

# TOMATO HYBRID SEED PRODUCTION: INITIATION OF PUBLIC PRIVATE PARTNERSHIP APPROACH IN AGRICULTURE

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## ABSTRACT

*Public private partnership (PPP) is a contractual agreement between public agency and private sector to accomplish the certain task. The PPP model has been adopted in different sectors in Nepal. To assess the effectiveness of PPP model in vegetable sector, a case of tomato hybrid cultivar Srijana seed production in Nepal was selected. This study employed qualitative approach of analysis. Information was collected from key stakeholders and experts through semi-structured interview schedule; and review of reports. Study found three types of PPP model existing on hybrid tomato seed production in Nepal namely: farmers group directly linked with NARC; NGOs facilitating community based seed production organizations (CBOs) and provide inbred lines from NARC; and private seed companies providing inbred lines to CBOs from NARC. Mainly NARC has been providing technology and support services to private sectors to minimize the market risk in tomato seed production. Among the different models, NARC and farmer group collaboration was found more effective followed by NGOs facilitating model and private companies. The study noted that the agreement between public and private sector is not executed as per the MoU. Public sector for maintenance of parental lines of hybrid seeds and the private sectors for the multiplication and distribution of hybrid seeds are essential to maintain seed cycle. Moreover, prior information on demand of inbred lines, empowerment of local CBOs and capacity building to private sector is necessary for the effectiveness of PPP model in vegetable sector through formulation of conducive policy.*

Key words: Hybrid seed and vegetable, inbred lines, public private partnership,

## INTRODUCTION

Public private partnership (PPP) is a contractual agreement between a public agency (Government at central or local level) and a private sector entity, in which the private party provides a public service and assumes substantial financial, technical and operational risks and rewards inherent in it. PPP is essentially a business venture which is funded and operated through a partnership of government and one or more private sector companies. The key is partnership between the government and private business sector(s). The structure of the partnership should be designed to allocate risks to the partners who are the best able to manage those risks and thus minimize costs while improving performance. Risk transfer is one of the major components through which PPP projects can generate better value for money. Different types of risks such as public risks, market risk, economic and financial risk, construction risks, environmental risks etc are included in the PPP model (NPC, 2011). The Government of Nepal wishes to introduce three kinds of PPPs models in Nepal and has already different kinds of policies of PPP model; however it is not getting momentum to start PPP model in the agriculture sector rapidly. However, recent Agricultural Development Strategy (2015-2035) of Nepal has focused on public private partnership (PPP) approach in several areas of Agriculture including vegetables.

The production and supply of seeds is increasing in formal sector in Nepal with a surge of community based and contract seed production led by community groups and private seed companies respectively. The role of private sector is evolving and emerging rapidly with its higher share in the production of commercial seeds and making availability of hybrid varieties in rice, maize and vegetables. The public sector is dominating in supply of varieties and seeds of OPVs including source seed production and supply of major food crops (rice, wheat, maize). Public sector is still a major player for agricultural research and provision of source seeds and support services (subsidies,

extension services etc.) including quality assurance services in the country. Despite these positive outlook and initiatives, presently the available options for quality seeds of new farmer preferred varieties are limited at the farm level (Gauchan, 2015; Timsina et al., 2015). Recently vegetable seeds sector is also getting momentum to expand the business. However, there is still gap in achieving strategic fit between downstream and upstream part of the seed chain (Timsina et al., 2016b). Timsina et al. (2015) reported that the national demand of vegetable seed could be met by adopting two strategies: first, the effort of varietal development, maintenance, testing and national listing of imported varieties that should be combined with the maintenance of the seed cycle based on the farmer's preference, and second, the effort is needed to improve the quality of seeds by adopting proper postharvest operation such as appropriate drying and storage technology. Timsina et al. (2016a) highlighted that Nepalese farmers have high willingness to pay for good quality tomato seed in Nepal. Therefore, public sector is responsible for the task that required high skills and mandate to produce breeder seeds, maintenance of parental lines of hybrid seeds and the private sector for the multiplication and distribution of seeds. The public private partnership model has become essential to maintain seed cycle through attraction of private sectors and to cope with the growing demand of quality seed to feed the growing population (Ghimire, 2012). With the use of PPP approach a government manages to carry out an economic activity which cannot be done, in general, based on market mechanism of neo-liberal economies due to low return to investment or presence of high risk or lack of capacity of the government of developing countries (Fugile et al., 1996). Recent studies have shown higher research return from investments in agricultural sector in the country, and also the country has dearth of required resources, the partnering between private and public sectors for the growth of the county seems a rational development strategy. Over the fifty years' experience in Nepal for seed sector development led by public sector was not satisfactory and involvement of private sectors has been realized for its development (Bharati et al., 2008).

In the present context, public private partnership model is drawing attention of present policy makers and politicians. This concept is simpler in delivery of scientific information to the recipients; however, it is equally complicated in case of agricultural sector and innovation in a country like Nepal where most of the farmers are small and marginal. Public private partnership has been started to take as an alternative model of development in different sectors.

## **METHODOLOGY**

This study employed qualitative approach of analysis. Information was collected from key stakeholders, through semi-structured interview schedule and review of reports and publications. A case of tomato hybrid cultivar Srijana seed production in Nepal was studied. Thus the respondents included are research and development workers, farmers, officials from NGOs, Seed companies, Agriculture Enterprise Centre (AEC) of Federation of Nepalese Chamber of Commerce and Industries (FNCCI).

### **Existing policies on PPP**

The Government of Nepal has already accepted public-private partnership (PPP) as an alternative source of procuring assets and services, including the private sector's financial participation for meeting the increasing demand for infrastructure and service in the country (NPC, 2011). In order to promote PPP modality in agricultural sector in the country, all the relevant laws and regulations of the government should be conducive. Policy review comes to the analysis that many policies in agriculture are directly related to this concept. Nepal Agricultural Policy, 2004, has spelt out promotion of participatory and competitive agricultural research and development system involving the private and the non-governmental sectors. Such participatory activities include agricultural production, collection, grading, storage and packaging of agricultural products. The policy also envisages development, expansion and dissemination of a market information system in partnership with the

private sectors. The National Fertilizer Policy, 2002 supports agricultural production by ensuring supplies of quality fertilizer (production, import and distribution) in the country, one of the key features of which is to ensure and sustain the participation of the private sector in the import and distribution of the fertilizers. Other policies like National Seeds Policy, 1999; National Tea Development Policy, 2000; National Coffee Development Policy, 2003; Agricultural Biodiversity Policy, 2003; Public private partnership policy for local organization 2004; Agribusiness Policy 2006; industrial policy 2009; and trade policy 2010, White paper policy of NPC 2011, ADS 2015, MOF 2015 have recognized the role of the private sector and included several provisions to attract private sector investment in agribusiness and value chain development. The Government of Nepal wishes to introduce three kinds of PPPs models in Nepal i.e. availability based, revenue based and hybrid types (NPC, 2011). Until now some of the initiatives have already been taken in PPPs model in the sectors like Infrastructure development, environment management etc. However, it is also prioritizing in the agriculture sector too. Recent Agricultural Development Strategy (2015-2035) of Nepal has focused on public private partnership (PPP) approach in several areas such as developing value chain on maize, dairy, vegetables, lentils and tea through comprehensive and integrated measures, market infrastructure development, liquid nitrogen program, commercial bio-fertilizer production enterprises, fertilizer factory and buffer stock establishment, power development with farming community, central warehouse and auction market and construction of facilities and equipment for business incubators (MOAD, 2014).

### **Case Study: Srijana tomato hybrid seed production in Nepal**

Tomato is one of the most important vegetable crops with continuous demand throughout the year and has covered 16416 ha of area with productivity of 17 mt per ha (ABPSD, 2012). The rainy season tomato is highly affected by late blight and bacterial wilt diseases (HRD 2015). Trend of tomato production under plastic house during rainy season in the hills of Nepal has been increasing rapidly over the years. Four open pollinated varieties (Pusa Ruby, Roma, Monprecus and NCL-1) released by National Seed Board are determinant type and are not suitable for rainy season production. To meet the varietal demand for rainy season production, 22 exotic hybrids have been registered by private sector and about 500 kg of hybrid tomato seed of these varieties is imported in Nepal (CEAPRED 2013). To reduce the dependency on import of expensive hybrid tomato seeds, Horticulture Research Division (HRD) of NARC registered hybrid tomato Srijana in 2009. This is the first tomato hybrid variety developed in Nepal. The parental line of the hybrid in last three years (2011/12-2013/14) received by 20 actors (Thapa Magar et al., 2016). Srijana is indeterminate type in growth habit, wilt resistance and tolerant to late blight. It can give up to 15 kg fresh fruit yield per plant under plastic house condition. It became popular among tomato growers in short period of time. To fulfill the increasing seed demand of Srijana; commercial seed production was initiated in a public private partnership (PPP) model. Private sector in PPP model is normally registered company or firm as per prevailing rules and regulations of Nepal. However, sometimes small entrepreneurs or community organizations can take part in smaller local PPP projects. Therefore, NARC has started to work with seed companies and some community based organizations. Basically, different types of risk included in the PPP model is not covered in PPP model of Srijana seed production, however NARC has been providing different support services to the private sectors to minimize the market risk. In the model, HRD and interested private sectors have signed a MOU in 2011 with terms and conditions. In year 2012/13 five private seed companies, three NGOs and one farmers group had involved in this modality (HRD, 2013). In the same year, HRD provided 230 g parental lines seed to the private sectors and they produced 43.86 kg of hybrid seed which was worth of NRs 3.728 million based on current government price (Table 2). In the year 2014 private sector produced 131 kg of hybrid seed and the worth was NRs 11.135 million (Table 3). Similarly in the year of 2015 hybrid seed produced by private sector was 79 kg and the market price was around NRs 6.715 million (Table 4).

Until now HRD has made agreement with 11 partners. The roles and responsibilities of each actor in PPP model are given below.

### **NARC:**

- Supply seed of inbred lines for commercial hybrid seed production on payment annually.
- Provide technical assistance at critical stages during the crop cycle as per the demand
- Provide hand-on training to technical staff and or collaborating farmers.

### **Private sectors:**

- Demand the required quantity of inbred lines in the previous tomato season( prior to sowing season)
- Inform HRD and SQCC about area of seed multiplication plot and site well in advance,
- Request for technical assistance one week advance,
- Arrange three visits of SQCC staff at nursery, one month after transplanting , first cluster setting stages
- Arrange four visits of HRD staff at nursery, one month after transplanting , first cluster setting and seed extraction stages
- Maintain security of the given inbred lines and not to use in other breeding program
- Should not obtain seeds from the inbred provided by HRD, Khumaltar

### **Financial arrangements**

- Private sectors have to bear all cost related with hybrid seed production and have right to fix price of the seed
- Should pay 3 % of its seed sale value based on dealer price to NARC annually.
- Should provide the daily subsistence and travelling allowance of the breeders/technicians provided by HRD as per the NARC rules and mutual understanding
- The material cost, staff cost of the technician and the resource person of HRD for hands on training should be borne by the organization itself.

There are three types of private sectors such as farmers group directly linked with NARC; NGOs are facilitating community based seed production organizations (CBOs) and provide inbred lines from NARC and its marketing; Private seed companies are also providing inbred lines to CBOs from NARC and purchase their produced seeds for its marketing.

### **Model 1: Farmers group directly linked with NARC**

NARC played an important role for the production and maintenance of inbred lines of tomato hybrid seed cultivar Srijana. Agriculture Research Station (ARS), Malepatan of NARC has been promoting farmer groups of Chuinkhor VDC of Syngjaand Armala and Dhikurpokhari VDCs of Kaski districts for the production of hybrid tomato seed in participatory way since 2009 before of this cultivar registration (ARS, 2013). It has been providing technology and support services such as trainings, plastic tunnels, material inputs, technical help and also facilitation for marketing of seeds in and around agrovets of pokhara. Moreover, it collects random samples of hybrid seed produced by farmer groups and test its quality through grow out test. In 2012/13, farmer groups of those area produced 15 Kg of hybrid seed. The model is operating effectively as farmers are getting attractive price for their product (Rs 90- 100 thousand per Kg). Since marketing of seed is facilitated by ARS, Malepatan to minimize the market risk, the producers share is high due to direct linkage of farmers group with agrovets.

### **Model 2: NGOs are facilitating CBOs and provide inbred lines**

NARC has been providing inbred lines to NGOs for production of hybrid seed. It is also providing technical support as per request. Centre for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED), a NGO facilitating farmer groups of Parbat and Kavre districts for the production of tomato hybrid seed cultivar Srijana from its Vegetable Support Project (VSP). NGO provides technical inputs, plastic tunnel and help in production of quality seed through regular monitoring and supervision by their own staff at field level. The farmers are empowered by forming a cooperative and linked with the traders and agrovets. CEAPRED is facilitating to make contract between the cooperatives and private sectors (seed companies, traders and agro-vets) before each production season and fixed the price. In the year 2011/12, farmers were getting only 50 thousand per Kg of seed because most of the buyers suspect to buy the seed due to its lower quality in the first year as they produced 1.5 Kg of hybrid seed. However, based on the performance, demand of seed increased and private sectors made agreement with cooperatives for 4 Kg of hybrid seed and farmers were able sell their seed at Rs 80 thousands per Kg in 2012/13. Most of the cooperative members initiated hybrid seed production and produced 20.2 Kg in the year 2013/14 but the agreement price was 75 thousand per kg of seed. This model is also operating effectively. However, there is question for its sustainability after completion of VSP. Therefore, it is necessary to strengthen the CBOs and linked directly to NARC.

### **Model 3: Private seed companies providing inbred lines to CBOs**

In this model, NARC has been providing inbred lines as model 2 for hybrid seed production. There are different private seed companies which have been involved for hybrid seed production. The major seed companies are SEAN service center, Anamoul, Kasthanandap International, Agrosala etc. Private companies have been producing hybrid seed in their own farm as well as supplying inbred lines to CBOs for hybrid seed production. In case of Dolakha district, the SEAN seed company has been providing inbred lines to farmers group and made agreement with farmers to purchase produced seed at around Rs 40,000 per Kg in recent year. In this model, farmers are compelled to sell their seed at low price even though the market price is very high because the company has agreement to purchase other vegetables seed too. This model is not operating effectively as farmers are not satisfied with low farm gate price and high marketing margin of seed companies.

### **Constraints for using PPP model in Vegetable seed sector**

- Private sectors are not paying revenue of seed sale as per agreement with NARC
- Supply and demand of inbred lines are mismatched due to lack of prior demand on inbred lines.
- Farmers are not getting reasonable farm gate price for their product in some cases.
- Stakeholders limited capacity in updated technical knowledge

## **CONCLUSION AND RECOMMENDATION**

The results shows direct linkage of public sector with community based organization seems profitable and sustainable among different models. However, different conditions should be satisfied to achieve success in this model such as private sectors should inform timely for inbred lines; capacity and bargaining power of CBOs should be strengthen to get reasonable price of their product and NARC should enhance its capability to supply inbred lines and increase the intensity of capacity building activities such as training, technology inputs to the private sectors.

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**Table 1: Details of Srijan inbred line distribution and hybrid seed production in first year of PPP initiation, 2011/12**

Organization	Year of MOU	Production sites	Inbred provided (gm)	Hybrid seed produced (kg)
Kasthamandap International	2011	Panauti , Kavre	11	6.5
CEAPRED	2011	Kavre, Surkhet	20	5.2
SEAN, Kathmandu	2011	Thankot, Kathmandu	8	2.2
Anmoul Biu	2011		20	2.5
Total			59	15.4

**Table 2: Srijana hybrid seed production by private sector in 2012/13**

S. N.	Name of Organization	Inbred seed provided (g)	Hybrid seed produced (Kg)	Estimated market price (NRs)
1	Anmoul Biu Pvt. Limited Chitwan	65	8.0	680,000
2	Social Rise Help Center, Palpa	12	0.9	76,500
3	SEAN Seed Service Company, Thankot	14	12.0	1,020,000
4	CEAPRED, Lalitpur	101	11.46	974,000
5	Agro Shala Nepal, Lagankhel	28	5.5	667,500
6	Women Group	10	6.0	510,000
Total		230	43.86	3,728,000

**Table 3: Srijana hybrid seed production by private sector in 2013/14**

S. N.	Name of Organization	Inbred seed provided (g)	Hybrid seed produced (Kg)	Estimated market price (NRs)
1	Anmoul Biu Pvt. Limited Chitwan	42	7.0	595,000
2	Kathmandu Agro Concern	35	12.0	1020,000
3	SEAN Seed Service Company, Thankot	25	18.0	1530,000
4	CEAPRED, Lalitpur	140	55.0	4675,000
5	Agro Shala Nepal, Lagankhel	27	12.0	102,000
6	Puspanjali Seed production group, Lalitpur	35	8.0	680,000
7	N-Agro concern, lalitpur	35	5.0	425,000
8	Mero Agro Concern, Lalitpur	55	14.0	1190,000
Total		394	131	11135,000

**Table 4: Srijana hybrid seed production by private sector in 2014/15**

S. N.	Name of organization	Inbred seed provided (gm)	Hybrid seed produced (kg)	Estimate market price (NRs)
1.	Anmoul Biu Pvt. Limited, Chitwan	35	8.0	680000.
2.	Kathmandu Agro Concern, Lalitpur	40	12.0	1020000.
3.	NEMACOL, Kalimati	10	2.0	170000.
4.	CEAPRED, Lalitpur	97	25	2125000.
5.	Agro Shala Nepal, Lagankhel	45	10.0	850000.
6.	Puspanjali Seed Production Group, Lalitpur	15	10.0	850000.
7	Fresh Organic Farm, Kathmandu	70	4.0	340000.
8	Pramila Krishi Farm, Kathmandu	8	8.0	680000.
	Total	320	79.0	6715000.