# RICE SEED PRODUCTION AND MARKETING PRACTICES IN NEPAL

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## ABSTRACT

*Production and marketing of rice seed involves diverse activities and actors in seed value chain. This study aims to investigate practices and pattern of rice seed production and marketing in Nepal employing survey of 270 seed producers and 240 seed dealers and retailers covering most of the Terai and market accessible hills. The finding showed that seed business activities are concentrated on later generation seeds produced by diverse actors but marketed mainly through seed dealers and retailers. The most popular varieties with highest seed sales are Radha-4, Sabitri and US 312 (hybrid) respectively. Seed dealers selling hybrids receive higher benefits due to their higher market margins. The major constraints faced by seed actors are low profit margins in seed marketing of domestic varieties as compared to exotic hybrids. Improving rice seed business requires strengthening seed production and marketing of domestically developed varieties through entrepreneurship development, networking and policy support.*

**Key words**: Actors in seed business, domestic varieties, market margin, policy support, rice seed, seed system

## INTRODUCTION

Seed system is one of the most vital components of agricultural system that involves activities associated with seed production, multiplication, processing and marketing to ultimate seed use by farmers. An efficient and effective seed system is expected to provide seed of adapted varieties at proper quantity, quality, time and place at an affordable price to farmers. Timely supply of sufficient quantity of quality seeds of high yielding varieties increases crop yields by 15-25% (Thompson, 1979) and it can be further raised up to 45% with timely applications and efficient management of other inputs such as fertilizer, irrigation water and pesticides. An estimated 50% of the global increase in yields over the past 50 years has been derived from genetic progress and seed quality, in addition to agronomic improvement and phytosanitary product uses (FAO, 2011). Fresh replacement of quality seed of improved varieties increases not only yields but also reduces cost of production due to lower seed rate requirement and disease free status of the good quality vigorous seeds. Use of quality seeds also enhances efficiency and productivity of other key inputs such as fertilizers, irrigation and human labour.

The growth of production and marketing of quality seeds of rice in the country has increased in recent years with the advent of liberal economic policies particularly on seed sector and growth of private and community sector in seed business. For instance, the trend of seed replacement rate (SRR) in rice has increased from less than 3% in the year 2000 to about 12% in 2014, indicating a gradual rise of formal supply of quality seeds in the country (SQCC, 2014; Gauchan et al., 2014). The major objective of any seed sector strategy and policy is to enhance timely access and availability of sufficient quantity of quality seeds of choice varieties to farmers in affordable price. However, the current SRR as an indicator of availability and access in major food staples including rice is very low (less than 12%) as compared to desired level of 25% SRR (MoAD, 2013). As a result, the productivity of rice in Nepal is still low (3.3 t/ha) as compared to global average of 4 t/ha (FAOSTAT, 2014). Therefore, there is a need to study current status, prospects and constraints in existing production and marketing of rice seed system to improve SRR for increased productivity and income of farmers. Furthermore, most of the past studies in rice are focused on technical aspects of seed production and marketing of grains or products without due consideration given for seed system; a vital input in agriculture and the means of delivery of new technologies. In addition, seed production and marketing has also not been a prioritized activity in overall agricultural system. As a result, there are limited information and scant studies on rice seed production and marketing in Nepal.

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## METHODOLOGY

This study involved a nationally representative sample survey of 270 seed producers and 240 seed dealers and retailers (Agrovets) located in key seed producing and marketing locations of Terai (east of Jhapa to far west in Kailali) and accessible regions of central and western hills and mountains. In addition, the survey was supplemented by institutional survey of selected seed companies, cooperatives and community based seed producer (CBSP) groups from selected seed producing and marketing centers. The survey covered 10 key seed producing districts of Terai (Morang, Siraha, Rautahat, Chitwan, Rupendehi, Dang, Bardiya) and hills (Kavre, Tanahun, Syangja) in 2011/12 and 2012/13 for collecting information about rice seed production, while it covered 30 districts (20 Terai and 9 hills and 1 mountain districts) for seed dealers-retailers (Agrovets) to collect marketing information. Seed marketing survey covered hilly districts mainly from central and western region and one mountainous district (Jumla) from mid-western region. The seed producing districts were chosen based on the dominance of seed production activities of the seed actors (presence of CBSP groups, Cooperatives, contract seed production activity of seed companies). For the selection of seed producers, first 2 dominant seed producing villages from each district were selected from where 25-35 seed producer farmers affiliated with CBSP groups, cooperatives or seed companies were randomly interviewed. For seed marketing related information, we selected Agrovets randomly from market centers of 20 Terai and 10 Hills and mountain districts where they were engaged in rice seed marketing. The sample size ranged 5-10 Agrovets in the Hills (where presence of Agrovets were limited) and 10-20 Agrovets in the Terai districts (where their presence was higher). The actual sample size represented about 20-30% of the total sample size of producers and traders and covered representation of different ecology (hills, Terai), production systems (main season and spring rice) and market centers (urban, rural) and seed actor types (producer cum dealer, traders only). The survey information covered institutional profile, business operations and practices of seed actors, general features of seed producers, entrepreneurs and institutional actors, existing marketing systems and market networks, type of rice varieties and hybrids produced, sold and marketed and their market price including major bottlenecks and gaps in seed production, marketing and supply.

## RESULTS AND DISCUSSION

### SEED ACTORS AND THEIR SOCIOECONOMIC FEATURES

Broadly three types of seed actors were common in Nepal in terms of their real involvement with seed enterprise and production led seed business motives. These include Seed companies, Cooperatives and CBSP groups who had a practice of contracting or engaging farmers for rice seed production. The unique feature and similarity of all of these three actors was that they all were involving individual farmers in producing seeds whether by bringing them to group or cooperative members or in contractual mode of seed production with seed companies, thus providing smallholder farmers an opportunity to earn cash income and livelihood by growing seed crops. There are no seed companies or cooperatives owning separate seed producing farms for producing large scale commercial seed production in Nepal. The key socioeconomic and seed producing features of sample farmers associated with CBSP groups, Cooperatives and Seed Company from key seed producing districts are presented in Table 1.

Table 1: Characteristics of seed producers that are associated with key seed actors

| Characteristics | CBSP Groups (N=94) | Cooperative (N=92) | Seed Company (N=84) | All (N=270) |
|---|---|---|---|---|
| Age (years) | 46 | 44 | 46 | 45 |
| Education (years) | 7 | 6 | 8 | 7 |
| Family size (no) | 6.52 | 6.51 | 7.05 | 6.68 |
| Farm size (ha) | 1.03 | 1.29 | 1.76 | 1.34 |
| Rice cultivated area (ha) | 0.83 | 0.93 | 1.58 | 1.10 |
| No of rice varieties grown | 1.84 | 1.36 | 1.69 | 1.63 |
| Average rice seed area (ha) | 0.48 | 0.69 | 1.50 | 0.85 |
| Average rice seed produced (t) | 1.2 | 2.5 | 4.1 | 2.5 |
| Rice seed yield (t/ha) | 2.50 | 3.62 | 2.73 | 2.94 |
| Rice seed sold (t) | 1.0 | 1.8 | 3.7 | 2.2 |
| Rice seed sold (%) | 83.3 | 72.0 | 90.2 | 88.0 |

**Source:** Field Survey (2012, 2013).

The data showed that demographic features (age, education) of the sample seed producers were of similar type and nationally representative across the seed actors, whether they engaged with Seed Company, Cooperative or CBSP groups. However, average farm size (1.34 ha) and family size (6.68) of seed producing farmers were larger than that of national average farm size (0.70 ha) and five family members obtained from national census survey (CBS, 2013). This indicates that farmers with better resource endowments (land, labor) are engaged in seed production. Farmers generally grew 2-3 varieties of rice in their field but actual number of varieties in seed production was average of 1.63 varieties. Rice seed area owned and used in seed production by farm households was smaller in CBSP groups (0.48 ha) followed by Cooperative (0.69 ha), while seed producers affiliated with seed company had largest farm size and area under rice seed production (1.5 ha).

Average seed yield obtained by seed producers was 2.94 t/ha and it ranged from 2.50 to 3.62 t/ha among the seed producers. The share of marketed seeds from the total produced seed was highest in seed producers associated with seed companies as compared to those associated with CBSP groups and Cooperatives. On average 88% of the produced seed was sold and the rest 12% was locally consumed.

## PRODUCTION SHARE AND MODE OF PRODUCTION

Seed business activities in rice during survey were led by three key actors mainly CBSP, Cooperatives or Seed Company and they were involved in membership or contractual mode of seed production with farmers. The seed types, production shares by seed actors for rice seed production is presented in Table 2. The findings showed that seed actors are mainly concentrated on commercial or later generation (certified or improved) of seeds. These include: (i) Certified seed (CS), (ii) Truthfully labeled (TL) seed, and (ii) improved seeds.

Table 2: Seed production share (%) by class of seeds and contractual modes of production

| SN | Seed types and contract mode | Seed types and share (%) | Seed producers and their affiliation with actors | | | |
|---|---|---|---|---|---|---|
| | | | CBSP (N=94) | Cooperative (N=92) | Seed Company (N=84) | All (N=270) |
| 1 | Type of seed produced | Certified /Truthful Labeled Seed (%) | 81 | 95 | 95 | 90 |
| | | Improved seed (%) | 19 | 5 | 5 | 10 |
| 2 | Contractual seed production | Seed producers (%) | 60 | 47 | 83 | 63 |
| | If contract followed | Verbal (%) | 88 | 64 | 47 | 67 |
| | | Written (%) | 12 | 36 | 54 | 33 |

Source: Field survey (2012, 2013). Note: The sample survey was not able to clearly separate CS and TL seeds.

A large proportion (90%) of seed business by sample seed producers involved quality assured seeds, either certified or truthfully labeled (CS/TL), and the rest 10% accounted for improved seeds (IS) which were not quality assured (CS/TL) seeds. Contractual mode of seed production among seed producers varied with the type of seed actors. More than three-fourth of the seed producer farmers associated with CBSP groups and two-third of Cooperatives had adopted verbal mode of contract, while about half of the seed producers associated with seed company adopted written contractual mode for producing quality seeds. The contract mechanism for seed production was mainly done for the period of one year or one crop season.

Seed testing, certification, seed tagging and bagging are essential functions of seed actors for maintaining quality and marketing of seeds. Such quality assurance builds trust to help avoid fraudulent sale in the private seed sector (Tripp, 2001). About one-third of total quality assured seed produced by these seed actors during survey year were certified, while two-thirds were truthfully labeled. Truthful labeling was the most common practice adopted by seed actors since they have flexibility not to depend on seed certification agencies for quality assurance (Khanal, 2015). Among the three types of seed actors, the extent of performing quality assurance services was lower in CBSP groups as compared to cooperatives and private companies since quality assurance (certification or truthful labeling) adds to the costs and technical requirements, and

demands contacts with the formal certification agencies (e.g. Regional Seed Testing Laboratories (RSTL) that are mostly located in regional centers of Terai and Kathmandu. Moreover, many public certifying agencies had limited technical staff and slim budget to provide certification services for CBSP groups that were located far away from their offices in the remote hills and mountains.

## SEED MARKETING CHANNELS AND PRACTICES

Seed marketing is one of the most vital components of seed system that involves activities associated with seed collection, storage, distribution, and market intermediaries to ultimate seed user farmers. The various market channels through which seed is marketed vary greatly according to the needs of a seed enterprise. There were two major seed market channels prevalent in Nepal. These included (i) sales of seeds by seed entrepreneurs through seed dealers and retailers often referred to as Agrovets (Agriculture and veterinary shops) and (ii) direct marketing (sale) by seed entrepreneurs to seed users from their own seed stores/sales points, which involved no intermediaries in the marketing. A case study of rice marketing indicated that most of the seed companies market their major bulk of their seeds (90%) through first channel or private dealers (Agrovets), while some cooperatives and many of the CBSP groups market their seeds directly through their own stores/outlets (Gauchan et al., 2014). The seeds that were marketed through market and non-market channels were either produced with contract growers or it may be purchased from farmers groups (e.g. CBSP) and cooperatives. Seed dealers preferred to market imported hybrid seeds as compared to domestic inbred varieties as there was high price margins and benefits in selling hybrids. Rice seed marketing was more efficient in directly marketed seeds from seed producers to grain producers and other users of seeds.

## MARKET SALES AND MARGINS

Seed dealers cum retailers (Agrovets) sell different rice varieties covering inbred varieties (domestic released and non-notified ones) and hybrids (both registered and non-registered ones). The larger share (90%) of seed was sold to Agrovets by the seed companies, some to cooperatives, CBSP groups, and individual farmers and limited quantity also to District Agriculture Development Offices (DADOs). Most of them provided 7-10% commission to buyers buying in bulk. The seeds were sold mostly on credit (70-90%) while remaining about 10-30% of the seeds was sold on cash. The price of seed in some districts was determined at the district level (e.g. Chitwan, Rupandehi) by district seed coordination committee, where presence of private seed companies and cooperatives had greater influence in seed sector in the districts. Seed dealers often used to sell rice varieties and hybrids in different names that may be formally released/registered or not in Nepal with varied market margins (Table 3). The market sale margins (benefits) was lower for domestic inbred varieties (Rs 4-5/kg), while for imported hybrid varieties, margin was relatively high with average of Rs 18-42/kg. More than one-fourth of the total sales in survey year (2013) made by Agrovets accounted for hybrid seeds. The sale price of hybrids was very high with high variation among them that ranged from NRs 150/kg to maximum of NRs 600/kg, with an average sale price of Rs 345/kg. The survey estimated that about 1,000 t of hybrid seeds were marketed across Nepal in 2013 which constituted about 30% of the total Agrovet sales and about 10% of total formally supplied seeds in the country. Nearly one-third of hybrids and one-fifth of all inbred varieties marketed by Agrovets in 2013 were not officially registered and notified in the country.

Table 3: Sale of rice varieties and hybrids by dealers and retailers (N=240) in Nepal 2013

| Variety types | Sale ( t) | Average buying price (NRs/kg) | Average market sale price (NRs/kg) | Sale margins (NRs/kg) |
|---|---|---|---|---|
| Nepali released varieties | 1874 (60) | 45 | 50 | 5 |
| Non released inbred varieties | 339 (11) | 47 | 51 | 4 |
| Registered hybrids marketed | 582 (19) | 345 | 387 | 42 |
| Un-registered hybrids and uknown varieties | 301 (10) | 315 | 333 | 18 |

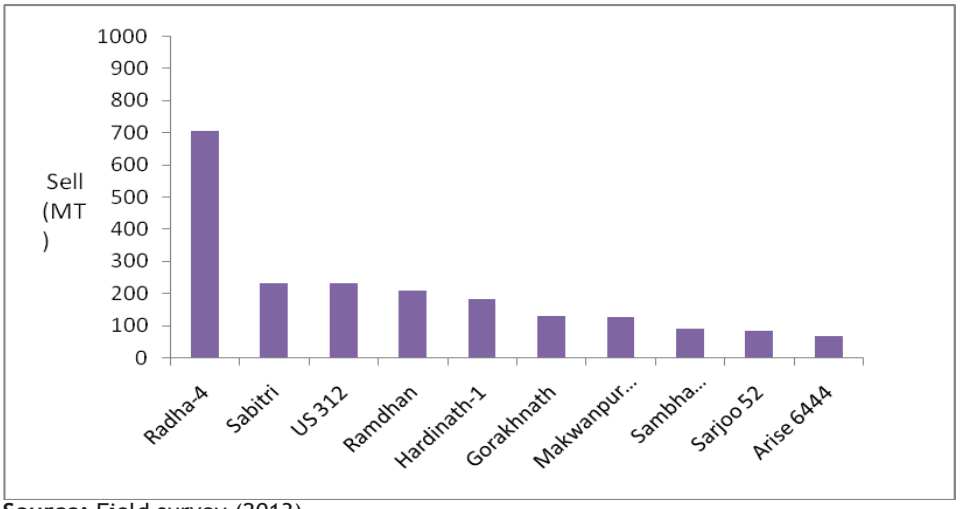
| | |
|---|---|
| **Total** | **3,104 (100)** |

**Source:** Seed dealers (Agrovets) survey, 2013. Figures in parenthesis indicate percent market share

MOST POPULAR MARKETED VARIETIES

Seed dealers cum retailers (Agrovets) marketed more than 100 rice varieties and hybrids across Terai and market accessible favourable regions of lower hills of Nepal in 2013. About half of them were only officially notified, which included half of the released inbred varieties (35 out of 69 inbred varietes in 2013) and 17 hybrids that were registered in Nepal until 2014. The ten most popular varieties with highest seed sales in 2013/14 is presented in Figure 1.

Figure 1: Dominant varieties marketed by seed dealers in 2013




**Source:** Field survey (2013).

Radha-4 variety had the largest seed sales followed by Sabitri and then US 312, which is registered hybrid. Ramdhan and Hardinath-1 ranked fourth and fifth, Gorakhanath hybrid sixth and Makawanpur-1 in seventh postion. Shamba Mahsuri Sub1 ranked eighth which has been gaining popularit from the year 2013 due to its good grain quality, higher market price and its higher demand in the market. Among 10 important ranked varieties, three were hybrids rencently registered in Nepal. In addition, data showed that varieties such as Radha-12 was popular in the eastern region, Masuli in the Terai and lower altitudes of hills and Khumal-4 in the mid hills across Nepal. Estimates showed that one-third of the total estimated share of formal sector seed in 2013 was marketed through dealers cum retailers (Agrovets).

VALUE OF SEED MARKET

The value of rice seed market in Nepal accounted for over NRs.600 million in 2013 by combining total seed marketed and distributed through formal sector only. The total formal rice seed marketed and distributed in 2012-2013 is estimated about 10,000 t with 9,000 t of improved inbred varieties and about 1,000 t of hybrids contributing about 12% seed replacement rate (SRR). The value of improved inbred varieties formally marketed in Nepal was estimated to be NRs.320 million with 2013 seed sale price (NRs. 35/kg). The value of hybrid rice seeds with average price of NRs. 300/kg accounts for NRs.300 million in the current price. The total value combining improved inbred and hybrids accounted for NRs. 620 million (US$ 6.2 million). This value of seed market accounts only for formal sector supply but does not include seeds supplied informally through farmers own savings and exchanges. Estimates showed that there is a higher demand of formal rice seed market to the amount of 20,000 t annually in the country as estimated recently by Nepal Seed

Producer Association of Nepal (SPAN, 2014). This indicates that the formal system currently supplies only half of the total actual quality seed demand for rice crop in Nepal. This assessment showed that the potential formal seed market value of quality improved rice seed in Nepal in 2013 was of about NRs 1 billion (US $ 10 million).

GAPS AND ISSUES IN PRODUCTION AND MARKETING

The field survey observations and assessments showed that rice seed production and marketing was not a prioritized activity in overall rice seed system in Nepal. Production and marketing of rice seed face several constraints and bottlenecks for efficient supply and farm level deployment of choice varieties. The major gaps and issues in current seed production and marketing system obtained from survey were: (i) low profit margin for marketing of domestic inbred varieties (ii) slow multiplication of quality seeds of farmers preferred varieties in seed chains with limited policy support and seed networking (iii) mis-match in demand and supply of source seeds as a result of poor integration of variety development, seed multiplication and marketing chains, (iv) inadequate training, networking and capacity building of seed actors in quality seed production and marketing of domestically developed inbred varieties, (v) inadequate seed storage, processing and marketing infrastructure and (vi) problems in seed marketing and market networks with dominance of unregulated market supply. Furthermore, marketing of good quality seeds of domestic improved inbred varieties were constrained by poor market information and absence of proper packaging, labelling, branding and seed marketing campaigns. Seed dealers also lacked proper public sector support, awareness level, training and networking in promotion and marketing of domestically developed varieties. Hence, at the farm level, farmers had limited choice of seeds of improved varieties and constraints in timely access of quality seeds.

## CONCLUSIONS

Seed business is emerging as a viable and sustainable enterprise in Nepal. The main actors in seed production are individual seed producers, CBSP groups, Cooperatives and Seed companies. Seed production was done either through contractual mode or membership based production by the groups or cooperatives. However, seed marketing was done by a range of seed actors such as Agrovets (dealers-cum retailers), seed companies, cooperatives and CBSP groups. Seed business activities were mainly concentrated on commercial or later generation of seeds focusing on certified, truthful labeled or improved of seeds. Marketing of seeds are done mainly through seed dealers and retailers (Agrovets) and to some extent directly to users. About one-third of the total estimated share of formal sector seed is marketed through dealers cum retailers (Agrovets). Non-market channels are also prominent among CBSP groups and cooperatives selling their seeds through own informal channels and District Agricultural Development Offices. Agrovets market more than 100 rice varieties and hybrids, out of which about half of them are only officially notified. The most popular varieties with highest seed sales in order of rank are Radha-4, Sabitri and US 312 (hybrid), respectively. More than one fourth of the total sales made by Agrovets accounted for hybrid seeds. Recently flow of hybrid rice seeds is expanding with higher profit margin for Agrovets and increasing trend for market oriented production in favourable rice producing domains of Terai and the hills. Seed dealers selling hybrids receive higher benefits due to higher sale price and profit margins for hybrids as compared to inbred rice varieties.

Presently, seed marketing is not a prioritized activity in overall rice seed system in Nepal. Moreover, seed production and marketing system face several constraints and bottlenecks for efficient supply and farm level deployment of choice varieties. Furthermore, marketing of good quality seeds of domestic improved inbred varieties are constrained by low profit margins and absence of proper packaging, labelling, branding and seed marketing campaigns. Seed dealers also lack proper public sector support, training and networking in promotion and marketing domestically developed varieties. Strengthening production and marketing system of quality rice seed for enhanced access and availability at farm level will require development of efficient production and marketing mechanisms including entrepreneurship skills among the seed actors. This can be made through (i) improving information flow of the quality assurance of domestic improved varieties in the market (ii) proper linkage of varietal development and seed multiplication chains with marketing to reduce mis-match in demand and supply, (iii) strengthening market and seed infrastructure facilities for production, processing, packaging, labeling and branding with adequate

market campaigns and monitoring, (iv) enhancing capacity of seed producer farmers and private seed suppliers in marketing and business skills by diversifying their linkages and networking (v) price incentives for quality assured domestic varieties and their seed production and sales, and (vi) effective implementation and harmonization of seed policy and legislation for diversifying farmers' choices for quality seeds of preferred domestically developed varieties. Policy measures should support, promote and strengthen commercial seed networks in rural areas, not only for marketing seeds but also for quality assurance services as well as related inputs such as fertilizers, registered pesticides and small-scale tools and equipment. Future in-depth research will be required to focus on measuring efficiency of seed production and marketing channels for identification of appropriate measures to strengthen overall production and marketing of rice seed system in Nepal.

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