

# Role of Organizational Governance in Household Level Economic Indicators: Evidence from Community-Based Rice Seed Production of Nepal

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## Abstract

Organizations are the role-oriented institutions, and in economic sense they tend to contribute in generating benefit to their members by minimizing costs in input and output marketing. With this notion, development agencies have been strengthening local farmer-owned organizations in community-based rice seed production system in developing countries where private seed companies and government corporations have not been successful to supply diverse rice varieties in cheap price. In spite of the great potential of these farmers' organizations, the performance of these institutions is poorly understood. This paper measured the governance of these organizations and analyzes how organizational governance indicators (participation, business plan, incentive system and linkage) contribute on household level economic indicators (technical efficiency and proportion of rice seed sold by household in the market). Data for the study were collected from the three Tarai districts: Siraha, Chitwan and Kailali of Nepal. Four community-based rice seed producer organizations with 15 households from each of these organizations were chosen for the study. The economic indicators were estimated using household data whereas governance indicators through group discussion and documentary study. The impact of governance indicators on economic indicators was estimated by simple linear regression technique. Result shows that there is wide variability of economic and governance indicators across the organizations and there is positive impact of governance indicators on both economic indicators. However, the degree of impact of these indicators on proportion of rice seed sold is higher as compared to that of technical efficiency. Moreover, organizations with higher educated leaders have better governance indicators. It means facilitation of these organizations for selecting/developing higher educated leaders is important for enhancing organizational governance, which also contributes on economic benefits at household level.

## 1. Introduction

Organizing farmers in groups and cooperatives is a popular tool in developing countries for their socio-economic empowerment (Cook, 2005; Acharya, 2009). Extension agencies take this approach as a cost effective strategy for delivery of extension services. It is believed that these organizations could serve as an innovation platform for members to learn each other through self-help approach (Cochrun, 1994). Similarly, organizations have potential to enhance economy of scale in marketing of agricultural products, and organized farmers might have higher bargaining power in the market chain as compared to individual households. With this assumption, research and development agencies have prioritized the formation and strengthening agricultural groups or cooperatives. The concept of community-based seed production (CBSP) system evolved with the same notion from 1990s, especially as a response to the failure of private seed companies and government corporations' to supply diverse rice varieties in

cheap price in the rural areas (Cromwell & Wiggs, 1993; David, 2004). In this system, farmers' organized in groups or cooperatives (synonymously referred to as community-based seed producer organizations – CBSPOs in this article) produce seed at household level, and access input and output marketing as well as extension facility through CBSPOs.

In Nepal, the Tarai region (70-650m above mean sea level) got priority in strengthening of CBSPOs as this region is the major food basket of the country, contributing 70% of the total rice production. There are 128 formally registered CBSPOs involved in rice seed production and marketing, and majority of them are located in the Tarai region. Rice seed replacement rate (SRR) in Nepal is only 8.7%, which is lower than the recommended SRR of 25%, and it is believed that CBSPOs could play vital role in the country in improving the SRR (Seed Quality Control Center - SQCC, 2012). In spite of the great potential of CBSPOs in supplying diverse rice varieties in rural communities, the performance of these organizations is poorly understood, and a couple of available studies show variability in the performance of these organizations and reasons for it are unclear (Khanal & Maharjan, 2010; Witcome, Devkota & Joshi, 2010; Pokhrel, 2012).

Poor organizational governance is one of the factors for low performance of these organizations because CBSPOs in developing countries are in the form of groups or cooperatives, and in many cases these structures are the continuity or some modification of the traditional social organizations/cooperatives whose objectives was primarily of overall socio-economic development of members, and not to develop them into the business entities. Members of these organizations have diverse socio-economic backgrounds (such as land size, income, etc) and so in their priorities while organizing in CBSPOs. For example, poorer members of the organizations might be more focused on the conformance roles focusing on how poorer members receive incentives from the organizations while another category with better off socio-economic status might be more concerned towards their return on investment from seed marketing activities carried out by their organizations. Due to abovementioned heterogeneity (conflict of interests) among the members, CBSPOs are more likely to face the problems of free riders, horizon, control and influence costs (Acharya, 2009). Similarly, one-member one vote principle, which exists in the cooperative norm, might not motivate the members to invest in the organizations, and as a result organizations could face shortage of financial resources. Moreover, the issue of common property (free riders) problem might arise when property rights are not sufficiently defined to ensure that individuals bear full cost of action or receive benefits from their actions. It is the challenging tasks for CBSPOs how they develop governance policy that address the issue of members from different socio-economic backgrounds (such as poor vs less poor) and increase economic efficiency in seed production and marketing.

In economic sense efficiency is the ratio of output to input and it shows the capacity of household to combine available resource to maximize the benefits from seed production. The economic efficiency is the measure of benefits households' realize, and it is calculated by the multiplication of technical efficiency (TE) and allocative efficiency. However, the former one is more popular method to understand households' capacity to maximize benefits from seed production using the available resources considering crop yield as dependent variable (Poudel & Matsuoka, 2008; Khanal & Maharjan, 2013). It means TE shows farmers' capacity to realize benefits from seed production. Moreover, households' could realize benefits from seed marketing which is handled by their organizations. The level of benefits households intend to get from rice seed marketing could be captured by understanding the proportion of rice seed sold by households to their concerning CBSPOs. This paper measures the organizational governance of CBSPOs and estimates the impact of governance indicators on household level economic indicators.

## 2. Conceptual framework for measuring organizational governance

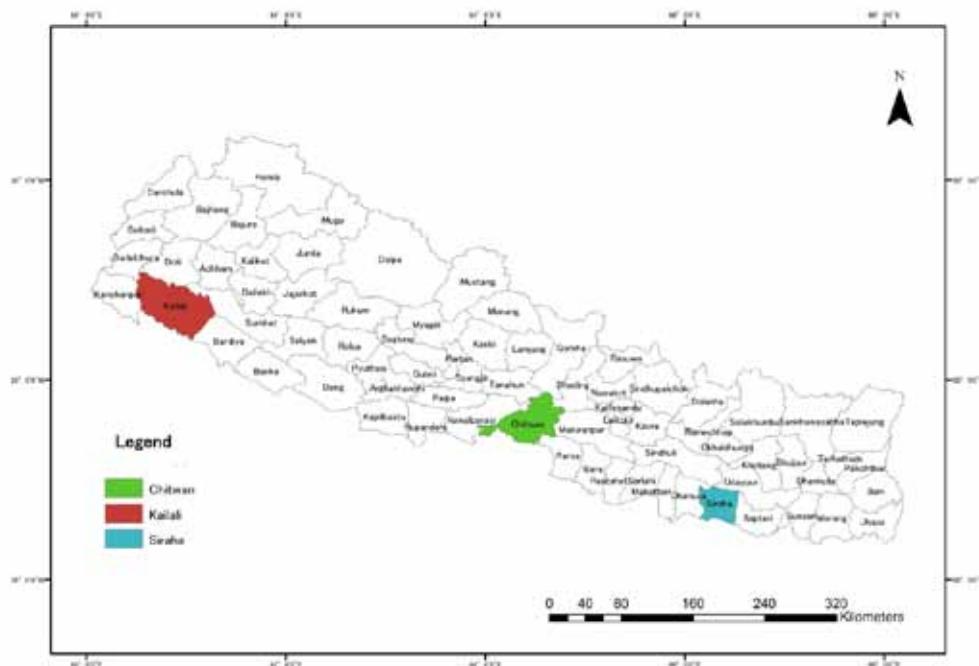
Organizational governance refers to the instrument that organizations deploy to achieve their intended goal (Hunnington, 1968). Rice seed production is carried out at household level, but seed marketing is handled by CBSPOs where most of the members take membership. So, governance of CBSPOs is analyzed putting rice seed marketing in the context. As discussed already there might be wide socio-economic difference among the CBSPOs members because these organizations were developed to contribute in socio-economic condition of farmers residing in the particular geographical area. It means the criteria to participate in such organizations are being residence of a geographical boundary, and involved in agricultural activities. So, participants of these organizations are more likely to have heterogeneity in demographic, economic, and institutional resources. This might lead to inefficiency of CBSPOs in marketing due to linkage of these resources with variability, frequency and economy of scale of CBSPOs' output (processed seed). For example, poorer members of CBSPOs might supply less proportion of their total produced seed to their CBSPOs as compared to richer members due to food insecurity issue. Also, being small organizations owned by small farmers, CBSPOs have to address risks from external factors such as government policy, climate and market through contingent decision. To address the external factors, CBSPOs could develop mechanical, adaptive, reactive or interactive strategies, and make contingent decisions (Brinkerhoff & Goldsmith, 1990) in line with organizations' efficiency. Governance system contributes in addressing these strategies as it defines a mechanism for maintaining authority, formality, hierarchy, and information flow.

Normally each CBSPO form an executive committee from their members to make decision in the organization following democratic principles. It is believed that the governance system developed by executive body will address internal and external challenges faced by CBSPOs. For example, incentive system could address the issue of variability, frequency and economy of scale. Similarly, members' participation could also contribute in organizations' efficiency by enhancing members' accountability towards their organizations. Better informed households would be more loyal and more accountable towards their organizations' decisions (White, 1984). One way to understand organizational governance is by measuring the performance of executive body of CBSPO in designing strategies to address the abovementioned internal and external challenges. These strategies are participation, incentive system, business plan and linkage. It is believed that these strategies could also contribute in enhancing institutional innovations for organizations' efficiency in different risk scenarios (Cromwell & Wiggins 1993; Mywish, Julie & Ducan, 1999; David, 2004; Bishaw & van Gastel, 2008).

### 3. Methodology

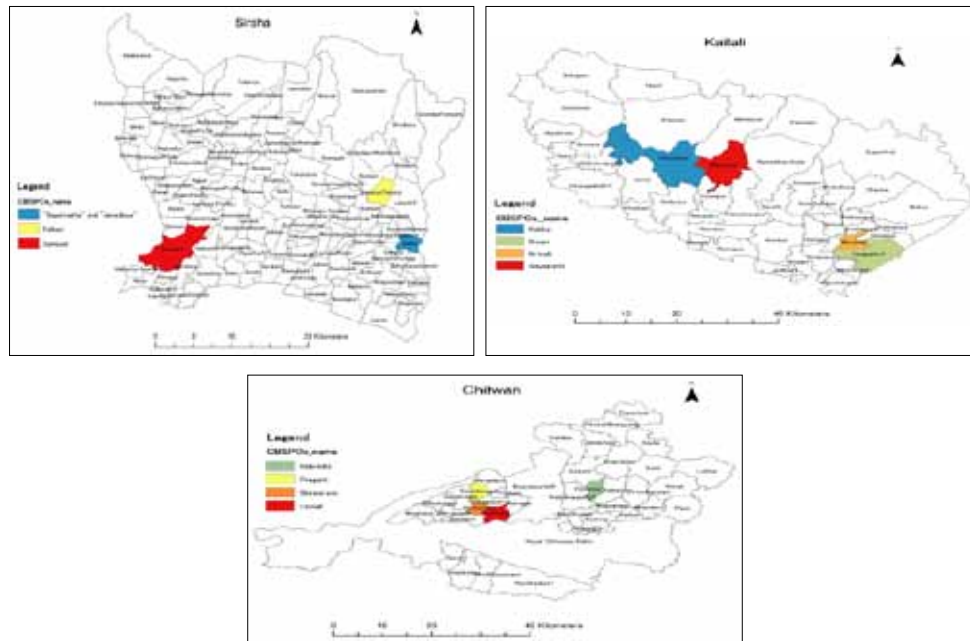
#### 3.1 Study area and sampling technique

This study was carried out in three Tarai districts of Nepal: Siraha, Chitwan and Kailali, representing eastern, central and western parts of the country (Figure 1). So, the district selection was purposive but four CBSPOs with at least two years experience in producing rice seed and registered in district agricultural development offices were selected randomly from the available CBSPOs' list in each of the districts. Then, 15 households from each CBSPO were chosen for household survey, making the total sample size 180. Figure 2 shows the distribution of CBSPOs in the selected districts, and Annex 1 depicts the profile of these CBSPOs. Information related to governance was collected through group discussion with CBSPOs' executive committee members and study of CBSPOs' existing documents and facilities.



**Figure 1.** A map of Nepal showing study districts

**Source:** Raw data from Department of Hydrology and Meteorology, Kathmandu, Nepal



**Figure 2.** Distribution of CBSPOs in the selected districts

**Source:** Raw data from Department of Hydrology and Meteorology, Kathmandu, Nepal

### 3.2 Indicators for organizational governance

Four indicators (participation, incentive system, business plan and linkage) were used to assess the organizational governance. However, five sub-indicators under each of the above indicators were developed based on the existing literature on what makes the CBSPOs successful with respect to governance indicators. For example, in case of ‘participation’, sub-indicators were developed considering who are the vulnerable members to participate, and in what activities they need to be participated considering the welfare of all members. The study considers women’s participation as their status in low, strategies to address poorer members’ concerns in the organizations, members’ participation in annual meeting, and activeness of sub-committee members (technical, financial and marketing sub-committee). Moreover, CBSPOs of Nepal have followed the traditional cooperative structures and membership in these organizations is low. It was hypothesized that addition of new members in the existing CBSPOs could enhance social capital and economy of scale in seed marketing. Similarly, business plan is the key operational document which shows how organizations implement their policies to achieve intended outputs, and to minimize risks from internal and external factors. CBSPOs’ business plans were analyzed considering the clarity of sub-committee members’ roles to implement annual activities, methods adopted by CBSPOs in market research, product diversification, quality control mechanism and publicity of seed in the market.

CBSPOs argued that members could realize incentive through two ways: economic benefit, and social benefit (transparency of information). The sub-indicators reflecting the economic benefits include system of collecting share (money) in the organization as it could enhance members’ motivation to sell seed in the market through their CBSPOs, payment system for executive members based on their work load, and incentive system to seed growers so that they could sell majority of seed produced at households to their organizations. Similarly, indicators reflecting transparency in the organization include system of sharing executive committee’s decisions to general members, and system for common property management. The common property in this case stands for materials (e.g. sprayers to manage diseases and pests) CBSPOs get from development projects. These materials may be utilized for household’s benefit in addition to their common benefit while using at organizational level. It would be more likely that executive members misuse their power in using these materials in their personal activities if proper system is not established. Similarly, CBSPOs need to maintain good linkage with agriculture research stations to enhance access to source seed, laboratory facilities for testing seed quality, and to access credit as well as trainings from extension agencies (David, 2004). The detail of sub-indicators associated with the above-mentioned indicators is summarized in Appendix 2.

### 3.3 Measurement and ranking of indicators

Each sub-indicator receives score ranging from 1 to 4, where 4 represent the best performance. The score was given for the sub-indicators based on their level of development (Appendix 2). The idea for scoring of sub-indicators was taken from a report

which analyzed the capacities of community-based organizations dealing with HIV/AIDS in African countries (USAID, 2005) though the activities and objectives of these organizations were different from CBSPOs. Moreover, the method and findings of a pilot study for assessing the capacity of CBSPOs on participatory crop improvement project of Nepal (Forum for Rural Welfare and Agricultural Reform for Development - FORWARD, 2011) was useful in the selection and measurement of sub-indicators. The sub-indicators and their score value were validated in two CBSPOs not included in the study sample before the implementation of field study. After assigning score for each sub-indicator, average score of the major indicators were calculated. Then, using the average score, major indicators are categorized as low, average, good and very good. The relationship of these categories and score is as follows.

- If score <2.5 = low,
- If score 2.5-3.1 = average,
- If score 3.2-3.7 = good, and
- If score > 3.7 = very good

**3.4 Measurement of technical efficiency in rice seed production**

Technical efficiency of households’ in rice seed production was measured through stochastic frontier production model developed by Aigner, Lovell & Schmidt (1977), and Meeusen & van den Broeck (1977). This model is considered superior to deterministic model as it removes the non-systematic variation in the model and increases the precision of interest variables, and previous scholars have also used this model (Kalirajan, 1999; Piya, Kiminami & Yagi, 2012; Khanal & Maharjan, 2013). The detail of this study is given as:

$$\ln Y_i = \beta_0 + \beta \ln x_i + v_i - u_i \dots\dots\dots(1)$$

Here, Ln is the logarithm,  $Y_i$  is rice yield ( $\text{kg ha}^{-1}$ ),  $\beta$  is the vector of parameters to be estimated,  $x_i$  represent inputs. These inputs include seed (kg), labor (labor force unit - LFU<sup>2</sup>), chemical fertilizers (money spent for chemical fertilizers - NRs.ha<sup>-1</sup>), livestock (Livestock standard unit - LSU<sup>3</sup> as a proxy indicator to represent the amount of animal manure applied in the field), and land (land used in rice seed production in ha).,  $v_i$  represents the two-tailed error term accounting for random variation in output due to factors outside the control of farmers such as measurement errors. Another term  $u_i$  represent the error term associated with farm level inefficiency, and it is assumed to have zero mean with variance( $\sigma_u^2$ ) and distributed half normally.

$$TE_i = Y_i / Y_i^* = f(x_i; \beta) \exp(v_i - u_i) / f(x_i; \beta) \exp(v_i) = \exp(-u_i) \dots\dots\dots(2)$$

Where,  $Y_i^*$  is the maximum possible output;  $Y_i$ ,  $x_i$ ,  $\beta$ ,  $v_i$  TE and  $u_i$  are as explained earlier.  $TE_i$  measure the output of the farm relative to the maximum output that can be produced using the same input vectors. The value of  $TE_i$  is ranges from 0 to 1. If  $TE_i = 1$ ,  $Y_i$  achieves the maximum value of  $f(x_i; \beta) \exp(v_i)$ , and  $TE_i < 1$  represents the shortfall of production from the maximum possible production level in the environment characterized by stochastic elements which vary across the farmers.

**4. Results and discussion**

**4.1 Overall performance**

In general, CBSPOs have better performance in participation and linkage as compared to business plan and incentive system (Figure 3). However, there is quite variation among these organizations with reference to the above mentioned indicators. CBSPOs from Chitwan district (Bijbridhi, Pragati, Shreeram and Unnat) are better in these indicators than those of Siraha and Kailali (Table 5). Among all, Sampaid (CBSPO from Siraha district) showed the least performance with reference to the overall indicators whereas Bijbridhi showed the highest performance.



**Figure 3.** Comparison of organizations’ performance

**4.2 Indicator wise performance**

**4.2.1 Participation**

The study shows that except three CBSPOs of Siraha, women are in the executive committee across CBSPOs (Table 1). Presence of women in executive committee means that women could raise their voice in the organizations. But in none of the cases

women were in the most influential position i.e. chairperson. As mentioned previously, CBSPOs have heterogeneous members with reference to resources (e.g. land). This means it might be difficult for poorer households to participate in seed marketing if their organizations do not provide them credit facility and/or early payment for seed that households supply to CBSPOs. It was found that all CBSPOs have policy of prioritizing poor people in credit or timely payment of seed they sell to their organizations. But CBSPOs of Chitwan and Kailali have adopted the practice of early payment for seed.

**Table 1.** Performance of CBSPOs with respect to participation

Districts	CBSPOs	Sub indicators					Mean	Remarks
		Women	Poor	General assembly	Sub-committee	Entry of new member		
Kailali	Krisak	4	3	3	3	2	3	Average
	Kisan	4	3	3	3	2	3	Average
	Sayapatri	4	3	3	3	2	3	Average
	Kalika	4	3	3	3	2	3	Average
Siraha	Fulbari	4	2	3	2	2	2.6	Average
	Sagarmatha	2	2	3	2	2	2.2	Low
	Janadibya	2	2	3	2	2	2.2	Low
	Sampaid	2	2	2	1	2	1.8	Low
Chitwan	Unnat	4	4	4	4	4	4	V. good
	Shreeram	4	3	4	3	3	3.4	Good
	Pragati	3	3	3	3	3	3.0	Average
	Bijbridhi	4	4	3	4	4	3.8	V. good

However, two CBSPOs i.e. Unnat and Bijbridhi have adopted the practice of providing both services (credit facility for implementing seed production activities, and early payment of seed for their poorer members). There is no clear cut written mechanism at CBSPOs for selecting poorer members; however, executive committee members argued that they decide their poorer members based on land size and annual households' cash income.

All the organizations have the system of holding general assembly in a yearly basis, and this event is supposed to choose new leadership from members. However, in majority of CBSPOs except Shreeram and Unnat, the same people are in the executive committee from the beginning of their organizational establishment. It was found that in most of the cases, sub-committees have been formed but they are functioning only in two CBSPOs (Unnat and Bijbridhi). In most of the cases there was no entry of new members since the establishment of the organization, and those who have been added as members after the establishment of CBSPOs, have not got equal number of share to those of founder members. For example, in Shreeram founder members have got six shares with one share equivalent to NRs 5,000 but new comers have received shares @ three shares per member. However, the newly entered members have not been discriminated in Unnat and Bijbridhi.

#### 4.2.2 Business plan and its implementation

All CBSPOs have drafted their annual business plan but except in Bijbridhi there was no detail information who should lead on what activity (Table 2). Generally sub-committee members are responsible to accomplish the activities of their concerning area but in the absence of clear cut roles and responsibility in their plan it would be less likely to implement activities on time. The second issue in business plan is how CBSPOs do market research. It was found that Unnat and Bijbridhi make consultation with farmers, agrovet and NGOs before preparing their annual business plans.

But in case of Kalika, Sayapatri, Janadibya and Sagarmatha, there was no system of doing any market research but they produce rice seed based on the accessibility of rice source seed from development projects regardless of the types of rice varieties they receive. In case of Fulbari and Sampaid, they organize meeting with local community before preparing the business plan. The organizations from Kailali and Pragati consult with local agrovet and local community in this process. The study shows that all the CBSPOs grow both modern and farmers' varieties of rice but only Krisak, Kisan, Unnat and Bijbridhi sell fertilizer to their

members in addition to seed.

Similarly, all the CBSPOs sell seeds of other crop varieties; however, maize and kidney bean were found only in Chitwan but wheat is common across the districts. CBSPOs argued that diversifying products help CBSPOs minimize the management costs as well as reduces the necessity of taking loan at organizations.

**Table 2.** Performance of CBSPOs with respect to business plan

Districts	CBSPOs	Sub-indicators					Mean	Remarks
		Role clarity	Market research	Product diversification	Quality assurance	Publicity		
Kailali	Krisak	2	3	4	3	2	2.8	Average
	Kisan	2	3	4	3	2	2.8	Average
	Sayapatri	2	1	3	2	2	2.0	Low
	Kalika	2	1	2	2	2	1.8	Low
Siraha	Fulbari	2	2	3	3	2	2.4	Low
	Sagarmatha	2	1	3	3	2	2.2	Low
	Janadibya	2	1	3	2	2	2.0	Low
	Sampaid	1	2	2	2	1	1.6	Low
Chitwan	Unnat	3	4	4	4	3	3.6	Good
	Shreeram	3	4	4	4	3	3.6	Good
	Pragati	2	3	3	4	3	3.0	Average
	Bijbridhi	4	4	4	4	4	4.0	V. good

Only CBSPOs of Chitwan sell their seed in the truthfully labeled bags (including the name of crop and variety, germination %, weight, seed treated with pesticides or not and name of the producers' organization). However, Janadibya, Sampaid and Sayapatri CBSPOs sell rice seed without tagging. Among CBSPOs of Chitwan, Bijbridhi sells >70% of the total rice seed production using proper labeling and bagging.

#### 4.2.3 Incentive system

All CBSPOs have adopted the practice of collecting cash amounts in their organizations. They call it 'share', and there is a system that profit made by organizations from seed marketing activities would be distributed to the members/shareholders based on the proportion of share amount they deposited in the organization. However, less than half of the members have collected share in CBSPOs of Siraha and in two CBSPOs of Kailali. However, majority of the members (>75%) deposit share in CBSPOs at Chitwan. Only two CBSPOs (Unnat and Bijbridhi) distributed the profit generated from seed marketing to their members based on the proportion of their share ownership (Table 3). But in other cases the share amount has contributed to increase their organizations' cash reserve.

Second issue in the incentive system is the provision of incentive to the executives who involve in organizations' management tasks. In case of six CBSPOs (four from Siraha and two from Kailali), there was no system of providing incentive to the executives though they involve in various stages of seed marketing. Similarly, executive members take some resources from the respective CBSPOs on consensus basis especially at the time of major festivals such as Dashain. It means there is no written rule how much resource is distributed to the executive members, and when they are involved in the organizations' tasks. However, in case of three CBSPOs of Chitwan (Unnat, Bijbridhi and Shreeram) executive members are paid based on their involvement, especially in roguing (i.e. removal of diseased or unwanted plants/weeds from seed production plots).

**Table 3.** Performance of CBSPOs with respect to incentive

Districts	CBSPOs	Sub-indicators					Mean	Remarks
		Share collection	Incentive to executives	Incentive to growers	Information management	Common property		
Kailali	Krisak	3	2	2	2	3	2.4	Low
	Kisan	3	2	2	2	3	2.4	Low
	Sayapatri	2	1	2	2	2	1.8	Low
	Kalika	2	1	2	2	2	1.8	Low
Siraha	Fulbari	2	1	2	2	2	1.8	Low
	Sagarmatha	2	1	2	2	2	1.8	Low
	Janadibya	2	1	2	2	2	1.8	Low
	Sampaid	2	1	2	1	1	1.4	Low
Chitwan	Unnat	4	4	4	4	3	3.8	V. good
	Shreeram	4	4	4	4	3	3.8	V. good
	Pragati	4	3	2	3	3	3.0	Average
	Bijbridhi	4	4	3	4	4	3.8	V. good

It was found that Unnat, Bijbridhi and Shreeram provide seed and fertilizer in subsidy to their seed growers, but other organizations have not developed such practice.

Transparency of organizations' decision to their members is considered to play vital role in improving cohesion among the members in any organizations. Members who are more informed about their organizations' decision are more likely to be more flexible towards organizations' decision and more accountable towards their organizations (White, 1984). It was found that CBSPOs of Chitwan have better performance in record keeping as compared to CBSPOs from other two districts. Moreover, CBSPOs get different materials (such as sprayers, grading machine and so on) from development projects. However, only Bijbridhi has adopted the practice of providing these materials to their members for their household activities on payment basis (for example, members have to pay NRs. 20 while using organization's one sprayer for one day).

#### 4.2.4 Linkage

Nepal Agricultural Research Council (NARC) provides source seed to seed producers no matters seed production is carried out individually or by group, but priority is given for farmers engaged in CBSPOs. It means it is easier for farmers to access source seed if they approach to NARC through their organizations. It was found that except CBSPOs of Siraha all other organizations were found to have bought rice source seed visiting NARC stations. However, the two-way communication has been established only in Chitwan. It means in Chitwan not only CBSPOs visit NARC stations to access source seed but NARC's professionals also make visit to CBSPOs in the process of monitoring their rice crop at field. CBSPOs argued that NARC professionals' visit has been useful to enhance seed quality as farmers get technical advice from these professionals in pests and disease management as well as roguing.



**Table 4.** Performance of CBSPOs with respect to linkage with service providers

Districts	CBSPOs	Sub-indicators					Mean	Remarks
		Agri. Research	Lab	Agri. Extension	Village Development Committee	Government bank		
Kailali	Krisak	3	3	4	3	3	3.2	Good
	Kisan	3	3	4	3	2	3.0	Average
	Sayapatri	3	2	3	4	2	2.8	Average
	Kalika	3	2	3	2	2	2.4	Low
Siraha	Fulbari	3	3	3	2	2	2.6	Average
	Sagarmatha	3	3	4	2	2	2.8	Average
	Janadibya	3	3	3	2	2	2.6	Average
	Sampaid	2	2	2	1	1	1.6	Low
Chitwan	Unnat	4	4	4	3	4	3.8	V. good
	Shreeram	4	4	4	3	4	3.8	V. good
	Pragati	4	4	4	2	4	3.6	Good
	Bijbridhi	4	4	4	3	4	3.8	V. good

CBSPOs were also found to have consulted with seed lab for testing seed quality, and District Agriculture Development Offices (DADOs) to access agricultural training. The relationship of CBSPOs with seed lab and DADOs is also similar in these districts as it is with NARC stations. Moreover, even if the National Seed Policy 2000 envisioned Village Development Committee (VDC) as an important local resource center to support CBSPOs from government side, there is poor coordination of CBSPOs with VDC. Except in CBSPOs of Sayapatri which built a seed storage house with partial support from VDC, there is poor communication between VDCs and CBSPOs. As in the above cases, CBSPOs of Chitwan have taken loan from Nepalese government bank named as 'Krisibikash Bank' which has a mandate to provide loan to the farmers. In other districts CBSPOs have not taken loan from the same bank though it has branches in other districts as well. Executive members from these organizations argued that they could not access loan from the bank not being able to put collateral. In spite of the requirement for putting collateral in Chitwan, executive members were found to put their households' properties, especially land, to get credit for their organizations.

#### 4.3 Impact of governance indicators with economic indicators

There is positive impact of governance indicators on household level TE and proportion of seed sold by households in the market. However, the degree of impact of the governance indicators on proportion of seed sold is higher than they have on TE. The coefficient for the impact of participation on technical efficiency is 7.68, which means that one unit increase in participation tends to increase the TE of household by 7.68 units. It is also clear from this analysis that participation has the highest impact on TE as compared to the other governance indicators. Similarly, linkage has the highest impact on marketing and its coefficient is 28.88 (Figure 2). It means one unit increase in linkage leads to increase the households' seed sold proportion by 28.88 units.

To complement the above analysis, the governance indicators and economic indicators were summarized at CBSPOs level (Table 5). It is clear from the table that CBSPOs of Chitwan have better economic and governance indicators as compared to those from other two districts. Moreover, the governance indicators were also compared with characteristics of the CBSPOs' leaders (Table 6) considering that their leaders characteristics could be related to organizations' performance in governance. Though there are 7-11 members in the executive committee of the selected CBSPOs, chairperson and secretary were chosen in the analysis as CBSPOs argued that these positions are most influential in organizations' decision making process. So, characteristics (age, years of formal education and training) of these two positions were compared with CBSPOs' governance indicators.

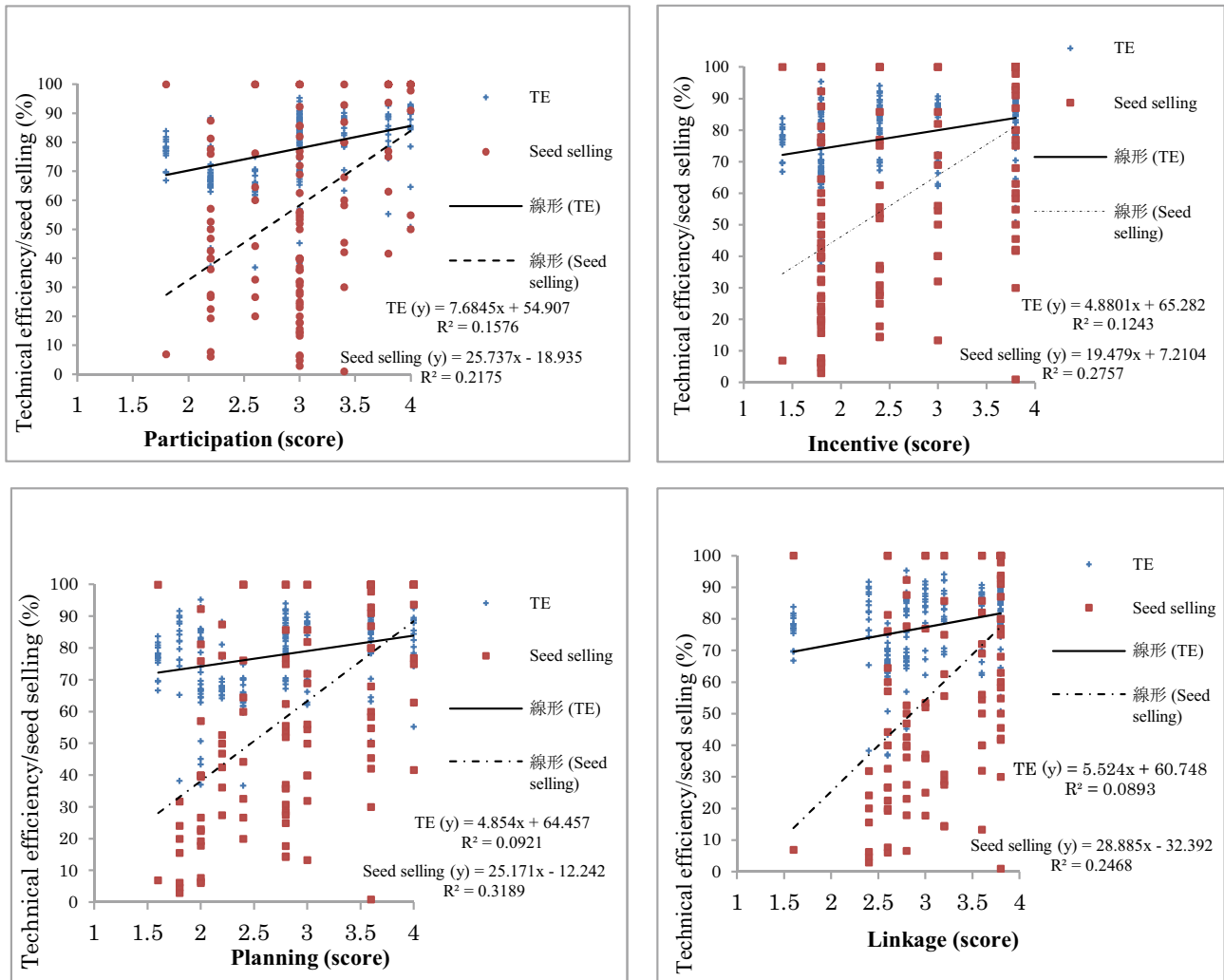


Figure 4. Impact of governance indicators on technical efficiency (TE) and seed selling (n = 180)

Here, age represents experience whereas education and training represent the intellectual ability of the leaders. It means CBSPOs with higher intellectual leaders can have better performance in governance. There is similarity in age of the leaders across CBSPOs. However, variation exists in education level and leaders 'attendance in business plan training. As shown in Table 6, leaders' education is higher in Chitwan as compared to Siraha and Kailali. There is also similar trend in average education level of CBSPOs members across the districts (Chitwan: 10.4 years, Kailali: 6.0 years and Siraha: 6.5 years). It means average education level of general members reflect the leaders' education in this study. Similarly, CBSPOs' leaders from Chitwan district have got business plan training from development agency whereas it was not taken by these leaders in other districts. The attendance of business plan training by CBSPOs' of Chitwan might be due to their higher education level as higher educated leaders might have better linkage with development projects.

**Table 5.** Household level governance and economic indicators across CBSPOs

District	CBSPOs	Participation	Planning	Incentive	Linkage	Technical efficiency (%)	Seed sold (%)
Kailali	Krisak	3	2.8	2.4	3.2	85.6	63.4
	Kisan	3	2.8	2.4	3.0	85.3	49.4
	Sayapati	3	2	1.8	2.8	82.8	53.2
	Kalika	3	1.8	1.8	2.4	82.4	15.0
Siraha	Fulbari	2.6	2.4	1.8	2.6	67.5	62.4
	Sagarmatha	2.2	2.2	1.8	2.8	73.1	90.1
	Janadibya	2.2	2	1.8	2.6	66.0	37.6
	Sampid	1.8	1.6	1.4	1.6	73.6	53.4
Chitwan	Unnat	4	3.6	3.8	3.8	87.6	92.4
	Shreeram	3.4	3.6	3.8	3.8	87.0	67.9
	Pragati	3	3	3.0	3.6	83.5	61.0
	Bijbridhi	3.8	4	3.8	3.8	85.0	89.0

Previous studies have also recognized the importance of education for the better performance of agricultural cooperatives (Witcombet, Devkota & Joshi, 2010; Acharya, 2009) as the leaders having these skills could show better performance in the organizational governance. Nkhoma (2011) argued that illiterate leaders are more likely to be corrupt and opportunistic, which turned the organizations towards financial mismanagement and nepotism. These types of leaders might not want to develop system for proper allocation of incentives in a transparent way.

Similarly, accountability is another aspect affected by low education level. Generally, less educated leaders are less accountable towards what they are supposed to do. These leaders get better opportunity to misuse power such as diverting activities in accordance to their own priorities without doing proper consultation with other members or designing activities in the interest of political parties (Chriwa et al. 2005). It is clear from the study that especially three CBSPOs: Bijbridhi, Unnat and Shreeram are better in both economic and governance indicators. These three organizations were also promoted by development projects but leaders of these organizations were school teachers (higher educated). Being local teachers, they had capacity to motivate farmers to organize in group/cooperatives, developed planning and incentive system, and could make linkage with development projects to access resources. They argued that system of collecting share in the organization is vital in the success of CBSPOs because this system makes the member accountable towards their organizations.

**Table 6.** Comparison of CBSPOs' governance indicators with their leaders' characteristics

Districts	CBSPOs	Participa.	Planning	Incentive	Linkage	Chairperson			Secretary		
						Age	Edu.	Train.	Age	Edu.	Train.
Kailali	Krisak	3.0	3.0	2.4	3.2	43	7	1, 2, 5	42	10	1, 2, 5
	Kisan	2.8	2.8	2.4	3.0	58	4	1, 2	45	7	1
	Sayapati	2.0	2.0	1.8	2.8	45	10	1	42	10	1, 2
	Kalika	1.8	1.8	1.8	2.4	48	8	1, 2,	49	10	1
Siraha	Fulbari	2.4	2.4	1.8	2.6	66	8	1, 2	35	14	1, 5
	Sagarmatha	2.2	2.2	1.8	2.8	39	14	1,2,3,5	45	10	1
	Janadihya	2.0	2.0	1.8	2.6	35	12	1,2,3,5	29	10	1
	Sampid	1.6	1.6	1.4	1.6	38	12	1,2,3	45	10	1
Chitwan	Unnat	3.6	3.6	3.8	3.8	45	14	1, 2, 3, 4	50	12	1,2,3,4
	Shreeram	3.6	3.6	3.8	3.8	60	12	1, 2, 3, 4	60	12	1
	Pragati	3.0	3.0	3.0	3.6	67	12	1,3,5	32	12	1, 5,4
	Pithuwa	4.0	4.0	3.8	3.8	70	11	1,2,3,4,5	47	14	1,2,3,4,5

**Note:** Participa. = Participation, Edu. = Education i.e. formal schooling years, Train. = Training (1= Seed production, 2= Marketing, 3= Leadership, 4= Business plan, 5= Account)

When these organizations implemented share collection policy, some members dropped the organizations because they were not confident about safety of their investment. But after few years (especially in Unnat and Bijbridhi), some of dropped out farmers rejoined the same organizations looking at CBSPOs' progress. It means better performed CBSPOs have experienced co-evolutionary pathway which is driven by efficiency gain, and this phenomena is similar to what Morris & Smale (1998) used to discuss the evolution of maize seed industry.

## 5. Conclusion and policy implication

This paper measured the governance of CBSPOs with respect to participation, business plan, incentive system and linkage. The governance indicators provide basis to enhance organizations' efficiency in marketing by addressing the internal and external factors. The result shows that in general CBSPOs have better performance in participation and linkage as compared to incentive system and business plan. There is positive impact of governance indicators on households' economic indicators i.e. technical efficiency and proportion of rice seed sold in the market. This provides the basis that if extension agencies facilitate CBSPOs for designing their governance indicators benefits will be realized at household level. Low education level of the organizational leaders is the challenging issue in many organizations, and better performing organizations have higher educated leaders than that lower performing one. It means organizational governance and benefit at household level could be improved if there are higher educated leaders in these organizations. There might be three ways to enter higher educated leaders in the organizations. First, these leaders could be searched from the existing members and if development projects facilitate these organizations from preparing good governance plan, new qualified members might be attracted to be in executive body as incentive system could attract them. If such leaders are not there, CBSPOs could invite new higher educated members from the community. Third option might be development project could arrange higher education for CBSPOs leaders. This does not mean that just changing higher educated leader could improve the organizational governance; the leaders need to be empowered and accountable towards their organizations through appropriate rules and monitoring and evaluation system.

## Endnotes

<sup>1</sup> SRR is the ratio of improved seed supplied in the area divided by total seed requirement

<sup>2</sup> LFU is the measurement of family labor, where people from 15-59 years old regardless of their sex were categorized as 1 person = 1LFU, but in case of children (10-14 years old) and elderly people (>59 years old) 1 person = 0.5 LFU

<sup>3</sup> LSU is the aggregates of different types of livestock kept at household in standard unit calculated using the following equivalents; 1 adult buffalo = 1 LSU, 1 immature buffalo = 0.5 LSU, 1 cow = 0.8 LSU, 1 calf = 0.4 LSU, 1 pig = 0.3 LSU, 1 sheep or goat = 0.2 LSU and 1 poultry or pigeon = 0.1 LSU (Khanal & Maharjan, 2013)

## References

- Acharya, B.M. (2009), *Is cooperative really a democratic organization? Lessons learnt from the selected cooperative acts of the world. Sahakari Sambad Ann. Bull.* Cooperative development Board, Kathmandu, Nepal.
- Aigner, D., Lovell, C.A.K. and Schmidt. (1977), Formulation and estimation of stochastic frontier production model. *Journal of Economics* 6: 21-37.
- Bishaw, Z., and van Gastel, A.J.G. (2008), ICARDA's seed delivery approach in less favorable areas through village-based seed enterprises: Conceptual and organizational issues. *Journal of New Seeds* 9 (1): 68-88.
- Brinkerhoff, D.W., and Goldsmith, A.A. (1990), *Institutional sustainability in agriculture and rural development*. Praeger Publisher, New York.
- Chriwa, E., Dorward, A., Kachule, R., Kumwenda, L., Kydd, J., and Poole, N. (2005), *Farmer organizations for market access: principles for Policy and Practice*. Department of Agricultural Science, Imperial College, London.
- Cochrun, S.E. (1994), Understanding and enhancing neighborhood sense of community. *Journal of planning literature* 9: 92-99.
- Cook, M.L. (1995), The future of US agricultural cooperatives: A neo-institutional approach. Accessed in 10 April from web. [missouri.edu/~cookml/publicat.htm-35k](http://missouri.edu/~cookml/publicat.htm-35k).
- Cromwell, E., and Wiggins, S. (1993), *Sowing beyond the state: NGO and seed supply in developing countries*. Retrieved April 1, 2011, from [linkinghub.elsevier.com/retrieve/pii/0305750X9400133J](http://linkinghub.elsevier.com/retrieve/pii/0305750X9400133J).
- David, S. (2004), Farmer seed enterprises: a sustainable approach to seed delivery? *Journal of Agriculture and Human Values* 21: 387-397.
- FORWARD. (2011). Annual report of the project titled Participatory Crop Improvement in South Asia. Forum for Rural Welfare and Agricultural Reform for Development, Chitwan, Nepal.
- Huntington, S.P. (1968), *Political order in changing society*. New Haven, Yale University Press.
- Kalirajan, K.P. (1999), The importance of effective and efficient use in the adoption of technologies: A micro panel data analysis. *Journal of Production Analysis* 2: 113-126.
- Khanal N.P and Maharjan, K.L. (2010), Sustainability of community-based seed production enterprises in Nepal: Institutional issues. *Nepal Agriculture Research Journal* 10: 33-40. [http://pustakalaya.org/eserv.php?pid=Pustakalaya:3772&dsID=NA\\_RC2010\\_NepalAgricultureResearchJournalVol10.pdf](http://pustakalaya.org/eserv.php?pid=Pustakalaya:3772&dsID=NA_RC2010_NepalAgricultureResearchJournalVol10.pdf)
- Khanal, N.P. and Maharjan K.L. (2013), Technical efficiency of rice seed growers in the Tarai region of Nepal. *Journal of Rural Problem* 49 (1): 27-31.
- Meeusen, W. and J. van den Broeck. (1977), Efficiency estimates from Cobb-Douglas production function with composed error. *International Economic Review* 18: 435-444.
- Mywish, M., Julie, H., and Ducan, B. (1999), *Increasing seed system efficiency in Africa: Concepts, strategies and issues*. Retrieved March 15, 2011, from [ideas.repec.org/p/ags/midiwp/54578.html-12k](http://ideas.repec.org/p/ags/midiwp/54578.html-12k).
- Nkhoma, A.T. (2011), Factors affecting sustainability of agricultural cooperatives: lessons from Malawi. A Master Thesis. Agricultural Commerce of Massey University, New Zealand
- Piya, S., Kiminami, A., and Yagi, H. (2012), Comparing the technical efficiency of rice farmers in urban and rural areas: a case study from Nepal. *Trends in Agriculture Economics* 5: 48-60.
- Pokhrel, S. (2012), Role of DISSPRO and CBSPs in current seed supply situation in Nepal. *The Journal of Agriculture and Environment* 13: 53-59.
- SQCC. (2012), *Seed balance sheet 2012*. Seed Quality Control Center, Ministry of Agriculture and Cooperative, Kathmandu, Nepal.
- USAID. (2005). CBO/FBO capacity analysis: a tool for assessing and building capacities for high quality responses to HIV/AIDS. Retrieved September 10, 2013, from [http://www.medicalteams.org/docs/learning-zone/core\\_capacity\\_analysis.pdf?sfvrsn=0](http://www.medicalteams.org/docs/learning-zone/core_capacity_analysis.pdf?sfvrsn=0)
- White, L. G. (1984), *Lessons in Development Project Management*. College Park.
- Witcombe, J.R., Devkota, K.P., and Joshi, K. D. (2010), Linking community-based seed producers to markets for a sustainable seed supply system. *Journal Experimental Agriculture* 46 (4): 425-437.

**Appendix 1.** Profile of community-based seed producers selected for the study

District	VDC/ Municipality	CBSPOs name	Years of establishment	Total Members	Involved in rice seed production	Surveyed households
Kailali	Munuwa <sup>†</sup>	Kisak <sup>b</sup>	2001	58	28	15 (53.7)
	Tikapur <sup>‡</sup>	Kisan <sup>a</sup>	1997	26	20	15 (75)
	Masuriya <sup>†</sup>	Sayapatri <sup>a</sup>	2009	20	15	15(100)
	Chaumala <sup>†</sup>	Kalika <sup>a</sup>	1999	18	15	15 (100)
Sub-total				120	78	60 (80)
Siraha	Padariya <sup>†</sup>	Fulbari	2009	20	19	15 (78.9)
	Gadha <sup>†</sup>	Sagarmatha <sup>a</sup>	2007	25	20	15 (75)
	Gadha <sup>†</sup>	Janadibya <sup>a</sup>	1998	25	23	15 (65.2)
	Siraha <sup>‡</sup>	Sampaid <sup>b</sup>	2009	20	15	15 (100)
Sub-total				90	77	60 (77.9)
Chitwan	Patihani <sup>†</sup>	Unnat <sup>b</sup>	2003	98	64	15 (23.43)
	Parwatipur <sup>†</sup>	Shreeram <sup>b</sup>	2003	54	45	15 (33.33)
	Saradanagar <sup>†</sup>	Pragati <sup>b</sup>	2001	74	48	15 (31.25)
	Madhabpur <sup>†</sup>	Bij Bridhi <sup>c</sup>	1998	48	28	15 (53.57)
Sub-total				270	185	60 (32.43)

<sup>†</sup> =VDC, <sup>‡</sup> Municipality; <sup>a</sup> = Cooperative, <sup>b</sup> =Group and <sup>c</sup> = Producer company (converted from group in 2006), Figure in the parenthesis indicates the proportions of the concerning CBSPO's members

**Detail names of CBSPOs:** Krisak = Bij Bridhi Krisak Sahakari Sanstha; Kisan = Krisak Bij Bridhi Krishi Sahakari Sanstha; Sayapatri = Sayapatri Biu Utpadak Krishi Samuha; Kalika = Kalika Biu Utpadak Samuha; Janadibya = Janadibya Krishi Sahakari Sanstha; Fulbari = Salhes Fulbari Biu Utpadak Krisak Samuha; Sagarmatha =Sagarmatha Bahuudeshiya Sahakari Santha; Sampaid = Sampaid Biu Utpadan Samuha; Unnat = Unnat Bij Bridhi Krisak Samuha; Shreeram = Shreeram Bij Bridhi Krisak Samuha; Pragati = Pragati Bijbridhi Krisak Samuha; and Bij Bridhi = Bij Bridhi Company

**Appendix 2.** Indicators and scores used to assess the capacity of CBSPOs

**1. Participation**

Sub-indicators	Scores			
	1	2	3	4
1.1 Participation of women	<10% women members in the organization	11-25% women members in the organization	26-50% women members in the organization	Women in the executive committee
1.2 Participation of poor (support strategies to poor)	No system	System exists but operational plan not developed	Special consideration for poor in credit or timely payment	Special considering for poor in the payment and credit both
1.3 General assembly (Annual meeting of CBSPOs)	Not held	Held but not regular	Regular but same members in the executive committee from the beginning	Held regular, and some members changed
1.4 Sub-committee	Not formed	Formed but not functional (no meeting within a year)	At least one sub-committee functional ( 2 meetings in a year)	At least two committees functional
1.5 Entry of new members	No system for entry of new members (only founder members exist)	System exists but no members entered in the organization	New people entered in the organization without equal share	New people entered in the organization with the provision of equal share

**2. Business plan and its implementation**

Sub-indicators	Scores			
	1	2	3	4
2.1 Role clarity in the business plan	Not available	Available in draft form but operational plan not developed	Operational plan developed but roles not specified	Detail operational plan developed and roles specified
2.2 Market research	Consultation is not done with stakeholders	Consult with local farmers	Consultation local farmers and local agrovets	Consultation with farmers, local and distant agrovets
2.3 Product diversification	Seed production of only one crop	Seed production of two or more crops	Two or more crops and inclusion of local varieties	Sell two or more crops seed and other inputs
2.4 Seed quality assurance measures	Simple bagging but no tagging	Seed packaging in branded bags but no tagging	Seed packaging in branded bags, use of tagging for <50% seed	Seed packaging in branded bags for >50% seed
2.5 Publicity of products	No publicity	Sending letter to organization	Sending letter and demonstration of seed in agri-fair	Publicity through FM radio

**3. Incentive system**

Sub-indicators	Score			
	1	2	3	4
3.1 Share collection from members in the organization	No system of collecting share	<50% of the members	50-75% of the members	>75% of the members
3.2 Incentive to executives	All voluntarily	Occasional basis only to chairperson	Occasional basis both chairperson and executives	Defined norms to pay chairperson and executives
3.3 Incentives to growers	No system for providing incentive to seed growers	Technical facilitation or subsidy on fertilizer/seed exists	Technical facilitation and subsidy exist but not crop insurance	Technical facilitation, subsidy and crop insurance
3.4 Information management	Written documents do not exist	Very raw, unclear and poor record keeping system	Draft type of simple record keeping system	Good record keeping system using ledger books
3.5 Common property management	No system for the use of common property	System exists but not in function	Mobilized based on rotation	Mobilized based on payment to the organization

**4. Linkage with service providers**

Sub-indicators	Scores			
	1	2	3	4
4.1 Linkage of CBSPOs with agricultural stations (NARC) for source seeds	No linkage	Poor linkage with some communication	Visit to NARC station and source seed received	Two way visits and source seed received
4.2 Linkage of CBSPOs with seed testing laboratory	No linkage	Poor linkage with some communication	Visit to seed laboratory and services received	Two way communication between seed laboratory and CBSPOs
4.3 Linkage of CBSPOs with VDC	No linkage	Poor linkage with some communication	Visit VDCs and formal communication exist	Resource tapping from the organization
4.4 Linkage of CBSPOs government bank	No linkage	Poor linkage with some communication	Visit bank and formal communication exist	Resource tapping from the organization
4.5 Linkage of CBSPOs with DADOs	No linkage	Poor linkage with some communication	Visit DADOs and formal communication exist	Good linkage (received training or other sources)