

DIVERSIFICATION OF AGRICULTURE: A REVIEW

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In the present liberalized world, Indian agriculture is different from that of green revolution period. During the period of green revolution, agriculture growth was largely achieved by supply driven policy instruments such as irrigation, power, extension services, price support whereas in the post-reform period the agriculture growth is demand driven, urbanization, increase in per capita income and changing consumption taste and pattern have shifted the consumer demand from food grains to live stocks and horticulture products. Although large number of farmers still depends on traditional food crops for their livelihood, however fifty percent of the agricultural GDP comes from horticulture and live stocks products. So, this is high time to have policy support to diversify the agriculture from traditional low-valued crops to high valued horticulture and livestock commodities. For the purpose of achieving higher income and employment growth in agriculture, diversification of farm activities is emerging as important instrument. The policy makers are also emphasizing on changing the way the agriculture sector works in order to tackle the inconsistencies in the farm sector and achieve food security. On this backdrop, the diversification of agriculture towards high-value commodities (HVCs) like fruits, vegetables, dairy, poultry, meat and fish products, etc. is suggest as a viable solution to stabilize and raise farm income, enhance agricultural growth, increase employment opportunities and conserve natural resources.

Keywords: *Cash Crops, Horticulture, Livestock products*

INTRODUCTION

Agriculture is the backbone of Indian economy because of its high share in employment and livelihood creation. The share of Agriculture in the GDP has registered steady decline yet this sector provides direct employment to more than 50% of total workforce in the country and large proportion of the population depends upon agro based industries and trade of agriculture products. About 60% of the population of our country is rural and the main occupation is agriculture. So, a large proportion of the land of the country is used for agriculture and horticulture. If the productivity in agriculture and horticulture improves with the help of mechanization, advanced technology, this sector may have a leading role India's economic development.

Agriculture productivity is measured as the ratio of agricultural outputs to agricultural inputs. While industrial products are usually measured by weight, their varying densities make measuring overall agricultural output difficult. Horticulture is the branch of agriculture that deals with the art, science technology and business of vegetables garden plant growing. Agriculture is the main stay for 80% of rural population of the states. Agriculture is employment and primary income generating activity. It is also an important sources of raw materials and demand for many industrial products. Particularly fertilizers, pesticides, agricultural implements and a variety of consumer goods which contribute significantly to great extent to the rural economy.

The Post-Green Revolution period saw diversification of the agricultural sector towards the crops that have experienced higher growth in the yield, which was characterized as technology-led diversification. Much of the area was diverted towards high value food-grain crops including rice, wheat and maize. This has led to emerging scenarios of specialization in many states of the country.

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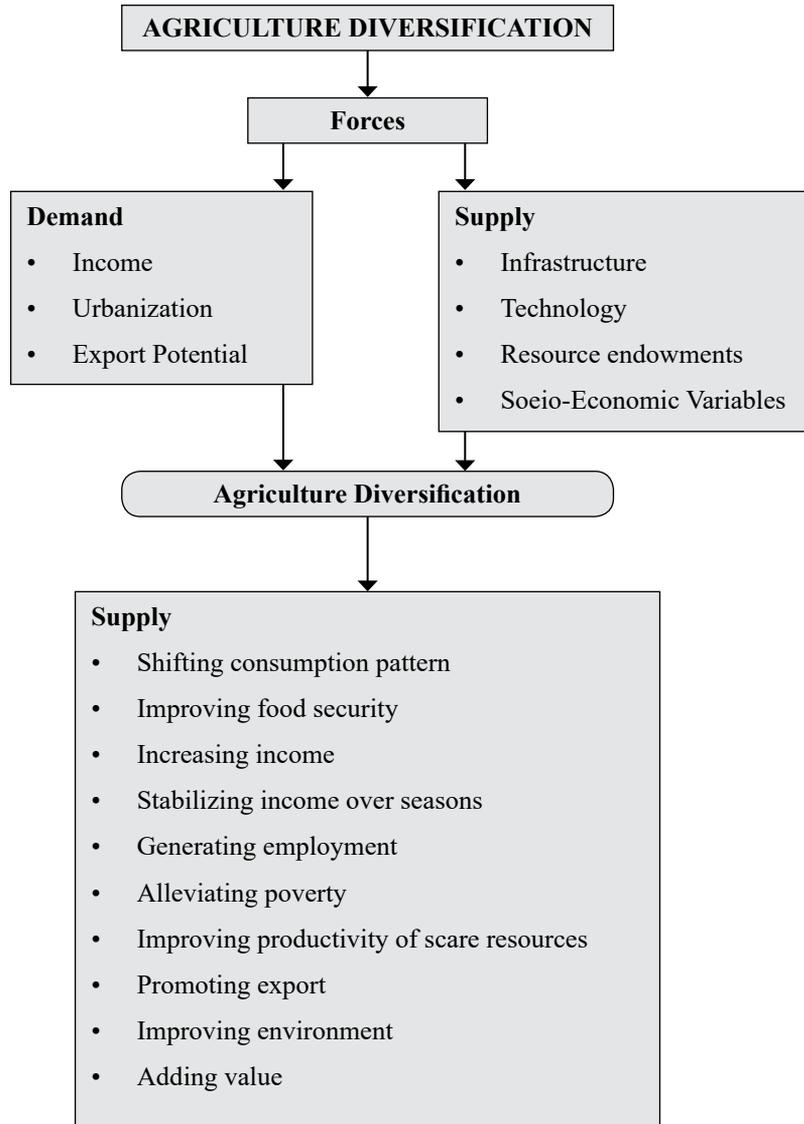
Surprisingly, not only the agricultural growth slowed down in 90s but also agricultural production remained highly volatile compared to 80s. Annual real rates of gross capital formation declined sharply between the early and late 90s and during the same time, the public investment in the agriculture sector has witnessed a declining trend (from 33 to 22 per cent). In addition, many concerns were emerged regarding the traditional food baskets, which favoured rice-wheat combination and resulted specialization in the cropping pattern.

These concerns are mainly related to the increased risk of farmer's income and related to the negative externalities it generated in terms of environment degradation and regional disparities. On the one hand, the contribution of agriculture to the GDP is declining overtime whereas the number of people engaged in agriculture and its allied activities are still in large numbers raising concerns of both land and labour productivity. Consequently, the policy makers started emphasis on changing the way agriculture sector works in order to tackle negative externalities it creates and at the same time find ways to remove inconsistencies and achieve better levels of food security for poor and malnourished people. This calls for alternative production systems or opportunities that can generate new employment, growth and enhances incomes (Barghouti et al., 2004).

Agricultural diversification indicates the changes in crop-mix, enterprises-mix and activity-mix at household level (Chand, 1999). It is considered a shift of resources from monoculture to a large mix of crops and livestock. The need for agricultural diversification arises due to various factors. As many parts of India have witnessed quite a high number of farmer suicides, diversification of the crop mix can be an efficient mechanism for diminishing the impact of risk on farmers' welfare (Jorge and Valdes, 1995). Besides this, globalization of agriculture under WTO regime has provided different challenges and opportunities for the Indian agriculture; it is expected to have an inflow of subsidized cheap food imports that may have wide implications for our agriculture. On the other hand, it also allows the Indian farmers to produce high-value horticulture and livestock products for the growing affluent foreign and domestic consumers. Moreover, dominance of the wheat-paddy cropping system has led to serious economic, social and ecological problems, such as deceleration in productivity growth, drop in agricultural self-employment, over exploitation of ground water resources and decline in soil fertility (Chand, 1999).

Agricultural diversification in favour of horticulture and livestock products is desirable to increase farm employment and income; reduce disparities across space and time; check degradation of natural resources; and enhance export (Chand, 1999; Joshi, et al., 2004, 2006; World Bank, 2005; Weinberger and Lumpkin, 2007). Horticulture and livestock products absorb more workforce than the traditional crops. For example, Chand, (1999), finds that in Punjab, labour absorption was 307 hours per acre in potato and 225 hours in other vegetables crops; whereas corresponding figure for traditional crops like wheat, barley and mustard cultivation was only 127 hours. He further finds that if the area under wheat and paddy (the traditional crops) is substituted by fodder crops (require for livestock), and dairy farming is raised on the same area, it would result in 7.3 times more labour absorption than the wheat-paddy cultivation. Apart from effect on direct employment, diversification also provides scope for indirect generation of employment through boosting agro-processing industries.

Factors affecting agriculture diversification and its impact may be better understood by the following figure



A REVIEW

Present study which reviews about diversification of agriculture have been presented in four parts related to agriculture diversification related to different aspects of agriculture diversification:

1. Rural diversification
2. Concept of diversification of agriculture
3. Determinants and factors of diversification
4. Impact of diversification

Rural Diversification

Different social have come to the conclusion that agriculture diversification is a major cause of rural upliftment leading to rural diversification. Literature argues that agricultural diversification geared to increasing labour absorption can be so designed as to meet national demand for agriculture to earn foreign exchange required for economic development (Hayami, 1991). Weinberger and Lumpkin (2007) point out that there is a considerable scope for exploiting the potential of non-traditional crops, such as horticultural produce, since it could motivate diversification from traditional low profit commodities. Hayami (1991) argues that agricultural diversification defined as diversification of agricultural production, marketing and processing activities from the major cereal sector can contribute significantly to both growth and equity in developing countries. He, however, cautions that diversification to new crops and livestock products are not likely to succeed unless it is based on major technological advancements in farm production or processing/ marketing. Technological innovations in diversification are very important and they would be effective only if institutional innovations also take place. These two have to be consistent with the conditions of product and factor markets. It is thus put that agricultural intensification is a precondition for rural diversification (Slater, 1991).

Diversification is also argued to be the single most important source of poverty reduction for small farmers. These small farmers become semi-commercial when they market part of their output, produce some high-value cash crops and livestock products, purchase inputs and hire labour. In agriculture, however, diversification relies on profitability, which is constrained by market availability and size, land suitability and rights, irrigation infrastructure, and labour supply (Dorjee, Borca and Pingali, 2007). Diversification invariably leads to income variability and changes the rural scenario.

Price risks are significantly smaller in growing traditional crops (farmers are used to) than new crops. So risk aversion is important here. We know that low-volume markets are associated with high-price volatility. There are also issues related to land conversion to new crops. So is conversant to crop and a change in crop demand soil adaptation, which may entail come which poor farmers may not afford. Diversification of agriculture can affect both the structure and the level of employment in the rural area. Family labour is substituted by hired labour and changes would take place in the level of labour input as well as the distribution of labour by gender.

Large scale diversification may require large-scale changes in existing irrigation infrastructure. Failure to diversity within the irrigation systems is the result of incentive failures. Rosegrant and Binswanger (1994) argue that water pricing could solve this problem at crop diversification would occur. It is pointed out that establishment of water rights can provide maximum flexibility in responding to change and diversification of cropping proceeds.

Labour use and agricultural diversification can go hand in hand. The argument is that farmers should not grow wheat but instead grow onions and this would lead to increased use of labour use. The proponents miss the point that where is the market; and even if the market is created, what about the price volatility (Singh, 2006). The answer in retail chains would help, but this also presently is limited in a country like India. Studies have shown that small farmers lose in this participation. The opinion that is being generated is that corporate house should get into production process as they have better managerial skills and can introduce new technologies. The reason is that they are now making research and development expenditure, which was earlier in state domain in the era of Green Revolution. Technologies innovation can be a strong driver in promoting agricultural diversification in favour of more competitive high-value crops is expected to overcome many of the emerging impediments development in low –income countries. They say agriculture is gradually transforming

from subsistence to semi-commercial and commercial status (Joshi, Gulati and Cummings Jr., 2007). One may not agree with how it is being paced, but it is certain that it is driven by a host factors. Agricultural diversification in many developing countries is influenced by slow down of growth in demand for cereals, increasing demand for high-value commodities, increasing availability of advance technology, declining agricultural prices, changing role of the governments, expanding role of the private sectors, improving supply-chain management, improving food safety and better quality, emerging trade liberalization, and liberalization of capital flow. These proponents of change call for diversification-related investments and this should be directly associated with getting agriculture onto the path of sustainable and equitable growth via its linkages within economy and capitalizing on the development in technical and political arenas (Barghouti, Kane and Sorby, 2007).

It is further argued that the developed world is making the most diversification opportunities, leveraging off the availability of quality resources, relatively undistorted market signals and substantial market information, it is the diversification of production systems to the developing countries (Barghouti, Kane and Sorby, 2007).

Rural diversification forms an essential part of rural transformation. It encompasses not only agricultural diversification but also income, employment and occupational diversification. The role of rural non-farm sector (RNFS) is crucial both in generating productive employment and alleviating poverty in rural areas, because of the limited absorptive capacity of urban sector and near saturation of the agricultural sector in further absorption of workers. Policy formulators are increasingly recognizing the importance of RNFS in providing sustainable livelihoods to a large number of people in rural areas. The role of non-farm sector in the rural economy in terms of opportunities for employment generation has been recognized by number of scholars (Vaidyanathan, 1986; Visaria and Basant, 1994; Chadha, 1993; Dev, 1990; Unni, 1991; Papola, 1992).

Various studies, following a study by Vaidyanathan (1986), tried to understand the nature of emerging non-agriculture sector, that is whether it was 'distress diversification' or of a dynamic and non-agricultural sector (or relative importance of 'push' and 'pull' factors). Research also tried to pinpoint the factors explaining the spatial variation in the relative importance of non-agricultural sector at different levels of disaggregation – all India level, states, NSS regions, agro-climate zones and sub-zones. Level and growth of non-farm sector was associated with various explanatory variables, such as land productivity, crop diversification, rural inequalities pertaining to land and assets, poverty, unemployment rates, urbanisation, literacy, and so on. Some micro studies were also conducted that tried to understand the processes that lead to the emergence and growth of non-agricultural sector.

The concept of diversification conveys different meaning to different people at different levels. For example, with respect to the national economy, it generally conveys a movement of resources, especially labour, usually out of agriculture to industry and services, a sort of structural transformation in agriculture practices such as in cropping pattern, livestock rearing or in agricultural enterprises. The higher the competition among the farm activities the higher would be the magnitude of diversification and lesser competition leads towards specialization (Singh, 2006).

Concept of Agriculture Diversification

The concept of diversification admits varying interpretations and connotes different meanings to different peoples. In a popular notion, it means a shift of resources from farm to non-farm activities, use of resources in a larger mix of diverse and complementary activities within agriculture, and a movement of resources from low-value crops to high-value crops. In the present context, the process

of diversification is defined as a shift of the cultivated area from cereals and low-value crops to high-value cash crops, including fruits and vegetables. The diversification of agriculture towards selective high-value cash crops including fruits and vegetables, compatible with the comparative advantage of the region, is suggested as a viable solution to stabilize and arise farm incomes, increase employment opportunities for small and marginal farmers, boost exports and conserve and enhance the natural resource base, principally land and water (Vyas, 1996; Chand, 1996; Joshi et al., 2004; Rao, Birthal and Joshi, 2006; Sharma, 2005).

Within the agriculture sector, diversification is a shift from the traditional cropping pattern of less remunerative crops to high value added diversified agriculture. In other words diversification involves the changes in the production portfolio from the low-value to high value commodities like vegetables, milk, meat, eggs and fish based on the market demand that creates the new horizon for the rural income source (IFPRI, 2007). From a narrow point of view, agricultural diversification implies increasing the variety of agricultural commodities produced at the farm level (Hayami, 1991).

But a broader view suggests that agricultural diversification is a process of a gradual movement out of subsistence food crops (particularly staple foods) toward diversified market-oriented cash crops that have a larger potential for returns to land. At the conceptual plane diversification of agriculture could be classified into the following three categories:

1. Shift of resources from farm to non-farm activities;
2. Shift of resources within agriculture from less profitable crop or enterprise to more profitable crop or enterprise;
3. Use of resources in diverse but complimentary activities (Vyas 1996, Delgado 1999).

The process of agriculture diversification is triggered by the availability of improved rural infrastructure, rapid technological advancements in agricultural production, and changing food demand patterns. Hence, this process of diversification towards high-value crops is likely to accelerate agricultural growth and usher in a new era of rural entrepreneurship and generate employment opportunities. There appears immense scope for diversification of agriculture towards high-value commodities in India (Lone, 2013). Diversification of agriculture being a strategy would open up opportunities, to a large extent, for value addition in agriculture and will also lead to better crop planning and improve the earning opportunities in the farm community.

From this discussion it is clear that diversification means not only to produce more than one crop, but to involve the entire rural economy and broadening the income sources. The process involves not only the crops but also new marketing and agro food based industrial activities (Goletti, 1999). Agro-climatic conditions, resource endowments and infrastructural facilities at the regional level within a country may affect the level of diversification (Rao, 2004).

Crop diversification takes into account the economic returns from different value-added crops. It also implies the effective use of environmental as well as human resources to grow a mix of crops with complementary marketing opportunities, and it entails shifting of resources from low value crops to high value crops. Due to globalization, crop diversification in agriculture is also a means to increase the total crop productivity in terms of quality, monetary and quantity value under specific, diverse agro-climatic situations all over the world. (Satyasai and Viswanathan, 1997, Thakur, 2010). Many economists advocate crop diversification as a tool of risk management. It is a strategy that involves doing more than one activity at any given time. It involves in mitigating price risks and production risks of falling output (Chaplin, 2000).

The process of diversification can be classified into horizontal and vertical diversification. Horizontal diversification is one of the most common phenomena in India. Through this approach the diversification takes place by adding more crops in the existing cropping system as a way to improve the overall productivity of a farm or region's farming economy, or a shift from subsistence farming to high value crops, whereas Vertical diversification stands for the addition of value in the existing cropping system through processing, packaging and branding or other efforts to enhance the product value (Jana, 2006 and Singh, Boukerrou and Miller, 2009).

Stages of Agriculture Diversification

- i. Process of diversification of agriculture may pass through four stages:
- ii. Shifting from monoculture to multiple cropping.
- iii. Starting more than one enterprise. (crops and animal husbandry),
- iv. Initiation of mixed farming and
- v. Incorporating the activities which are beyond the agricultural domain such as adding the value through the processing, packaging and producing by products e.g. jam, pickles etc. (Chaplin, 2000)

Although, the structural diversification is taking place in the Indian economy as a whole and within the agriculture in particular, but the pace is slower than other developing countries in the world. As the share of agriculture in Gross Domestic Product (GDP) is declining this means more and more resources are being diverted to non-agricultural sector especially the labour force. Within the sub-sector of agriculture gradually the share of output and employment in the non-crop sector, i.e., animal husbandry, forestry and fisheries though very small is gradually increasing. Thus the diversification within the agriculture sub-sector is taking place in terms of a move away from crop production to other agricultural activities. Within the crop sector, the area under commercial crops is increasing, while that under inferior cereals is decreasing (Vyas, 2006).

Need and Importance of Agriculture Diversification

The need of agriculture diversification is witnessed after the green revolution due to fluctuation in the price due to demand and supply equation under the WTO regulation for the market. In this case agriculture diversification proves to a good shock absorber in the ups and downs of the market value of the farm products may ensure economic stability for the farming families. (Singh, and Miller 2009). Agriculture diversification is necessary due to some factors, which are stated below (Planning & Coordination Department, Government of Orissa).

1. To mitigate the adverse food situation.
2. Ensure constant flow of income.
3. Employment generation.
4. Alleviate hunger and malnutrition.
5. Mitigate ill effects of unusual weather.
6. Increase the income of the small and marginal farmers.

Diversification of agriculture bears a number of advantages in terms of the individual farmers but these advantages are conditioned by a number of factors. In this case, if the large number of

farmers made similar changes, the price of that commodity or product will automatically decrease resulting in the high supply of that particular product. Accordingly same magnitude of diversification in agriculture practiced by very few people harness the highest level of profit but on the contrary practiced by the large number of people limits the profit ration in general (Grimes, 1929).

Determinants and Factors of Agriculture Diversification

As the physical and socio-economic factors are the most important in controlling the agricultural practices in any region, so the study of determinants of agriculture diversification enable us to know the dominating factors in a particular region who control the agriculture practice. Moreover, it helps us in knowing the contemporary competition among crops (Bhalsing, 2009). There are a number of factors determining the course of agricultural practices. Forces that drive agricultural diversification in a particular socio-economic set up may be different in another set up. (Jha, Tripathi and Mohanty, 2009). Broadly these factors may be categorised as: natural factors, institutional factors and public interventions

Natural Factors

Natural and physical factors including the soil, drainage, slope, rainfall, temperature, humidity etc. are the basic factors modifying the cropping pattern. Any effort to modify these natural and physical conditions in order to introduce a different cropping pattern may prove, in most of the circumstances, quite difficult and also economically non-viable. But the introduction of technology in some other circumstances can modify these conditions. Irrigation is one of the most important technological changes which have remarkable impact on the cropping pattern.

Institutional Factors

The most important factors which determine the diversification of agriculture is the market. Diversification in agriculture is the result of profit maximization, price response, etc. Equally important is the market infrastructure and institutional arrangements. Beside the market, there are two other set of factors regulating agriculture diversification

Public Interventions

Third set of factors include public interventions, which influence the nature of cropping pattern and extent of diversity, as the emphasis is given by the policy makers on food security by producing food grains within the country. As a result whole series of policy intervention (price, credit, research and development policy) were designed to favour the production of food grains to meet the needs of the country. But once the country reaches the “food security threshold” it loses its argument to remain growing more food grains.

Income stabilization is one of the major factors in south-east Asian countries to direct the public policies to encourage rapid diversification of the rural economies. But in the Indian context this factor is one of the several factors prompting us to accelerate the pace of diversification (Vyas, 2006). These are:

- i. To increase the income on the smallholdings
- ii. Generation of fuller employment in the farm households
- iii. Seasonal stabilization of farm income; and
- iv. Conservation and enhancement of natural resource.

Diversification in agriculture is determined by various macro and micro-ecological factors and is more justified in developing countries to reduce the costs on external inputs, avoid heavy mechanization, release the burdens of over production and cropping intensity in agriculturally advanced pockets or locations, raise stability, productivity and personal share of income in agriculturally backward and marginal areas. It emphasizes a judicious combination of some new technological innovations with the traditional wisdom or knowledge of ancient communities. Furthermore, it affects varying nature of risks, opportunities and feasibilities of enhanced socio-economic and agro-economic security.

Generally agriculture diversification is governed by two main forces which are demand/consumption factors and production/supply factors. Demand factors incorporate the growing population, rising per capita income, urbanization and trade liberalization leading to change in the consumption pattern from cereals to high value commodities. (Joshi, Gulati and Jr. Cummings, 2007)

Demand Side Factors

There are a number of socio-economic, cultural, environmental and geographical factors which influence the consumption pattern. In general, the areas facing the problem of land scarcity and high population, bovines are the main source of meat, coastal areas report higher consumption of fish, the consumption of fruits and vegetables in the flood prone areas are generally low, pork consumption in the Muslim dominating regions is negligible, while the beef consumption in the Hindu dominating countries was low. Beside these general factors, there are other drivers also such as income and urbanization which play an important role in shaping the consumption pattern. (Joshi, Gulati and Jr. Cummings, 2007)

Rising Income

Improvement in the per capita income is un-doubted an important determinant of changing consumption pattern (Rao, Joshi, Kumar and Ganguly, 2008). As income increases consumer's preference shifts from staple food items such as rice, wheat, and coarse cereals to high value food items like fruits, vegetables, dairy, poultry, meat, and fish products. The above changes in the consumption pattern encourage the farming community to diversify its production portfolio in favour of high value food items. The per capita (GDP) Gross Domestic Products in South Asia has increased by an annual rate of 3.4 per cent during 1990's as compared to 3.2 per cent during 1980's with this increase in the GDP. Both the poor and rich have shifted their consumption in the favour of non-cereals. (Joshi et.al. 2007; Joshi et.al. 2004; IFPRI, 2007)

Urbanization

Urbanization is another important factor of demand side that influences the consumption pattern. The rate of urbanization in South Asian countries is very high, rising from the 23.3 per cent in 1980's to 1990's in 2000. (Joshi et.al. 2007). Life style in the rural and urban areas is very much different so is their consumption pattern. Urban people consume higher quantity of (HVC) high value commodities and allocate higher budget than the rural people. (Joshi et.al. 2007; IFPRI, 2007). An analysis of higher income group from the Asian countries shows that urbanization has led to a significant decline in the consumption of cereals and a rise in the consumption of meat, fruits and vegetables. (Huang and Bouis 2001). The share of high value commodities in the total food expenditure in India has increased from 31 per cent in 1983 to 39 per cent in 1999-2000 in rural areas and from 42 per cent in 1983 to 50 per cent in 1999-2000 in the urban areas (Kumar and Mruthyunjaya 2002).

Impact of Agriculture Diversification

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 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 gives 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 result s in significantly 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 mechanise farming system now a 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

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 depend 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.

References

- Barghouti, S. Kane, S., and Sorby, K. and Ali, M. (2004), "Agricultural Diversification for the Poor, Agriculture and Rural Development", Discussion Paper, No.1, ARD Department, World Bank, Washington DC
- Barghouti, Shawki; Kane, Samuel and Sorby, Kristina (2007), "Poverty and Agricultural Diversification in Developing Countries," in Joshi, Gulati and Cummings Jr., (eds.), pp. 87-128.
- Bhalsing, R. R., (2009), Impact of Irrigation on Crop Diversification In: Ahmed Nagar District (Maharashtra) *Shodh, Samiksha aur Mulyankan, International Research Journal*, II (7)
- Chaplin, H., (2000), *Agriculture Diversification: A Review of Methodological Approaches and Empirical Evidences*, Work Package 4, Working Paper 2, Department of Agricultural Economics and Business Management, Wye College, university of London.
- Chand, Ramesh (1996), "Ecological and Economic Impact of Horticultural Development in the Himalayas: Evidence from Himachal Pradesh", *Economic and Political Weekly*, Vol. XXXI, No. 26, pp. A93-99.
- Delgado, C. L. and Siamwalla, A., (1999). *eRural Economy and Farm Income Diversification in Developing Countries in Food Security, Diversification and Resource Management: Refocusing the Role of Agriculture*, (ed.) G.H. Peters and Joachim Von Braun. Proceedings of Twenty-Third International Conference of Agricultural Economists, Ashgate Publishing Company, Brookfield, Vermont, USA, pp 126-43.
- Deogharia P.C. (2011), 'Employment of Agriculture Labour in Mechanised and Non Mechanical Farm' *Southern Economist*, Vol 50, No. 15
- Essays, U. K., (2013), Advantages and Disadvantages of Diversification in Agriculture Environmental Sciences Essay. Retrieved from [Ztp://www.ukessays.com/essays/environmental-sciences/advantages-and-disadvantages-of-diversification-in-agriculture-environmental-sciences-essay.php?cref=1](http://www.ukessays.com/essays/environmental-sciences/advantages-and-disadvantages-of-diversification-in-agriculture-environmental-sciences-essay.php?cref=1)

- Government of Orissa, Diversification of Agriculture Crops, Value Addition and Marketing, Planning & Coordination Department Government of Orissa, D. J. Research & Consultancy Pvt. Ltd. N 1/69, IRC Village, Nayapalli, Bhubaneswar-15, Orissa
- Goletti, F., (1999), Agricultural Diversification And Rural Industrialization As a Strategy For Rural Income Growth And Poverty Reduction In Indochina And Myanmar, MSS Discussion Paper No. 30, International Food Policy Research Institute, 2033 K Street N.W. Washington, D.C. 20006
- Grimes, W. E., (1929), Diversification of Agriculture-Its Limitations and Its Advantages, *Annals of the American Academy of Political and Social Science*, Vol. 142, pp. 216-221
- Hayami, Yujiro (1991), "Agricultural Diversification: A Historical Perspectives," in APO, Agricultural Diversification – Report of a Study Meetings, Tokyo, pp. 27 – 41.
- Hayami, Y., (1991), *Condition of Agricultural Diversification: A Historical Perspective*, in *Agricultural Diversification*, Report of a study meeting, 17-27, Tokyo, Japan: Asian Productivity Association, 1991
- Huang, J and Bouis, H., (2001), Structural Change in the Demand for Food in Asia: Empirical Evidences from Taiwan, *Agricultural Economics*, Vol. 26, No. 1, pp. 57-69
- Institute, IFPRI). Research Report no. 2. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics.
- International Food Policy Research Institute., (IFPRI), (2007), Agricultural Diversification towards High Value Commodities A Study in Food Surplus States in India with Focus on Andhra Pradesh and Punjab, International Food Policy Research Institute (IFPRI) New Delhi
- Jana, B. L., (2006), *Diversification in Agriculture*, Agro-tech Publishing Academy, Udaipur.
- Jha, B., Tripathi, A, and Mohanty, B., (2009), *Drivers of Agricultural Diversification in India, Haryana and the Greenbelt Farms of India*, Working Paper Series No. E/303, Institute of Economic Growth, Delhi
- Johnston, G. W., Joaquin, S., Vaupel, S., Kegel, F. R and Cadet, M., (1995), Crop and Farm Diversification Provide Social Benefits, *California Agriculture*, Vol. 49, No. 1, pp. 10-16.
- Joshi P. K., Gulati A and Jr. Cummings, R., (2007), *Agriculture Diversification in South Asia: Beyond Food Security*, in Joshi P.K., Gulati A and Jr. Ralph Cummings (eds.) pp 48 Agriculture Diversification and Smallholders in South Asia, Academic Foundation, New Delhi
- Joshi P. K., Gulati. A., Brithal. P. S. and Tewari. L., (2004), *Agriculture Diversification in South Asia: Patterns, Determinants and Policy Implications*, *Economic and Political Weekly*, Vol. 39, No. 24, pp. 2457-2467
- Joshi, P. K., Gulati, A.; Brithal, P. S. and Tewari, L. (2003), "Agricultural Diversification in South Asia, Pattern, Determinant and Policy Implications", MSSD Discussion Paper, No.57, IFPRI, Washington DC.
- Joshi, P. K. (2004), "Crop Diversification in India: Nature, Pattern and Drivers", Draft Report, NCAP, New Delhi.
- Joshi, P. K., Gulati, Ashok; Brithal, P. S. and Tewari, Laxmi (2004), "Agricultural Diversification in South Asia, Patterns, Determinants and Policy Implications", *Economic and Political Weekly*, Vol. XXXIX, No. 24, pp. 2457-67.
- Joshi, P. K., Gulati, Ashok; and Ralph Cummings Jr., (eds.) (2007), *Agricultural Diversification and Smallholders in South Asia*, Academic Foundation, New Delhi
- Kumar, P. and Mruthyunjaya., (2002), *Long Term Changes in Food Basket in India, Paper in the International, Workshop on Agriculture Diversification and Vertical Integration in South Asia*, Organised by FCCI-ICRISAT-IFPRI, 5-6 November, New Delhi, India

- Lone, R. A., (2013), Agricultural Diversification towards High Value Commodities In South Asia, *International Journal of Trade & Global Business Perspectives*, Vol. 2, No. 4, pp. 688-694
- Murthyunjaya and Chauhan, S. (2003), "Crop Diversification Indian Agriculture: Silent Revolution towards Agribusiness", *Agricultural Situation in India*, Vol. LX, No. 5, New Delhi.
- Panigrahi, Ramakrishna (1995), *Pattern of Agricultural Growth in India: A state level Analysis M'*. Phil Dissertation submitted to Jawaharlal Nehru University, New Delhi
- Papola, T. S. (1992), "Rural Non-Farm Employment: An Assessment of Recent Trends", *The Indian Journal of Labour Economics*, Vol. 35, No. 3
- Pingali, P. L. and Rosegrant, M. W., (1995), Agricultural Commercialization and Diversification: Process and Policies, *Food Policy*, Vol. 20, No. 3, pp. 171-186
- Raju, B. Y., (2005), *Commodity Study on Diversification of Indian Agriculture*, Occasional Paper-36, Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development, Mumbai
- Rao, P. P., BIRTHAL, P. S., JOSHI, P. K. and KAR, D., (2004), *Agricultural Diversification in India and Role of Urbanization*, MTID Discussion Paper No. 77, Markets, Trade and Institutions Division, International Food Policy Research Institute, Washington, D.C
- Rao, P. P., Joshi, P. K., Kumar, S and Ganguly, K., (2008), *Agricultural Diversification in Andhra Pradesh, India: Patterns, Determinants and Implications*, (Published jointly with the International Food Policy Research
- Rao, P. P. BIRTHAL, P. S. and JOSHI P. K. (2006), "Diversification towards High Value Agriculture: Role of Urbanization and Infrastructure", *Economic and Political Weekly*, Vol. XXXXI, No. 26, pp. 2457-67.
- Rosegrant, Mark W. and Binswanger, Hans (1994), "Market in Tradable Water Rights: Potential for Efficiency Gains in Developing Country Water Resource Allocation", *World Development*, Vol. 22, No. 11, pp. 1653 – 25.
- Satyasai, K. J. S. and Viswanathan, K. U., (1997), *Commercialisation and Diversification of Indian Agriculture*, Occasional Paper-5, National Bank for Agriculture and Rural Development, Mumbai
- Sharma, H. R. (2005), "Agricultural Development and Crop Diversification in Himachal Pradesh: Understanding the Patterns, Process, Determinants and Lessons", *Indian Journal of Agricultural Economics*, Vol. 60 No. 1, pp. 71-93
- Singh, A., (2011), Diversification in agriculture, Retrieved from <http://www.eoearth.org/view/article/151757>
- Singh, A., Boukerrou, L and Miller, M., (2009), Diversification in Agriculture, in: *Encyclopedia of Earth*, (Eds.) Cutler J. Cleveland, Washington D.C. (www.eoearth.org/article/Diversification_in_agriculture)
- Singh, J., (2006), *Agricultural Geography*, Tata McGraw-Hill, New Delhi
- Thakur, R. N., (2010), *Nature and Pattern of Agriculture Diversification in Bihar and Eastern India*, in Roy, P.K. and Sharma S.P., (eds), *Globalization and Agricultural Diversification of India*, Regal Publications, New Delhi.
- Von Braun, J., (1995), Agricultural Commercialization: Impacts on Income and Nutrition and Implications for Policy, *Food Policy*, Vol. 20, No. 3, pp. 187-202.
- Vyas, V. S. (1996), Diversification in Agriculture: Concept, Rationale and Approaches, *Indian Journal of Agricultural Economics*, Vol. 51, No. 4.
- Vyas, V. S. (1996), "Diversification in Agriculture: Concept, Rationale and Approaches", *Indian Journal of Agricultural Economics*, Vol. 51, No. 4, pp. 636 – 43
- Vyas, V. S. (2006), *Diversification in Agriculture: Concept, Rationale and Approaches*, in Mujumdar,

-
- N. A. and Kapila, U., (eds.), *Indian Agriculture in the New Millennium*, Academic Foundation, New Delhi, Vol. 1, pp. 245-25
- Weiss, C. R. and Briglauer, W., (2000), *Determinants and Dynamics of Farm Diversification*, Working paper EWP 0002, Department of Food Economics and Consumption Studies, University of Keil
- World Bank, (1988), "Diversification in Rural Asia, Working Paper Series, No. 98, Agriculture and Rural Development Department, The World Bank, Washington DC
- World Bank, (1990), *Agricultural Diversification Policies and Issues from East Asian Experiences*, Policy and Research Series 11, Agricultural and Rural Development Department, World Bank, Washington DC, USA.