

NATURE AND PATTERN OF CROP DIVERSIFICATION IN JHARKHAND: A MICRO LEVEL ANALYSIS

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Diversification in agriculture' has tremendous impact on the agro-socio-economic upliftment of resource-poor farming communities. Beside the extended employment, increased work availability, increased productivity. It also has an impact on local resources in a larger mix of diverse cropping systems. A sound and empirical understanding about the nature of crop diversification in the state of Jharkhand and the nature of diversification is analysed in this paper. The pattern of crop diversification in Jharkhand has been also studied by taking into consideration the sectoral growth of agriculture, the agriculture growth rate/ sectoral contribution of growth rate and value of output of different items in agriculture has been analysed.

Keywords: Jharkhand, Agriculture and Cropping Pattern

INTRODUCTION

JEL Classification: C10, Q10

Agriculture diversification is an integral part of structural transformation and growth of agriculture of an economy. In the context of state of Jharkhand, the importance of agriculture a large change has occurred in the agricultural set up of the state. From a predominantly a mono-crop state, Jharkhand has become a major horticulture producer of the country, so it is necessary to study the growth and trends in area and production and productivity of different crops in Jharkhand. The statistical data and result show that there exist, diversification of agriculture in Jharkhand.

Diversification is necessary because the only cereals cannot ensure food security to the people. Agriculture diversification in Jharkhand has occurred across and within crops, horticulture and vegetable production. Diversification in agriculture has occurred largely through crop substitution. Concerns have been expressed whether this process would sustain in the long run, given the facts that land frontiers are closing with little scope to bring additional land under cultivation and land holdings are getting smaller and smaller under population pressure.

REVIEW

Studies show that diversification always focus on the economic gains as the economic development is seen as the most potent force to improve the socio-economic development, that is why economic benefits are well documented and the social one are omitted. Diversification in agriculture' has tremendous impact on the agro-socio-economic upliftment of resource-poor farming communities. Beside the extended employment, increased work availability, increased productivity (Johnston, 1995), it also has an impact on local resources in a larger mix of diverse cropping systems and livestock, aquaculture and other non-farm sectors in the rural areas. With the globalization of markets in the WTO era, diversification in agriculture means increasing the total production and

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productivity in terms of quality, quantity and monetary gains under diverse agro-climatic situations of the country. There are many opportunities of crop diversification both in the irrigated and non-irrigated vast areas in the rural India (Singh, 2011).

There are several benefits of agricultural diversification reported in the literature. In the short run these are:

Shifting consumption pattern: People are moving away from a diet based on staples to one with a greater content of animal products (meat, eggs and dairy) and fruits and vegetables. In turn, more dynamic farmers are able to diversify to meet these needs. Crop diversification has the potential to grow the higher number of crops than the traditional way of farming consequently more crops give more income to the farmers (Pingali and Rosegrant 1995, Von Braun 1995). Diversification helps in minimizing the adverse effect of the current system of crop specialization and monoculture nutrient recycling. (Deogharia P. C., 2011) **Employment generation:** As diversification involves more than one enterprise including processing, leading to changes in the crop mix/crop-livestock mix/crop substitution results insignificantly high demand for labour (Raju, 2005, Pingali and Rosegrant 1995, Von Braun 1995).

Poverty reduction in the developing country is possible with high productivity and diversification in two ways such as, intensification in production and its impact on income while the second is diversification of the agricultural expanding production in high-value-added activities (often for export) sugar, maize, palm oil, fruits, vegetables, flowers, livestock, fisheries, etc. (Pingali and Rosegrant 1995, Von Braun 1995) Diversification in agriculture has tremendous impact on agro socio-economic and uplifting of resource for poor farming communities. It generates income and employment for rural youth for the ultimate benefits of the farmers in the country (Singh, 2009).

Rapid urbanization in developing countries has an impact on consumption patterns. Moreover, a smaller number of farmers have to supply to a larger number of consumers. It does require adaptation to new farming techniques to meet the higher level of demand (Deogharia P. C., 2011). Because of mechanised farming system now day farmers are adopting diversified cropping pattern in agriculture. Apart from above benefits agriculture diversification also provides food security, promotes agriculture and agriculture-based export, improves environmentally sustainable farming system and provides good agriculture marketing system

Jharkhand is one of the backward states of the country and has high incidence of poverty, small size of landholding and underdeveloped rural infrastructure. However, the state has higher proportion of the cultivated area under high value crops / cash crops viz vegetables (7.9%) compared to all India average (5.0%).

A sound and empirical understanding about the nature of crop diversification in the state of Jharkhand and the constraints is analysed in this paper. An attempt has been made to support and evolve appropriate policies for the development of required institutional arrangements and creation of adequate infrastructure for promoting crop diversification in the state. In this backdrop this paper analyses:

The status and pattern of crop diversification in the state of Jharkhand.

DATA METHODOLOGY AND TOOLS

Three stage random sampling method was for selection of districts, blocks and villages. The selected districts (Ranchi, Hazaribag, Dumka, Palamu and West Sighbhum) represent different agro-climate zone of the state. For the selection of blocks a cluster analysis of the blocks in each district was carried out, taking some important socio economic and demographic features. viz, percentage of cultivator households, percentage of irrigated area, intensity of mechanization in the farm, level of education etc into consideration. For selection of households from the selected villages stratified random sampling method was adopted. Households within a village were classified into different strata (MF, MedF, SF & LF) on the basis of their land holding size. The perpose of fixing up strata was to ensure proper representation of different population groups in sample.

The data on relevant aspects were collected by recording oral information provided by the representative of the household on a specifically prepared and pretested questionnaire. The field survey was carried out during 2018-19 and the data pertaining to the agriculture year 2018-19.

The collected data is analyzed using appropriate statistical tools, to examine diversification trends tabular analysis was carried out at macro level in form sector. The magnitude of diversification at micro level was also worked out using farm level information collected through the field survey.

Pattern of Crop Diversification in Jharkhand

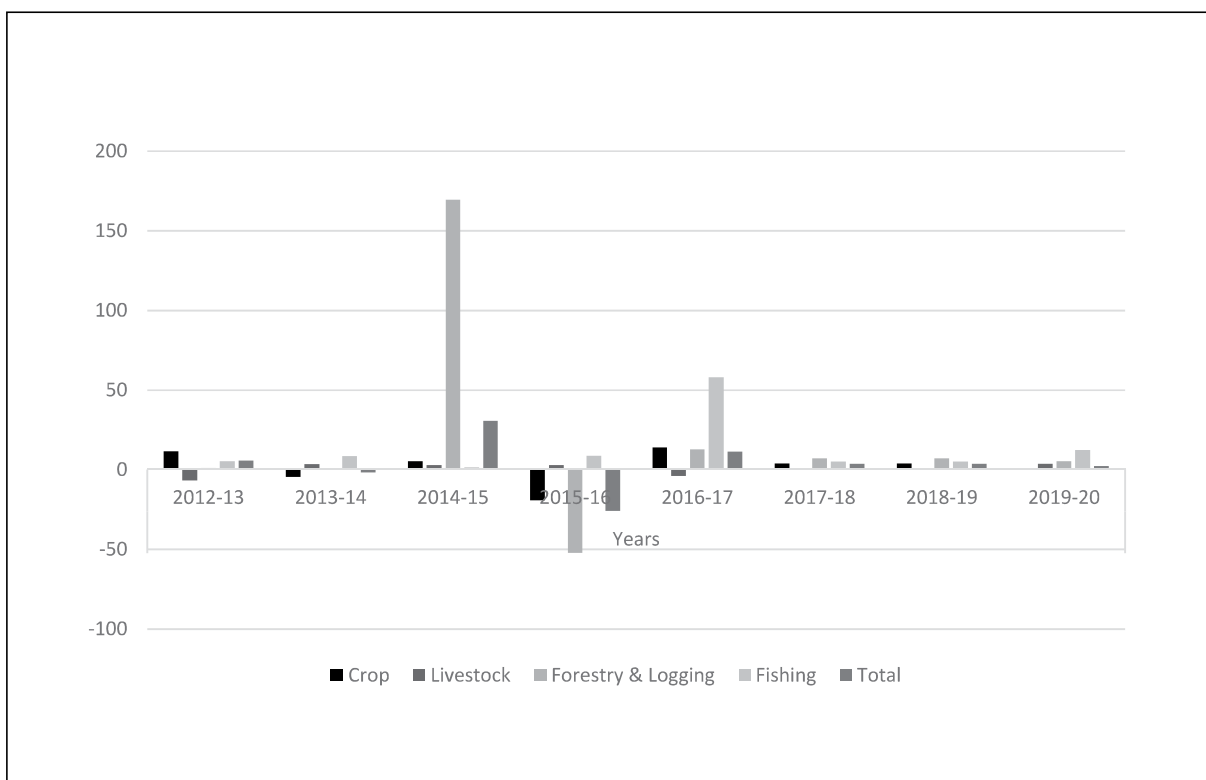
The pattern of crop diversification in Jharkhand has been also studies by taking into consideration the sectoral growth of agriculture, the agriculture growth rate/ sectoral contribution of growth rate and value of output of different items in agriculture has been analysed.

Table 1: Year-wise Sectoral Growth of Agriculture during 2012-13 and 2019-20 in Jharkhand (in Percentage %).

Items	Years							
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	
Crop	11.6	-4.5	5.4	-19.1	14.2	3.95	3.95	0.2
Livestock	-6.7	3.5	3.0	2.9	-3.8	-0.17	-0.17	3.8
Forestry & Logging	1.2	0.9	169.7	-52.2	12.9	7.26	7.26	5.3
Fishing	5.4	8.5	1.5	8.9	58.1	5.10	5.10	12.5
Total	5.9	-1.8	30.7	-25.8	11.4	3.78	3.84	2.5

Source: Compiled from Jharkhand Economic Survey different years.

The agriculture sector which comprises of crops, livestock, forestry, fishing etc. is dominated by crops. The share of crops has declined from 11.6% in 2012-13 to 0.2% in 2019-20, increased livestock, Forestry & Logging, Fishing from -6.7%, 1.2% and 5.4% in 2012-13 to 3.8%, 5.3% and 12.5% in 2019-20. However there has been an increase in the percentage share in the different items over year.

Fig: 1 : Year wise and Item wise Growth of Agriculture in Jharkhand

Item wise/ Sectoral contribution of growth rate and their share in GSVA has been represented in table 02

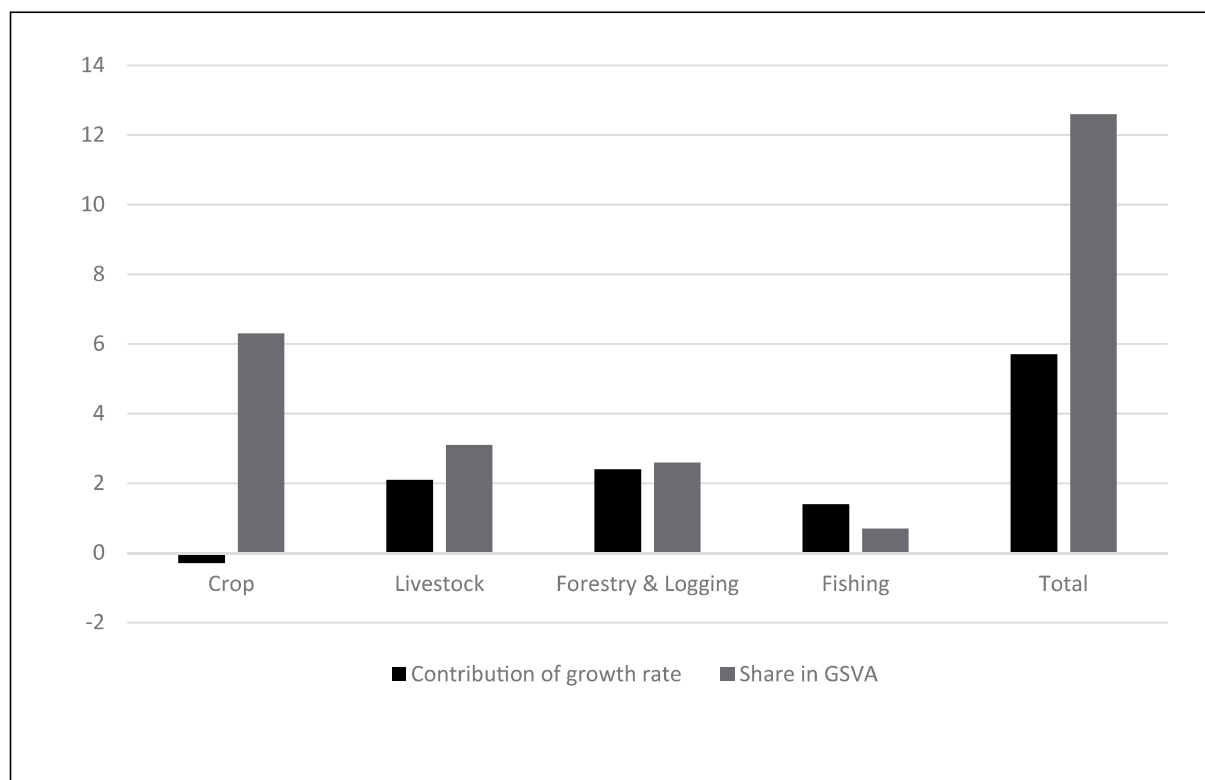
Table 2: Sectoral Contribution to Growth Rate for their share in GSVA in the year 2019-20.

Items	Contribution of growth rate	Share in GSVA
Crop	-0.3	6.3
Livestock	2.1	3.1
Forestry & Logging	2.4	2.6
Fishing	1.4	0.7
Total	5.7	12.6

Source: Compiled from Jharkhand Economic Survey different years.

The table shows that the contribution to growth rate of crop is highest (5.7%) during 2019-20 and its share in GSVA is also maximum (6.3%). The contribution to growth rate and item wise share has been also presented in bar diagram.

The Itemwise value of output of agriculture has been represented in table 6.3 for different years i.e. 2011-12 to 2018-19

Fig-02: Contribution to Growth Rate and Item wise Share**Table 3 : Value of the Output of Agriculture Forestry & Fishing Sector**

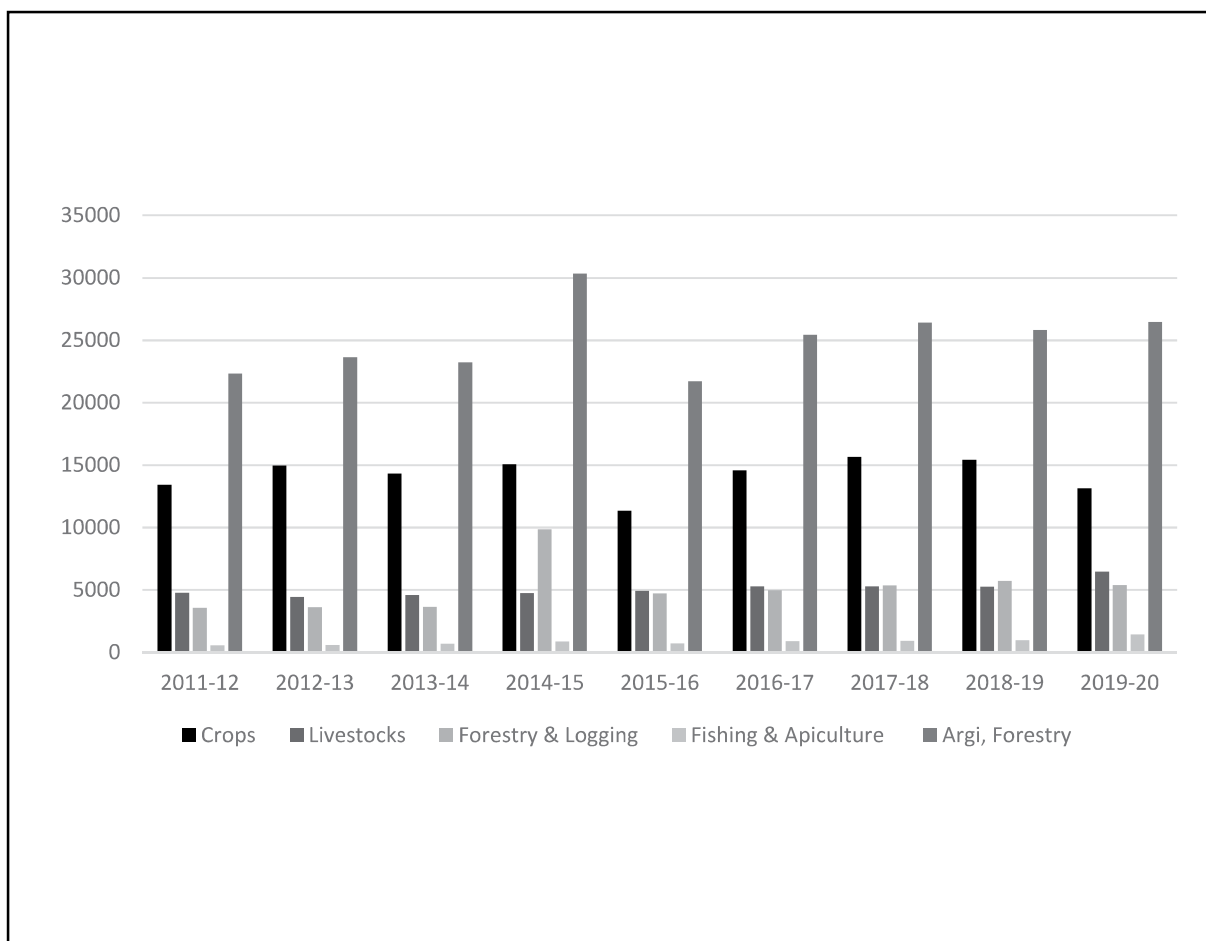
Items	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Crops	13421	14980	14305	15074	11336	14594	15643	15425	13160
Livestocks	4776	4457	4611	4751	4935	5280	5271	5261	6460
Forestry & Logging	3576	3619	3653	9853	4733	4988	5350	5739	5388
Fishing & Apiculture	563	593	699	854	712	891	937	985	1440
Argi, Forestry	22335	23650	23213	30332	21717	25434	26398	25813	26448

Source: Jharkhand Economic Survey 2018-19

The value of different crops over years (during 2011-12 and 2019-20) is consistent and no major change has been observed, however the value of fishing and apiculture and agri-forestry has increased over year.

This has also been represented in fig 6.3 and graphically. It is clearly visible in the graph.

Fig. 3 : Value of the Output of Agriculture Forestry & Fishing Sector



Cropping Pattern in Jharkhand

Cropping pattern is one of the important determinants of crop diversification, so it is desired to analyse the cropping pattern of the sample farmers of Jharkhand.

The Cropping pattern based on household information from the sample household from the selected districts has been presented in the table below. The household survey reveals that the food grain crops dominated the cropping pattern in the state of Jharkhand. Paddy is the major crop cultivated in the state of Jharkhand, several other crops are also cultivated in conjunction with paddy in order to meet the subsistence as well as cash need of the farmers. Wheat, Maize, Pulses and millets are also cultivated by the farmers of Jharkhand. Nowadays sugarcane has also being cultivated in commercial basis by the farmers of Jharkhand. Vegetables and oilseeds are also important crops in the state of Jharkhand Other crops has a minor presence in the state of Jharkhand. However, the farmers are diversifying crop towards high valued cash crop and do prefer to cultivate different types of vegetables and even sugar – cane.

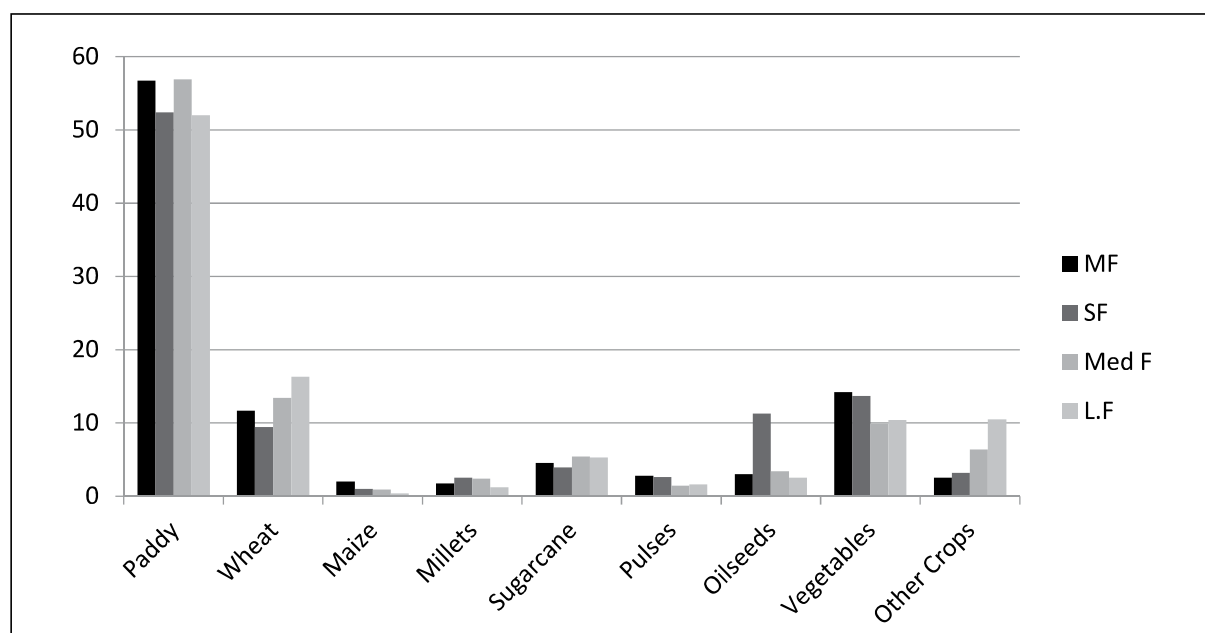
Paddy has been found the most important crop in all the selected districts of the state of Jharkhand. Summer rice (Garma Dhan) is cultivated in limited region of the state.

Table 04: Cropping Pattern Across Different Farm Size Among Sample Farmers of Jharkhand

Farm Size

Sn.	Crop	MF	SF	Med F	L.F
i	Paddy	56.7	52.4	56.9	52.0
ii	Wheat	11.7	9.4	13.4	16.3
iii	Maize	2.0	1.0	0.9	0.4
iv	Millets	1.7	2.5	2.4	1.2
v	Sugarcane	4.5	3.9	5.4	5.3
vi	Pulses	2.8	2.6	1.4	1.6
vii	Oilseeds	3.0	11.3	3.4	2.5
viii	Vegetables	14.2	13.7	9.9	10.4
xi	Other Crops	2.5	3.2	6.4	10.5

Source: Field Survey



Due to the subsistence concerns, generally the marginal and small farmers cultivate more food crop like paddy, wheat, maize and millets, whereas large farmers cultivate more cash crops. Our data also substantiate this proposition. The marginal and small farmer in all the districts of Jharkhand devoted more area to food crops and less to cash crops.

Analyzing the cropping pattern of the sample Districts, it has been observed that the trends in the State is that the small farmers devoted more area under the food crops and large farmers cultivated more area under cash crops. This can also be observed from the above table.

The impact of crop diversification in the state of Jharkhand has been observed by looking into the changes in area shares of various crops and horticulture to gross cropped area. It has been observed

during our study that paddy(rice), which is the main staple food of the state of Jharkhand, still continues to be the most important crop commanding about 70 percent of the cropped area in the state. However, the share of area under food grain has come down after eighties. Among the food grains the area shares of traditional varieties of paddy like gore as well as of pulses have fallen drastically, while cultivation of HYV of seeds has increased drastically. Among the non-food grains, the area shares of oilseeds, potatoes, onion, fruits and vegetables has increased over the period by varying degree. Here it has been observed that there has been a fall in the area share of food grains and hence rise in the area shares of non-food grains specially vegetables in the post globalisation period.

This performance of agriculture sector in the state of Jharkhand is closely associated with changes in the cropping pattern which again culminates into crop diversification. Our study found that there has been an exponential growth rate of the absolute area and production of the principal crop in Jharkhand. However, the annual exponential growth rate of area under food grain was as low as 0.30 percent during last decade. The state registered negative trend of growth rates under pulses and oil seeds. The trend growth rate of area under vegetables suggests that the vegetables has been another important ingredient of changing cropping pattern and diversification of crops in the state.

From the above analysis, it is clear that crop diversification in Jharkhand has taken place largely in favor of vegetable. Since late 1990s, the horticultural crops like vegetables and fruits also started gaining ground. The diversification seems to have taken place in favor of high value crops or the crops which seem to provide higher relative return to the cultivators. The spur in the pace and extent of diversification in Jharkhand seems to have taken place during 1995- 96 to 2000-01, i.e., in the post-globalisation period. It seems that the higher level of demand for high value crops as well as higher cash requirements of the farmers to satisfy their family needs led to this higher diversification. But higher diversification also requires better infrastructure and technological support, especially increase in irrigation facilities. The growth in the area under above-mentioned crops originated from the expansion of area under irrigation. Cash Crops are highly dependent on irrigation, as they are grown in off-monsoon seasons.

It also appears from our study that agricultural growth in Jharkhand in general varied positively with the level of crop diversification. The small and the marginal farmers who are risk-averse started allocating plots of land to non-food grains as well as food grains crops in order to mitigate risk. They could maintain a diversified portfolio of crops because of an increase in the yield level of the food grains as well as non-food grains. An almost secular increase in the yield level of most of the crops was again possible due to expansion of irrigation, among other things.

In conclusion, we can say that the cropping pattern change in Jharkhand has indeed been an emerging reality which is reflected through adoption of a diversified crop-mix by the farmers. This diversified crop-mix may be attributed to the predominance of the small and marginal farmers who, in order to mitigate risk, spread out their cultivated area among a number of non-food grain crops including vegetables but, at the same time, do not trade with their food security.

Conclusion

No country in the world can eliminate rural poverty without rising productivity in its agriculture sector but the fact is that both the researcher and farmers lose their interest in the sector because of the low price in grain-based production system. Earlier studies suggest that rural poverty can be eliminated through rising rural wages and income augmentation by employment generation and

production of value-added crops. It seems almost obvious that growth in agricultural productivity is the surest way to end poverty. Growth in agricultural productivity not only can increase farm incomes, it also stimulates linkages to the non-farm rural economy, causing economic growth and rapid poverty reduction. But in the environment of open trade, low price for cereals will no longer.

work to reduce the rural poverty, it should be dynamic and profitable and staple cereals have not been a source of dynamism in rural economies for two decades. A rejuvenating and profitable agriculture is associated with the diversification in agriculture sectors (Timmer 2005, Timmer 1988).

In a country where the agriculture is grain based and considered panacea for food security and side by side also accepted that opportunities for the enhancement of the income through the grain-based agriculture is limited. This paradoxical situation enables us to produce high value commodities to generate high income. In India where the agricultural land is dominated by the small land holders who can take the advantage of producing high value commodities. Thus, the present study reveals that the increase in area production and productivity of crops and the profitability of the farmers depends upon diversification of agriculture. Diversification will provide more employment and income to reduce vulnerability of poor farmers and it will support the policy makers and planners who aim to double the farm income.

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