tries to summarize. The national requirement of vegetable seeds estimated for NFY 2070/71 is about 1960 mt. whereas the estimated domestic production is around 1200 mt. with short fall by 41 %. The short fall is met by import of open pollinated (OP) and hybrid seeds.*

## INTRODUCTION

Center for Environmental Agricultural Policy Research, Extension and Development (CEAPRED), the pioneer non-governmental development organization working in the area of rural poverty alleviation in Nepal, was established on 23<sup>rd</sup> April 1991. Its operation is basically guided by a programmatic framework comprising the key thematic program areas: *i) Poverty Reduction and Sustainable Livelihood Improvement ii) Ecosystem services and Environmental Management iii) Action/Policy Research.* Socially inclusive, economically prosperous and environmentally sustainable society, promoting improved gender-sensitive and environmental friendly livelihood options for the rural poor, deprived and disadvantaged communities in Nepal have been CEAPRED's broad vision, mission and objectives.

Ever since its establishment, CEAPRED has consciously and consistently focused on sustainable poverty reduction and enhancement of food security and livelihoods of the poor, disadvantaged and deprived families, including small and marginal farmers of rural Nepal. CEAPRED's approach to poverty reduction consists of promotion of new and better economic and livelihood opportunities at the local level and linking these opportunities to the markets. Over the years, CEAPRED has implemented several programs to increase beneficiaries' incomes through high value agricultural programs such as vegetable seed production and off season vegetable production in various parts of the country.

The Center has also carried out other programs to economically empower the marginalized and landless people through mobilization of group savings, homestead gardening, small livestock rearing and micro-enterprise development. Efforts were also made to develop and harness locally available resources and institutions in order to ensure the sustainability of its development efforts. As such, activities were designed to mobilize local volunteers and enhance their capacity through several trainings and exposure and also to facilitate registration

and strengthening of local institutions. During this period, the beneficiary households were able to generate millions of rupees as additional income viz. more than 4.2 billion rupees from fresh vegetables, 240 million from vegetable seeds, 130 million from livestock and 99 million from off-farm activities.

CEAPRED over the span of 23 years implemented more than 70 different development projects. Most of the projects concern with income and employment generation through commercial high-value agriculture and agro-enterprise promotion. It has worked in 60 districts of all the five development regions of Nepal. CEAPRED since its initiation has adopted a three-pronged strategy of integrating Social Mobilization, Capacity Development and Local Institution Building. A wide range of donors including SDC, DANIDA, USAID, PAF, IFAD, GTZ, EU, DFID, etc. have provided the financial assistance to implement various programs envisaged by CEAPRED.

### **CEAPRED in fresh vegetable**

Home gardening and fresh vegetable production was one of the important branches of agriculture extension of the Ministry of Agriculture since the beginning of planned development. However, the main thrust of the Ministry and organizations under it was on production demonstration. Marketing was secondary till the restoration of democracy in 2046 BS. Utilizing the proven demonstration of FAO fresh vegetable and vegetable seed project, research results from Pakhribas Agriculture Center and Horticulture station Paripatle/Dhankuta, CEAPRED pioneered in implementing off-season commercial vegetable production in along Dharan-Dhankuta north-south road corridors. The special feature of this road corridor approach was that producer farmers were organized into groups and the groups were federated into cooperatives for organized marketing which clicked and proved to be one successful model. Since 1994, this cooperative model of production and marketing is continued till today for exporting fresh vegetable to different parts of Nepal, India and even to Bangladesh. This Dharan-Dhankuta model's production center around Sindhuwa was replicated in another north-south corridor of Arniko high way. Since then, several other organizations also replicated this model. While working with commercial fresh vegetable production and marketing, CEAPRED experiences that vegetable seed sub-sector is also an important area of income generation in remote areas where other options are limited.

### **Brief history of vegetable seed production in Nepal**

The year 1940 AD is the starting year of vegetable research in Nepal by public sector. In 1946 Government of Nepal could produce cabbage seed in government nursery in Balaju. Since 1946 till 1975, Government farms/centers produced and distributed vegetable seeds for general cultivation. Agriculture Input Corporation (AIC) started vegetable seed sale from 1974 and vegetable seed production started in farmer's field since 1975. Since 1975 onward, the demand of vegetable seeds grew faster due to commercialization of fresh vegetable production.

The private sector seed entrepreneurs also started emerging in marketing of vegetable seed after 1980. During last two and half decades, private sector took the lead in vegetable seed marketing. Globalization grew and vegetable seed import and use of hybrid seed attracted the farmers. According to Vegetable Development Directorate (VDD) the requirement of vegetable seed for the fiscal year 2009/10 was 1810 mt. This requirement increases by 30 mt. per year with the increase in fresh vegetable area by 8000 ha/year. The estimated domestic production of vegetable seed was around 1000 mt. per year during 2009/10 and increases by around 50 mt. per year. The national requirement of vegetable seeds estimated for NFY 2070/71 is 1960 mt. whereas the estimated domestic production is around 1150 mt with short fall by 41%. The short fall is met either by farmer-to-farmer exchange or by import of open pollinated (OP) and hybrid seeds. Most of the vegetable seeds produced in Nepal are of OP varieties whereas in some of the crops like cabbage, cauliflower and tomato, the largest part of growth in seed demand is for hybrids. A study carried out by CEAPRED in 2010 showed that many Nepalese OP varieties are being rapidly replaced by imported OP and hybrids, and this trend is likely to continue in the future. The study assessed that hybrid seed import is seven percent of the total imported quantity (680 mt. in 2008/09). The import quantity in 2002 was 213 mt. (CEAPRED, 2010). Thus the import of vegetable seeds is increasing in Nepal. The national production has not been able to meet the demand of vegetable seeds and import is increasing every year.

### **CEAPRED in vegetable seed production**

#### **Nepal's Opportunities in vegetable seed production**

#### **Agro-climatic variability in Nepal**

Agro-climatic variation and genetic bio-diversity are the natural boon to Nepal. Varied topography from 58 meter to 8848 m above msl and agricultural practices up to 4000 m provides vast opportunities most agriculturists know. Temperature in the cultivated areas may go as low as  $-10^{\circ}$  C during winter months (December -January) in high hills to as high as  $41^{\circ}$  C during summer months (May-June) in Terai. The annual

precipitation ranges from 250 mm (Mustang) to 2800 mm in eastern part of Nepal and 1000 mm in western parts of Nepal. Major portion of the rain is received during June to September (i.e. monsoon). Due to such peculiar geographical and climatic conditions, the country experiences four distinct seasons: spring, summer/rainy, autumn and winter and has major three ecological belts (mountain, hills and Terai). This makes 12 major combinations of agro-climatic zones. Furthermore, if four aspects of hilly terrain (facing of hills towards south, north, east and west) are also counted the micro-climatic combination zones/pockets are still many more. Utilizing such uniqueness and opportunities of existing micro-climates, all major food crops, fruits, vegetables, vegetable seed and flower and flower seed can be grown in Nepal both for domestic consumption and export purpose.

### **Genetic variability in Nepal**

Due to wide range of climatic variations, Nepal is very rich in plant genetic resources also. It is reported that more than 5000 species of higher plants are available in Nepal. However, from the enormous plant species available in Nepal, only few of them have been utilized for domestication. In between highly utilized and underutilized wild species, some vegetables have been little known and their uses have been limited to the indigenous traditional people of the area where plant species are being cultivated or are growing of its own.

The total number of agro-horticultural crops available in Nepal is roughly estimated to be about 400 as species and sub- species. In case of vegetable crops there are more than 200 species of vegetables available in different agro-ecological zones of Nepal. Out of them, only 50 species have been domesticated and used for commercial and or home consumption purposes. Both these utilized and unutilized vegetable species are the potential genetic wealth of Nepal.

Despite above comparative advantage Nepal has not been able to develop vegetable seed industry as it could have been done due to several reasons including technological and policy anomalies and administrative distortion. In the world scenario, Gene Giants have used intellectual property laws to control the world seed supply. In less than three decades, a handful of multinational corporations have engineered a fast and furious corporate enclosure in the seed chain. The proprietary seed market (brand- named seed that is subject to exclusive monopoly, in the name of intellectual property) now accounts for 82% of the commercial seed market worldwide. With this advancement the Nepali indigenous vegetable varieties are endangered. Nepalese cabbage and cauliflower (though it was introduced and adapted earlier) has almost been replaced by imported hybrids. Similar is the case with tomato, sweet pepper, cucumber and radish. Even highly self pollinated crops such as legumes are also endangered. Multinational seed corporate are adapting the strategy that aims to control plant germplasms and maximize profits by eliminating the Farmers' Rights. Today, the proprietary seed market accounts for a shocking and staggering share of the world's commercial seed supply.

Realizing this overwhelming situation and also learning's from the previous seed projects such as FAO/Fresh Vegetable and Vegetable Seed Project (1981-1994), Koshi Hills Vegetable Seed Project (1993-1998) and Seed Sector Support Project (SSSP) (1998-2003), CEAPRED entered in vegetable seed production and marketing from 1998 with pilot production of vegetable seed in Maina Pokhari, Dolakha followed by a DANIDA supported Participatory vegetable seed project in six districts (Dolakha, Kavre, Sarlahi, Surkhet and Baitadi) organizing farmers in groups/cooperatives. During the process CEAPRED has learned and acquired a lot of experiences which this paper tries to summarize. While working in north-south road corridor for off-season and seasonal fresh vegetable production, CEAPRED realized that vegetable seed is also one of the important sub-sectors for income generation in remote areas.

Vegetable Seed Project (VSP) funded by Swiss Agency for Development and Cooperation (SDC), was initiated in 2004. The project was designed to benefit poor farmers living in remote areas by diversifying their income opportunities through vegetable seed production and marketing with special focus on disadvantaged communities and farm families. The project was directed towards increasing household income and contributing to improved food security and livelihood.

**Phase I** (2004 -2006) was implemented in five districts namely, Baitadi, Dadeldhura, Surkhet, Kavre and Dolakha. The main objective of the phase was to promote vegetable seed for poverty reduction. The phase target was generating farm income of about Rs 33 million from 120 mt. of vegetable seed production and marketing, involving 3200 farm families. The actual quantity produced and marketed was 240 mt., which could generate direct income of Rs. 36.28 million by involving 3600 households. To support the seed production activities, 88 community micro-irrigation schemes and one seed collection center were also built. The impact of this phase was realized in terms of enhanced food security. Vegetable seed on an average could generate 3-5 times higher income from the same piece of land compared to foregone cereal crops. This increased income could buy more food grains and improve domestic expenditure on medicine, education and other assets. On food security front, among participating farm families, 10% households with food security level of less than 3 months moved to 6 months; similarly 3% from 6 months to 9 months, 3% from 9 months to 12 months and 4% moved to food

surplus groups. The project also contributed to improved social harmony and reduced social discrimination (CEAPRED, 2006).

**Phase II (2007 to 2010)** The Phase II aimed to contribute to improved sustainable livelihoods through seed in remote rural areas of Nepal. The primary target beneficiaries during this phase also were poor and disadvantaged groups (DAGs)<sup>1</sup>. This project also worked in line with the government's objective of poverty reduction through income generation and improved food security at the household level.

By December 2010, the project had covered 82 VDCs and one municipality of eleven districts. It had organized 7200 households into 362 groups. The farmers had produced 510 mt. seeds of different vegetables. The achieved incremental household income ranged from NRs. 15,000 to 150000 per annum with total income of NRs 87.5 million during the phase. Certain crops such as bottle gourd, sponge gourd, bitter melon and other climbers were more suitable for smallholders because the climbers did not require more land. The food security situation of the participating households improved significantly. Shift in food security status was upward, improving the food security level by 3 months under each category. Significant number of HHs (15 per cent of beneficiaries) is now having food surplus and this is attributed largely to increased income from vegetable seed production and marketing. Similar impact in income level of the farmers is realized. More than 11 percent of the beneficiary HHs falling below poverty level has moved above the poverty<sup>2</sup> level. The poor including DAGs and women in particular have benefited from this change.

The immediate impact of this phase can also be measured in terms of local institution building. It is particularly reflected in the number of evolved cooperatives. During this phase, twenty-seven cooperatives were established. The established cooperatives were functional in the areas of seed production and marketing. Socially, the developments of cooperatives are inclusive, indicated by the large participation of DAG members. Out of the total cooperative share holders (2439), 25.8 percent belong to DAGs. Similarly, among the total of 229 executive members, 33.18 percent DAG members were represented in the executive committee of the cooperatives.

The progress of phase II was reviewed by a team of independent experts in December 2009. This review team analyzed the seed system of Nepal in broader perspective beyond the project intervention. The team's vision on system was to consider the national needs, and cover the seeds of all economic crops. The review opines that the projects will have to address all the constraints of the seed system of Nepal. The review team supported the idea of strengthening public-private partnership and commented, "The seed system will only work efficiently if the roles and responsibilities of each stakeholder are clear, and not too many tasks are attributed to the public sector: the public sector stakeholders have a very important role to play in terms of regulation, certification, coordination and control, but a number of other tasks can be assumed by private stakeholders."

With these comments, the review team recommended the phase III extension of the seed project with some options for improvement. A few major points appeared as key for the improvement of the seed system:

- Redefinition of roles and responsibilities between public and private stakeholders: there are functions that are presently under the responsibility of government institutions but could be assumed by private stakeholders (reducing the burden for government services)
- Seed producers in Nepal do not yet have a national union: creating a national seed growers' union (or a federation of seed growers' cooperatives) would strengthen and boost seed production and the seed sector as a whole, and represent the producers and NGOs in the NSB
- Engage in hybrid seed production (varietal development and seed production) for some specific crops (vegetables) for which there is a high demand and a sufficient market potential
- Accreditation of seed inspectors (public – e.g. from NARC and DoA – and private certification agencies) by SQCC for official seed certification
- Government farms and NARC stations should focus on breeder seed production – no longer on foundation seed. Foundation and source seed production should be decentralized to Cooperatives, NGOs and experienced and trained farmers
- Experienced groups of seed growers should be entitled to truthfully label source seeds, to increase the availability of source seeds when there are not enough official breeder seeds

The rationale for project intervention and the flows of seeds in the system in Nepal have been well analyzed in review report. Based on these analyses, the review team strongly suggested continuing funding the new phase

<sup>1</sup> Groups of poor farm families: those suffering from caste, gender and ethnicity based discrimination

<sup>2</sup> Poverty: households having less than six months food sufficiency

which should address constraints on vegetable seed production, marketing and on policy issues such as seed quality control and truthful labeling. Against this backdrop, Center for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED), as implementing agency of this project, proposes the new phase of VSP III for SDC funding.

**Phase III (2011 to 2014) Vegetable Seed Project, Phase III (VSP-III)** is built on the success and learning of previous two phases of Participatory Vegetable Seed Production for Poverty Reduction – PVSPR I & II. While the earlier two phases aimed at improving the food security and livelihood status of the targeted HHs, the current phase focuses on scaling up and institutionalizing the interventions of previous phases at local as well as policy level. The major components of this phase include quality seed production and marketing including value chain, bringing cooperatives into formal marketing channel, federating primary cooperatives into district and national level unions, strengthening public-private partnership and promoting synergistic and connected development.

VSP-III is being implemented with financial support from Swiss Agency for Development and Cooperation (SDC) in 16 hill districts of Nepal: Baitadi, Dadeldhura, Achham, Kalikot, Dailekh, Surkhet, Salyan, Jajarkot, Rukum, Dolpa, Parbat, Myagdi, Kavre, Ramechhap, Okhaldhunga, and Khotang.

As of April 2013, 12,466 farmer households organized in 600 groups were involved in vegetable seed production, of which 20% were Dalits, 25% Janajatis and about 62% of the beneficiaries women. The proposed target of vegetable seed production by VSP for NFY 2069/70 is 253 mt. to meet about 13% of the national seed requirement and about 24% of the domestic production. To meet the above production target a total of 43 contracts were signed for seed production and marketing between farmer groups/cooperatives and seed entrepreneurs organizing eight marketing workshops. Although the seed production for NFY 2069/70 was targeted 253 mt., the estimated production agreed by the producers during the marketing workshop is 230 mt. Among the total agreed estimated production, about 83.63% (192.17 mt.) have been contracted with 43 contracting parties (seed companies, entrepreneurs and agro-vets). The rest 37.83 mt. has yet to be contracted



Farmers of Methinkot, Kavre involved in Hybrid tomato seeds production



Vegetable seeds packaged by CEAPRED supported cooperative in Kavre

In addition, variety development process has been initiated in six resource farms of different locations maintained by the project. Promotion of hybrid seed production (Tomato var. Srijana) has already been initiated in six districts (Kavre, Parbat, Rukum, Surkhet Baitadi and Okhaldhunga) in collaboration with NARC/HRD. Farmers, especially women, are now the breeders of these hybrid seeds. Likewise, in Surkhet and Rukum, customized seed production of radish and onion was initiated for export in partnership with CG Seed Company in Nepal and Laltir Seed Company in Bangladesh.

### **Change in food security, nutritional status, women empowerment and social harmony**

Through vegetable seed and fresh vegetable production, the participating households (HH) were able to increase their income by NRs 15000 to 250,000 with an average of NRs. 50,000/HH/annum. The overall impacts have been multidimensional. For instance, increase in vegetable consumption has enhanced the nutritional status of the farm family. The field assessment carried out in 2011 indicates that the average vegetable consumption of the beneficiaries has increased to 1.5 kg/day/HH from 0.75 kg/day/HH in the base year 2007, which has implication on the improved household nutrition. Collective action and participation of beneficiaries from diverse social and economic background and regular meetings among them have contributed to improvement in interpersonal relationship and social harmony. Gender Equity and Social Inclusion (GESI) sensitive interventions in the project areas have been able to socially empower the women and DAGs. The 2011-12 assessment indicates that 40% of the women beneficiaries are the shareholder in the primary cooperatives and

35% is represented in the executive committees of these cooperatives. Similarly, 14% of Dalits and 17% Janajatis are being represented in the executive committees of the cooperatives.

**Shift from project mode to program mode**

Considering the potential of seed sub-sector in rural poverty reduction and CEAPRED's successful past experiences in the sector, CEAPRED has taken a step forward and initiated action towards transforming ongoing vegetable seed project from project mode to program mode. In this context, CEAPRED initiated actions in three aspects to achieve this goal:

– (1) promotion of IPM package through USAID-funded IPM CRSP project aiming at laying the foundation for organic seed production. Three successful IPM packages have been developed – one each for

tomato, cucurbits and crucifers – and are being revalidated in VSP's resource farms for scaling up; (2) promotion of bead technology to maintain the right seed moisture level for long term storage, through another USAID-supported Horticulture CRSP project, particularly focusing on onion, okra, tomato, beans and cucumber. This technology is being validated in VSP areas. If successful, this will help seed producers to store the seeds for a long time with normal moisture content and fetch good price, and also help the traders in storage and sale of seeds for different seasons; and (3) customized seed production for export to Bangladesh through EC-funded Agriculture and Nutrition Extension Project (ANEP) in Surkhet and Rukum, which will create opportunities for linking Nepali seed producers with Bangladeshi seed traders.

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**Impacts of project intervention**

a) Participation of women farmers in vegetable seed production has outnumbered in all project district as shown in fig 1. Vegetable seed production is considered as one of the effective alternative to improve food security in remote areas. It is low volume and high value commodity for increased income and improved livelihood of the poor community. During phase II all together 7200 farmers participated in the vegetable seed production. Among 7200 participating farmer members 4422 are female and 2778 are male.

b) The food security situation of the intervened community has improved significantly. More than 1200 HHs with less than 3 months food security status sifted to 3-6 months. Similarly more than 1000 HHs with 3-6 months food security status sifted to more than 6. About 500 HHs with less than 9 months food security status shifted to food sufficiency status and significant number of farmers became food surplus with increased income from seed production.

- Food security improvement by 76% in <3 months food sufficiency household.
- Average 15% shift to upper strata from 3-6 months, 6-9 months and 9-12 months.

c) Change in poverty status has also been brought about by increased income. Income status of the farmers significantly increased with project intervention. More than 500 HHS below poverty level sifted to above poverty level with adaptation of vegetable seed production in remote areas.

The impacts of increased income are:

- Among the poor household 55% increased income spent on food items and rest 45 % in non-food item.
- Investment increased in household supply, medicine and education.
- Investment in livestock purchase and house roof repair.
- Additional land purchase by some of the beneficiaries.

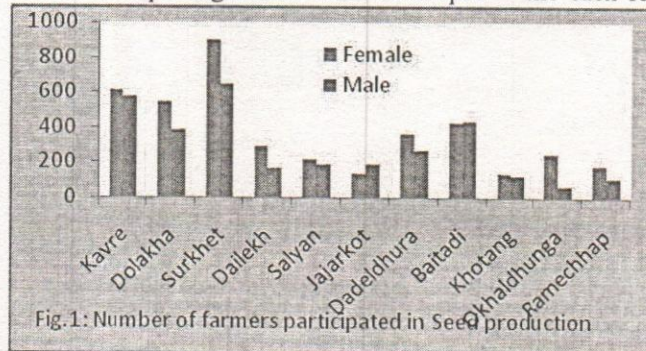
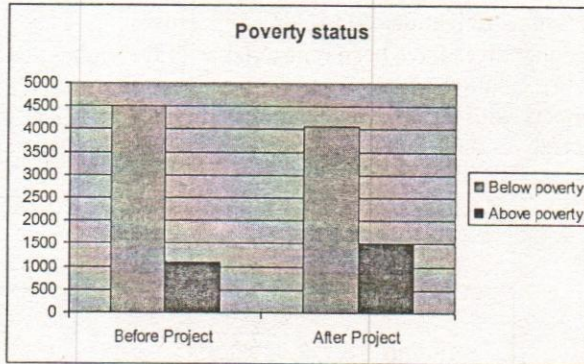


Fig.1: Number of farmers participated in Seed production

Fig 2: Food security shift during phase

Fig 3: Shift in poverty status

d) Increased participation of DAG in cooperatives

A total of 37 cooperatives have been registered as of December 2012 with 4,290 shareholder members including 48% female representation and 42% DAGs representation. Among shareholder members, 403 were involved as executive members with 62% participation of female and 39% DAGs (Figure 4). Out of the total cooperatives, 23 (64%) cooperatives have 33% or more representation of female as shareholder and executive member.

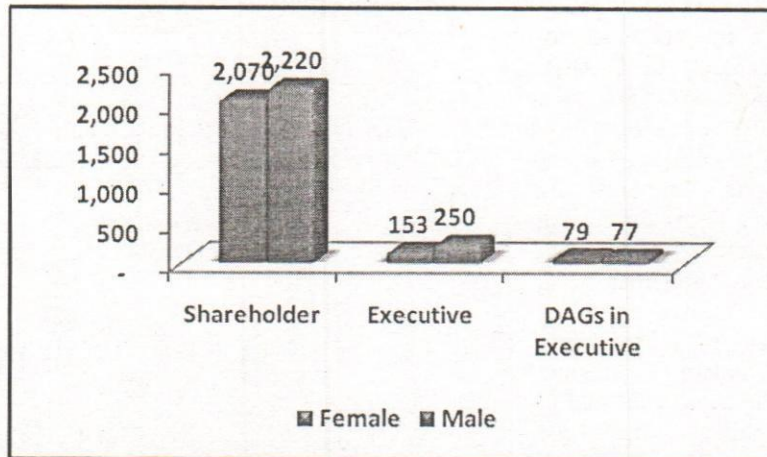


Figure 4: Representation of Female and DAGs in cooperative as shareholder and executive members

**Project Management**

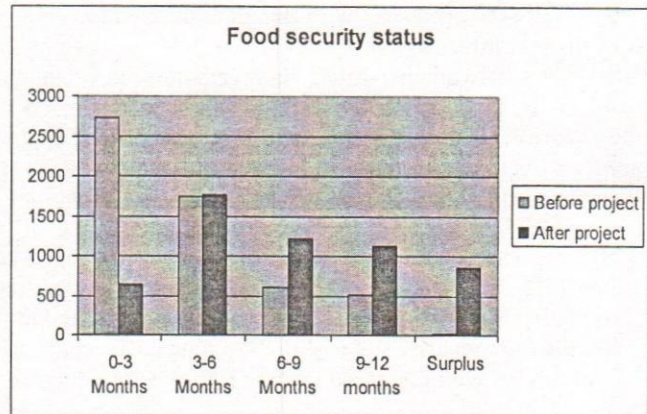
The Project Steering Committee (PSC) chaired by Secretary, MoAD is the key governing body for the project. Project Team Leader acts as Member Secretary to PSC. The PSC meetings are conducted two times a year. Policy guidance, coordination support, approval of the work plan and budget, and reviewing the project progress are the main functions of PSC.

At district level, a District Coordination Committee (DCC) has been constituted. The DCC is chaired by DADO and members are: Program Officer (DDC), Women Development Officer (WDO), representative from NARC/DOA farm, farmers' representative (at least one female) and VDC authority from major seed producing area, representative of seed production and marketing cooperatives, and representative of local seed entrepreneurs. District/Cluster Coordinator acts as Member Secretary. The DCC approves the project activities of the district, supervise, monitor, and guide district activities. DCC meeting takes place at least twice a year.

**Project partners**

The major anticipated partners contributing to outputs are NARC, DoA, Seed Quality Control Center (SQCC), Vegetable Development Directorate (VDD), Horticulture Research Division (HRD), and DADOs in public sector. SEAN in the private sector and SDC funded projects (HMRP, SSMP, LILI, Home Garden, and others) will play role for synergistic and connected development. Local bodies such as District Development Committee (DDC) and Village Development Committee (VDC) are also the partners who are expected to provide supplementary financial and governance support to develop seed enterprise at community level. The key roles of the HRD and VDD are to collaborate and contribute in outputs providing breeder's seed for source seed production and improved seed production, parental lines to produce hybrid seed, varietal-development, policy support, quality control support and technical support for quality control. SDC projects (HMRP, SSMP, LILI, Home Garden, and others) will also contribute to achieve outputs synergizing field activities for multiple income generation.

AEC/FNCCI, seed entrepreneurs, seed companies and agro-vets are the major partners who contribute significantly in seed marketing through pre-contract agreements with seed producers.



## Current issues in vegetable seed sub-sector

- 1. Limited varieties and slow process of varietal development:** Officially released vegetable varieties are 40, registered imported open pollinated varieties are 20 and hybrids are more than 200. Imports of self pollinated OP varieties e.g. Pea from New Zealand and Singapore, beans and cow peas from China and Thailand are also competitive with Nepalese OP varieties. We have very limited choice of Nepalese varieties for seed production due to weak and slow varietal development process. Even the limited numbers of varieties publicly released have not been maintained in a way it should have been.
- 2. Insufficient and non-covenant production of breeder/foundation seeds:** Considering the total requirement of improved vegetable seed in the country, annual requirement of breeder and foundation seeds in vegetable is 0.6 mt. and 40 mt. respectively, where as the total capacity of breeder and foundation seed production in NARC and DoA farms/stations is about 6 mt. Even this 6 mt. production is not synchronized in terms of demanded varieties and required quantities.
- 3. Limited investment from private sectors:** Though the number of seed entrepreneurs doing seed business are about 1854 (reported by SEAN), all of them are mostly interested in trading with imported seeds, mainly hybrids, due to higher margin available in those products. There are no specific policy measures to encourage private sectors for the investment in seed industry with R&D and quality assurance.
- 4. Absence of compiled crop and variety wise balance sheet for vegetable seed demand and national level production plan:** The total projected requirement for vegetable seed for 2007/8 was around 1,780 mt. which increased by 30 mt. annually (ad-hoc projection by VDD, 2009). With this assumption the requirement for 2011/12, 2012/13 and 2013/14 comes to be 1900 mt., 1930 mt. and 1960 mt. respectively. However, crop and variety wise disintegrated requirement and production plan at national level have not been worked out officially. The concerned public institutions (VDD, HRD, and SQCC) in collaboration with private sectors (I/NGOs and seed entrepreneurs) could have done it and regularized.
- 5. Information/ Data discrepancy on import:** Informal sources estimate that around 600-700 mt. seeds are being imported. However, the Foreign Trade Statistics show only 240 mt. vegetable seed import during 2010. It is assumed that some imports are not visible in trade statistics. This sometimes affects the marketing of Nepal produced vegetable seeds.
- 6. Duplication and overlaps of different projects:** During last three and half years, several projects have emerged and engaged in vegetable seed production and contributed a lot in seed production and privatization. During conflict period, most vegetable seed projects ceased their activities in the field and only SDC supported vegetable seed project continued and remained in the field. During recent years (2010 onwards) different donors, I/NGOs and government implemented projects (VSP, HVCP, Himali, UMN, Oxfam, DFID, etc.) are involved in vegetable seed production. From the point of view scaling up it is highly appreciable and proves that vegetable seed sector is a growing one and has good future. However, most of them are overlapping in the same areas for the same activities with same crops and varieties. This is creating some distortion in marketing and quality seed delivery. It would have been better if the government coordinates them through one window approach for balanced and demand led production. All donors also might have worked through joint coordination under NSB/SQCC, HRD and VDD.
- 7. State intervention in improved seed price:** The price decision of the breeder/nucleus/foundation seeds produced in the government farms/stations is the right of the government and maintain prescribed quality standard. However, the price of improved seed is the function of market, based on competition and negotiation between producers (farmers/farmer's groups/cooperatives) and buyers (seed companies and agrovets). However, the government has also declared the price of improved vegetable seeds which sometimes hinder the free market procedure. Now, the price of Nepalese seed is so high that it can not compete in Bangladesh market and export is ceased and stopped.

## Envisaged way forward for establishing vegetable seed system in Nepal

- 1. Seed Vision 2025 is almost at final stage.** To achieve the goal of Seed Vision 2025, collaborative and coordinated variety development research through public – private, public-public and private – private partnership must be in place. A national regulatory research guideline may be issued by MoAD for participatory variety development and release with resource sharing among University of Agriculture and Forestry, NARC, DoA, SEAN, NGOs and qualified individual scientists and farmer communities.



2. Maintenance of seed chain from breeder's (nucleus) seed to improved seed production with proper quality assurance and truthful labeling is a must. For this a strong coordination and collaboration among vegetable variety development institutions, improved seed production farmer's groups and cooperatives and seed entrepreneurs is imperative.
3. Issuance and enforcement of clear operational procedure and guideline to access and use breeder's (nucleus) seed for decentralized foundation seed production by qualified and capable NGOs, private sectors and individuals should be regularized.
4. Well established seed value chain and linkage from farmer's groups, seed production and marketing cooperatives, district/central federation of seed cooperatives (union) to seed entrepreneurs of national and international level.
5. Similar to other commodity crops, vegetable crop research also must be linked to international research institution and universities for exchanging research materials and germplasm for developing new varieties. In addition to this joint venture with foreign institutions and seed companies for export oriented production should be formalized under public-private partnership to harness the comparative advantages of Nepal with proper crop zoning both for domestic and export oriented vegetable seed production.
6. Government's leading organizations (DoA/VDD, NARC/HRD, and NSB/SQCC) may have one common coordination and steering body for streamlining all agencies and stakeholders (National and International) working for vegetable seed production and marketing under the umbrella of MoAD. The system of separate steering committee for each individual projects should be abolished
7. The government extension system should promote Nepal produced vegetable seed through farmer's field demonstration, mini-kits and campaigning for commercialization.
8. Collection and characterization of many land races and indigenous genetic resources which are on the verge of extinction must be done.
9. These precious genetic resources are very much crucial for the development of climate resilient high yielding competitive varieties as well as hybrid varieties in the future.
10. Conservation and management of biodiversity can also help in local seed security and in enhancing livelihoods of resource crunched farmers in marginal areas, particularly in the hills and mountains, where formal seed system does not function well.