



IGS – CUTS International Collaborative Program under SDIP

Problem Tree Analysis of Agriculture in Bihar

1. Introduction

The Sustainable Development Investment Portfolio (SDIP) project aims at improving trans-boundary water resource management and governance, particularly through the transfer of Australia's best practice technology and science, and strengthening policy and civil society dialogue by three major Himalayan river basins—the Indus, Ganges and Brahmaputra—covering north-east Pakistan, northern India, Bangladesh, Nepal and Bhutan. It focuses on agriculture productivity and energy access and trade. With the help of Indian Grameen Services (IGS) in Bihar, CUTS international is implementing parts of the project in the Ganges basin.

As a part of this project, a study was done in the lower and upper basin of Ganges to understand the agriculture scenario in lower and upper Ganges basin in Bihar i.e., problem faced by farmers, their cause and effect on farmers.

2. Methodology

The study was conducted in upper and lower basin of Bihar in the districts of Patna, Gaya, Nalanda, Bhojpur, Buxar and Rohtas in upper basin and Muzzafarpur, Begusarai, Darbhanga, Samastipur, Vaishali, Madhubani, Supaul and Katihar in lower basin. More than 1000 farmers were interviewed with sample questionnaire and focus group discussions were conducted. The data was also referred from secondary sources. Effort was made to understand and analyse the problems in agriculture and came out with some sort of actions required at ground and policy level to strengthen agriculture towards sustainability. Based on this study, a problem tree analysis was carried out to study the issues in agriculture in Bihar.

3. Agriculture in Bihar

Bihar, the state located in the north eastern part of India, mainly depends on agriculture as 85 % of the people are engaged in agriculture (92% of the farmers are Small & Marginal).

Category of Farmers	No. of Holdings	Operational holding (in Ha)
Marginal (0-1Ha.)	86, 45,932 (82.9%)	27, 87,789 (40.8%)
Small (1-2 Ha.)	10, 05,650 (9.6%)	13, 00,667 (19.0%)
Semi medium (2-4 Ha.)	5, 90,970 (5.7%)	15, 82,279 (23.1%)
Medium (4-10 Ha.)	1, 78,295 (1.7%)	9, 75,355 (14.3%)
Large (10-above Ha.)	11,570 (0.1%)	1, 93,760 (2.8%)

Total	1, 04, 32,417 (100%)	68, 39,850 (100%)
<i>Source : Agricultural Census Division, Ministry of Agriculture, New Delhi</i>		

It is privileged with abundant rain water, sun shine and labour with fertile land. Thus the state is gifted with immense natural resources for agriculture but half of its population (54%) is poor and agriculture productivity is far below of national average of productivity of major crops.

Crop	Average yield (ton/ha) - Bihar	Average Yield(ton/ha) - National	World most productive farm yield(ton/ha)
Rice	1.6	3.3	10.8
Wheat	2	2.8	8.9

*Source - https://en.wikipedia.org/wiki/Agriculture_in_India#Major_crops_and_yields
http://www.bameti.org/pdf/agriculture_profile_of_the_state.pdf*

The state has 5.71 million ha of cultivated area, of which 3.43 million ha (61%) has assured irrigation. The paradox is that the state receives bountiful rainfall approx. 1200 mm but only half of the area is irrigated, leading to low agricultural productivity and high risk.

4. Challenges

Agriculture sector in Bihar faces many challenges as per the problem tree drawn in Fig. 1. This problem tree represents the situation of agriculture in Bihar for more than 95% of the farmers who are marginal, small, semi-medium and medium. Effort was made to understand and analyse the problems in agriculture and came out with some sort of actions required at ground and policy level to strengthen agriculture towards sustainability¹.

These have been summarized below:

i. Nano size and fragmented land holdings:

The greatest challenge before the agriculture sector in Bihar is tiny size of land holdings. The average size of land holding in Bihar was as low as 0.43 ha in 2005-06, which came down from 0.75 ha in 1995-96. If this trend continues, the average size of land holding would be less than 0.2 ha in 2015-16. About 90 per cent holdings have land less than 1 ha.

ii. Low yield and High risk due to frequent draught and flood:

As mentioned above the yields of major crops are very low despite fertile land and abundant water in the state and there is immense scope to increase the yield of different crops through training, knowledge dissemination and technological advancement. It is observed that nearly 47 per cent of rice area is yielding less than 1.5 t/ha, which supplies about 43 per cent rice production in the state. Similarly, about one third of wheat area in Bihar is obtaining yield less than 2 t/ha, which accounts for about 36 per cent production. Similarly, about half of the pulses area is yielding less than 0.8 t/ha, which accounts 40 percent pulses production. Only 10 percent pulses area is giving yield more than 1 t/ha. It is obvious that such poor yields would not make

¹ http://www.globalbihar.net/wp-content/uploads/2012/02/papers/pk_joshi_agri.pdf

farmers viable and sustainable in the long run unless the yields are substantially increased by introducing improved technologies.

iii. Weak institutions:

It is paradox that traditional institutions have eroded and new institutions did not develop. For instance, credit and insurance sector is weak, though the credit flow in the state is rising over time. Kisan credit cards is also growing very slow (15%). The agri-insurance sector is at infancy and needs to be strengthened as agriculture sector is highly risky. Awareness needs to be created regarding insurance and KCC loan among the farmers. Similarly, the seed sector, technology delivery system and input service delivery system are also under stress and need rejuvenation. The challenge is to evolve innovative institutions in view of smallholder agriculture, those who have high transaction costs of accessing services, inputs and output markets. This will help ensuring timely supply of quality inputs, knowledge dissemination, price information, trainings, producing quality produce as per market demand and linking to the remunerative markets.

iv. Poor infrastructure:

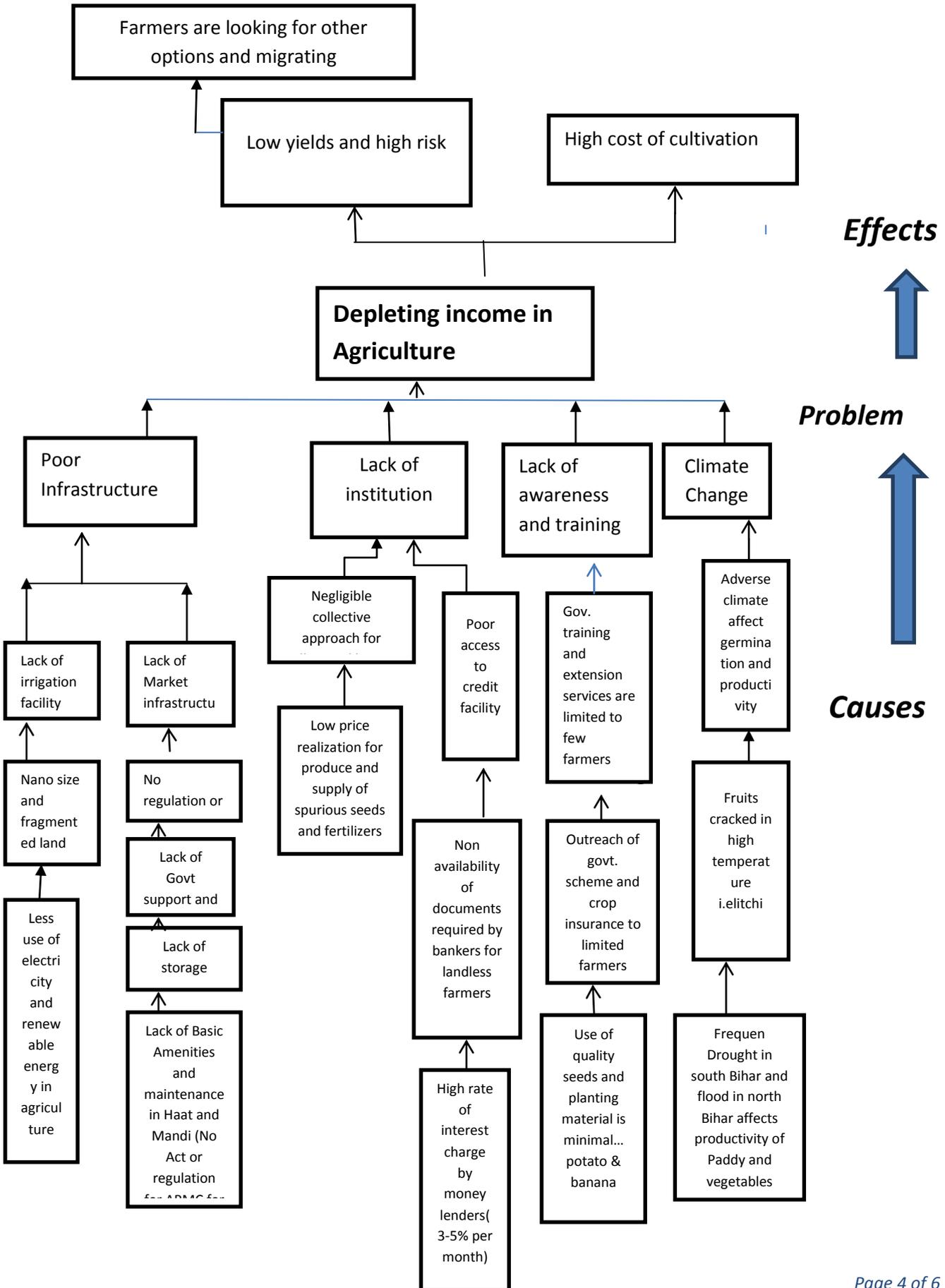
The state is characterized to have poor road network, thin markets and fragile electricity sector. The road density is 1.28 km per thousand people in Bihar compared to 4.19 km in Andhra Pradesh and 4.44 in Karnataka. However, the state has performed remarkably well in past years in improving road network. The markets are sparsely spread; there are only 6 markets per ten thousand km². Underdeveloped markets become a major constraint in accessing the markets and lead to low prices realization of their produce. Similarly there is lack of storage facility, ware houses, cooling chamber which leads to post harvest loss and low price of produce. APMC yard and rural *haats* are poorly managed and this does not attract buyer and seller resulting in poor marketing of agriculture surplus and hence the small holders are not getting remunerative prices for their produce. The state is abolishing APMC act instead of amending it.

Similarly, the power sector is poorly developed and managed as a result of which only 52 per cent of the total inhabited villages are electrified in Bihar by 2008 while villages of Punjab, Haryana and AP are 100% electrified. Non-availability of regular and quality supply of power is a major constraint in the development of the agro-processing sector in the state. Alleviating this constraint will substantially change agro-processing scenario in the state and attract private sector to develop modern processing plants.

v. Poor policy response towards bringing change in agriculture:

The investment in agriculture sector is poor. Agriculture sector received about 4 per cent of total plan outlay during X as well as XI Plan. Irrigation and flood control received about 11 per cent during X Plan, while mere 6 per cent during the XI plan. Social services received 41 percent of plan allocation during XI plan compared to 33 per cent during X plan. Agriculture being the focus area of the state (85% people are depending on agriculture) calls for higher allocation of resources especially for flood control, irrigation & drainage management and land development. Thus a well-defined policy and more investment (Govt. and Private) are required towards bringing change in agriculture sector of Bihar.

Figure 1: Problem Tree Analysis of Agriculture in Bihar



5. Recommendations/conclusion

a. Land Reform:

The first and foremost is land reform by correcting land records, settling dispute on ownership and correcting land lease markets as there are many landless farmer engaged in farming but they are not benefited out of any Govt. scheme as they do not have any evidence to produce that they are engaged in cultivation. This land reform will also give rise to mechanization of agriculture resulting in minimizing the cost and increasing the yield.

b. Investment in Agriculture sector:

Govt. needs to invest and have policy to deal with drought and flood. Flood and rain water need to be utilized for irrigation purpose, fisheries and producing hydroelectricity to overcome the issue of Irrigation and electricity. Research need to be undertaken for short duration variety of paddy for these areas. There is need to invest in agriculture sector either by Govt. or private sector to provide fully furnished markets and haats with basic amenities, grading & sorting facilities, cold chains, ware houses, to reduce post-harvest losses (15 to 30%) and attracting buyer and seller to the market so that the small holders are getting remunerative prices. There is need to decrease dependency on diesel operated pump set for irrigation through electrifying the area and ensuring electricity through power (Thermal or solar) grid to reduce the cost of cultivation and maximizing the area under assured irrigation as it is only 61 % .This clearly indicates that there is immense scope of increasing agriculture productivity of the state.

c. Linking to the Markets through developing farmers' Institutions:

Since 90% of the farmers are small and marginal; it is very difficult to have access to market and quality inputs in time. Hence a strong farmer producer organizations need to be developed and the existing old one to be strengthened so that the small holders interest is safe guarded through these institution by meeting the demand of market through producing quality produce and required volume.

d. Training /Awareness/ information for capacity building of Farmers:

Research outputs need to reach farmers to transform agriculture sector. In the short run, there is a need for having a massive seed production program of improved varieties/hybrids by public and private sector. Quality planting materials also need to be provided for horticulture crops. In the absence of this, the inferior saplings would spoil the revolution in horticulture sector. ATMA and KVKs are the two most important channels of connecting inventions and farmers. An effective coordination of these important pillars of extension system is necessary to reap the benefits of improved technologies.

e. Policy level changes:

Policy level change are required for strengthening market, market yards ,rural haats so that these markets can attract large no of seller and buyer in order to get linked to the bigger markets and producers are getting remunerative prices for their produce. Similarly irrigation, seed production in state needs special attention (Hardly 10% of Potato grower is using potato seed).

Similarly investment policy for agriculture is also required to develop infrastructure such as ware houses, cold chain, ripening chambers etc. to give bounce to agriculture. However govt. is already working to develop storage capacity at PACS level to avoid post-harvest loss.

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