

Crop Diversification: A Path towards Sustainability in Agriculture

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Abstract

The present paper is titled, “crop diversification: a path towards sustainability in agriculture”, and so in order to do justice to what the title demands, the paper begins with an elaboration on the importance of the growth of the agricultural sector and the potential factors that could trigger growth. However achieving sustainability of this growth becomes an issue, given the pressures on the resources, particularly the degrading soil and water resources. Thus, the aim of this paper is to highlight the importance of crop diversification, and as such tried to substantiate from different literatures that a diversification towards high value crops could in fact be an answer to the question of sustainability.

Introduction:

One of the basic drivers of economic growth and its sustenance for most agrarian economies is the sustained growth of the agricultural sector. Most Asian countries had predominantly started as agrarian economies, whose economies were substantially influenced by the growth of the agricultural sector and which accounted for the largest share of Gross Domestic Product, employment and export earnings.¹ Their economic transformations were largely fostered by the dynamic and rapidly growing agriculture. It was said that agricultural growth had contributed in ways like raising the living standards of the people, increasing domestic demands for non-agricultural goods and services, providing low cost labour for the non-farm sectors, providing more diversified income sources for the rural households, etc.² Besides all these, the indication of a dominating share of agriculture in an economy's GDP and employment would obviously make it crucial and necessary to develop its major sector in order to

maintain the economy's health. Maintaining a consistent agricultural growth rate, providing food security, contributing to the overall development scenario and participating in the global trade could be among the major expectations from the sector.³ With the appropriate technology, effective policies and the right dosages of investments, the sector can absorb a large number of labour, generate income and output sufficient enough to enable even a famine infested economy, to take off into a self-sufficient, exporting economy. This can be asserted with confidence when one looks back into the Indian experience in the mid-sixties when meeting the famine conditions was a major issue. The technology package including High Yielding Varieties (HYV) seeds, fertilizers, improved irrigation and plant protection chemicals, supported by a well organized extension service, agricultural price policy in terms of support price and availability of credit had helped India to get itself elevated into a world of self-sufficiency in food grains. However, sustainability in terms of the growth of agriculture

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as well as the resources had always been a question of doubt.

Most of the growth in agricultural output had been triggered either by expansion of cultivated area, or improvement in productivity per unit area, or by cropping pattern shifts⁴. “After independence, Indian agriculture had gone through three phases of growth- area based growth up to the late sixties; yield based growth in the Green Revolution areas and crops beyond those which experienced growth during the second phase.”⁵ The implication here is that, the sources of growth in agriculture can either be from public policy related factors (like irrigation, technology, etc.) or by shifting the cropping pattern from low value crops to high value crops. Input (irrigation, HYV, etc.) driven growth in the post Green Revolution period might have shown a positive picture initially, but the sustainability of this growth can be doubtful with the severe and increasing negative impacts on resources, particularly the degrading soil and water resources. The failure to maintain a sustained growth rate after the Green Revolution period may be attributed as a failure of the public policies. Therefore, it can be said here that, in order to promote sustainable agricultural growth, a regionally differentiated strategy based on agro-climatic conditions and land and water resource availability is needed.⁶ A strategy could be to advocate diversifying the cropping pattern in the cultivation of high value crops. A diversification towards high value crops would obviously usher in the idea of markets playing an important role both in the generation of demand as well as in acting as incentives for the producing agents, farmers. With the assumption that the demand (markets) exists, the sustainability of the agricultural growth is expected to depend on the working of the supply side factors (irrigation, technology, HYV seeds, cropping patterns etc.). However, from the previous discussion, it is seen that the public policy factors (like irrigation, technology, HYV etc.) seem to have failed to fully

achieve the objective of sustaining the sector’s growth. This is where the concept of diversifying the cropping pattern can be introduced as a potential solution to the issue of sustenance. Moreover, as economies grow, it is said that there is a gradual movement from subsistence food-crop production to a diversified market-oriented production system. Initial diversification would imply addition of other crops and other enterprises to the farm household, but as market orientation increases, diversification at the agricultural sector level is created by household level specialization. The shift at the household level is from traditional self-sufficiency objective to profit and income oriented decision making, thereby increasing the farm output responsiveness to market demands.⁷ Many researchers have been trying to analyze the various issues and situations in the agricultural sector. An important topic in this context, which had surfaced in recent times, is that of diversifying the agricultural sector. Diversification in any form has its own share of importance and advantages. As mentioned by G.K. Chadha et. al. that under specific circumstances, diversification has positive impacts both on income and employment.⁸ There have been studies conducted on crop diversification in terms of its potentialities for risks minimization, sustenance of agriculture, farm income generation, profit maximization, sustenance of depleting resources etc. However, in most cases, crop diversification in its complete form may not be successful due to topographical, climatic and other related factors. In spite of the various hindrances, studies also show that most of the Indian states have absorbed diversification in the cropping pattern in some way or the other. Most of the researchers have basically professed that crop diversification is a shift from traditional low yielding crops to high yielding crops. This transition may lead to commercialization of agriculture in a region if facilitated by the following strategies: investments in rural infrastructure to

facilitate integration of markets, investments in crop improvement research, establishment of secured property rights, liberalization of domestic markets and financial markets.⁹

What is diversification?

The term diversification could have multiple interpretations depending on the context it is being used. According to The Compact Oxford Reference Dictionary, Diversification is defined as ‘becoming more varied or expansion in its range of products or field of operation’.¹⁰ The economic interpretation of the concept also has a similar meaning. To quote from the Oxford Dictionary of Economics, diversification has been defined as, “A spread of the activities of a firm or a country between different types of products or different markets. Practically all firms are diversified to some extent: the truly single product firm is highly exceptional, and even it may supply various markets. Even very small shops usually sell a range of products. The advantage of diversified markets is that a firm or country will be less risky, as its markets are unlikely all to slump at the same time. A disadvantage of diversification is that every product and every market demands slightly different expertise; too wide a range may overstrain the capacity of management, leading to expensive mistakes when managers operate outside their area of competence.”¹¹

Crop diversification

In the midst of a doubtful juncture of sustainability in terms of the economic growth in general and the growth of the agricultural sector as well as the natural resources in particular, the issue would be to devise a suitable measure to the problem. The presentations by Mruthyunjaya and Sonia Chauhan indicate that ‘studies and experiences around the world prove that crop diversification promotes sustainable economic growth of a

country’.¹² Their statement is supported with a number of findings by different authors, which are summarized in the same paper. To mention a few, the studies by Mellor (1997), Austien (1981), Desai, Gupta and Namboodiri (1991) found the potentiality of high value crops in improving agricultural growth rates. Here, a diversification towards high value crops can be seen to be advantageous. A probable contender for the issue could be to introduce the concept of diversification.

Crop Diversification, in a broader sense, could be defined in two ways. Firstly, a traditional based diversification could be a type wherein farmers diversify their cropping pattern for self-consumption. In other words, a farmer would cultivate different crops with the objective of meeting his basic food requirements and thereby, the sale of any surplus crops would be a secondary objective. This may also be termed as what can be called a subsistence-led diversification. Secondly, what may be said to be a more modern diversification would be one, which is influenced by the modern day technologies, policies, inputs etc. The primary motive for such diversification would actually be to direct its outputs toward markets. Here, farmers may engage themselves in the cultivation of a number of crops so as to minimize the risk related to a failure of a particular crop or they would do so to increase the farm income, maximize profits etc. However, there could also be situations where the overall picture at the macro level may appear to be diversified; whereas, a more detailed study at the grass root level might present cases of specialization. In other words, there could be crop concentration in terms of particular regions, whereas at the aggregate level, the picture depicted could be that of a diversified cropping pattern. It can be mentioned here that the cropping pattern of a country is built upon the separate cropping patterns practiced by individual farmers, or groups of farmers within each village, district and state.¹³ This might show that care need to be taken while

defining the concept so that misinterpretations are avoided.

In addition, to cite from the study by G.K. Chadha et. al.¹⁴, crop diversification is said to be adopted so as to achieve two objectives. One is to maximize profits and secondly to minimize risk. Moreover, diversification can also be discussed at two levels viz. micro and macro levels. At the micro level diversification may be discussed in terms of individual farmers diversifying their cropping pattern, whereas a discussion at the macro level would imply diversification for the whole economy. Some findings on crop diversification by previous researchers are discussed in the present paper with the objective to throw some light on the relevance and suitability of diversification in the context of modern day agriculture.

Diversification and sustainability:

The article by D.M. Hedge et. al. talks about the major challenges facing the Indian agriculture particularly in terms of the sustainable development of the sector. They suggest crop diversification as a measure in meeting the challenges and sustaining the agricultural sector. It is advocated that crop diversification is a strategy for profit maximization, risk minimization, farm income stabilization and an important tool for economic growth in India.¹⁵ They also point out certain important functions of crop diversification. They maintain that crop diversification helps in promoting/encouraging the conversion of non-granary areas so that the yield is improved via planting cash crops, revive idle land, develop potential areas and devise new methods to allow quick yield. Moreover, in their same paper crop diversification is approached in two ways, horizontal and vertical approaches. The horizontal concept is the addition of more crops to the existing cropping systems, thus broadening the base of the system itself. This approach is said to hold special significance for small holders and has increased production due to high cropping intensities. On the

other hand, the vertical approach to crop diversification reflects the extend and the stage of industrialization of crops with practicing of enterprises such as agro-forestry, dry land horticulture, medicinal and aromatic plants, other economic shrubs and livestock. Here the authors draw a line between crop diversification and multiple cropping in the sense that the former concept considers economic returns from different crops. The extent of the crop diversification is said to depend on 'opportunities for diversification and the responsiveness of farmers to these opportunities. Markets, roads and technology absorption in the region are the key factors determining the status and speed of crop diversification'.¹⁶

C. R. Hazra¹⁷ and some other writers¹⁸ in their articles had defined crop diversification in the Indian context as a shift from traditionally grown less profitable crop(s) to more profitable crop(s). The shift can be from food grains to non-food grains or from crops to non-crops like horticulture, sericulture, forestry, fishery etc. Crop diversification is also mentioned to be intended for a sustainable agriculture, efficient resource use, risk reduction in dry areas and with liberalization of markets, to offer opportunities to farmers. C.R. Hazra, in his study on crop diversification in Indian agriculture, has listed a series of suggestive findings, some of which are worth mentioning. Firstly, changes in cropping pattern in favour of non-food crops are often suggested as a means of rapid employment generation in India. Secondly, the crop pattern changes have occurred mainly from crops with declining demand and lower value addition potential to crops with an increasing demand and higher value addition potential. Thirdly, infrastructural components such as modern processing and cold storage that can support oilseeds, fruits and vegetables and other horticultural crops deserve top priority.¹⁹ His study indicates the success stories of diversification towards oilseeds (soyabean) and

horticultural crops (vegetables and fruits) in various parts of India during the last one and a half decade.²⁰

J. Rajeshwar Rao talks about the importance of crop diversification in the attainment of a number of agriculture related objectives. He gives a set of justifying arguments for diversification. These are in terms of sustainability of natural resources, ecological balance, output growth, employment generation and risk coverage.²¹ Diversification is also defined by the author as, “adoption of farming system, involving shift in cropping pattern from traditionally grown remunerative crops to more remunerative crops like oilseeds, pulses, fodder crops, horticulture, medicinal and aromatic plants, floriculture, etc. including land based activities like livestock and fishery.”²² His findings indicate that a ‘silent diversification’ had been going on in the past which was not properly designed and focused. Thus, the author concludes that a growing and diversified agriculture stands vital and important to India’s development.

In another paper by P. Parthasarathy Rao *et. Al.* diversification has been defined in terms of the value shares of major crops and livestock products in the gross value of agricultural output.²³ The study found out that intensive high value agriculture is practiced in regions with high rainfall and low irrigation. In these regions, the adoptions of HYV cereals were also low. However, infrastructural facilities were found to be better. It is also mentioned here that production of fruits and vegetables are concentrated in the northern, eastern and north-eastern parts of the country.²⁴ The authors profess that diversification towards high value agriculture would generate better returns, increase land productivity, and per capita value of output. Their findings imply that high value agriculture is likely to emerge as an important source of agricultural growth.²⁵

W.E. Grimes in his article on ‘Diversification of Agriculture—its Limitations and its Advantages’, says that diversification results in lower production

costs and more stable and usually larger annual farm income.²⁶ He illustrates that farmers are attracted by the high prices of certain goods, as such; they start to diversify their agricultural operations towards those goods and thereby increasing the production of those goods. However, he maintains that the value of those goods rarely continue to remain high as the increased output pulls down the prices and ultimately their returns. Thus, profits from the high valued goods could no longer be produced under usual conditions.²⁷ Such type of Diversification is said to give disastrous results and thereof, price forecasting and the information being made available to the farmers is expected to produce more beneficial results. He further illustrates from the American experience of diversification which have led American farmers to earn higher incomes under reduced costs. Every region is said to have comparative advantage in some farm product or the other. Such products are identified and the farmers of the particular region put that product to as much acreage as they can manage and additionally operate supplementary enterprises on the farm so as to use their time, labour and resources when not required in the main product. This kind of farming process is said to have increased the farm incomes and minimized the cost. A paper by Raju Mandal notes that, “Diversification of crops may take place either by a change in the proportion of area under each crop or a change in the value-wise contribution of each crop to total agricultural production.”²⁸ He further adds that the gradual changes in the consumption pattern within the country as well as abroad are a clear indication that the policy focus needs to be reoriented towards diversifying the cropping pattern to meet the emerging market needs. Moreover, for a more competitive farm sector as well as the economy competitive and high quality products are said to be important. At the same time, “diversification into not only crops but also seasons may provide a boost to agricultural production and

its stability to a great extent.”²⁹ His study shows that irrigation and agricultural work force have positive and significant impacts on the growth of crop diversification.

Partially substantiating the above discussion, an empirical presentation of some findings in a paper titled, “Socio Economic Factors in agricultural

Diversification in India”, ascertains certain relationship between diversification and the growth rate in NSDP agriculture of various states in India. The authors had revealed that the degree of crop diversification experienced across various states showed significant association with the growth rate of the agriculture sector.³⁰ The table below gives a picture of this claim:

State	Triennium Ending (TE) 1968-69 to 1982-83		TE 1982-83 to TE 1998-99	
	Diversification percent	Annual growth rate in NSDP agri. (%)	Diversification percent	Annual growth rate in NSDP agri. (%)
Andhra Pradesh	8.37	2.24	14.09	3.09
Assam	7.62	2.44	5.55	2.25
Bihar	8.72	0.56	4.62	-1.31
Gujarat	9.23	3.75	10.40	1.86
Haryana	18.53	2.97	19.49	4.60
Himachal Pradesh	6.66	2.31	4.02	2.63
Kerala	4.67	0.03	11.52	5.05
Maharashtra	5.20	-0.42	9.63	5.72
Orissa	8.13	1.16	6.55	-1.54
Punjab	26.02	3.86	12.23	4.35
Tamil Nadu	7.49	-1.28	7.71	4.07
All India	7.37	1.92	7.65	3.22

Table 1 : Extent of Agricultural Diversification and output growth over time in major states.

Source: Chand, Ramesh & Sonia Chauhan, “Socio Economic Factors in agricultural Diversification in India”, *Agricultural Situation in India*, vol. LVIII, February, 2002, No. 11, table-1, p 52

From the above presentation, it is clear that the extent of diversification were quite high in the states of Punjab, Haryana and Uttar Pradesh. In the first Triennium Ending period (1968-69 to 1982-83) it can be seen that Punjab had the highest percentage of diversification (26.02%) as well as the highest annual growth in NSDP agriculture (3.86%). Haryana is placed at second in terms of level of diversification (18.53%) and third in terms of growth (2.97%). In the same period, Maharashtra is among

the states with the minimum percentage of diversification and had also recorded a negative growth in NSDP agriculture. These evidences show that in most cases diversification and growth of agriculture are both seen to be moving in the same direction. Thus, one major finding of their paper is that, among other factors, diversification of crop pattern is a significant factor influencing the growth of agriculture.

Diversification in the local context: Some concluding remarks

In the context of North-East, it has been cited that the region offers tremendous scope for the cultivation of a wide variety of fruits and vegetables (high yielding crops) due to the diversities in topography, altitude and climatic conditions.³¹ Furthermore, in the same study it was also pointed out that Nagaland displayed higher potentials in the productivity of fruits and vegetables than the national average.³² With a display of such high calibre in the cultivation of high value crops and given the vast array of advantages of diversification, it would be worth remarking here that the region's agricultural sector could do well in not just elevating its regional output but has the potential to enormously contribute to the country's national output as well. Overcoming certain region specific agriculture related issues such as the existence of large numbers of small farmers, low capital formation, dominance of food crops in the cropping pattern, depleting land resources, stagnant agricultural growth rates etc. could be a hurdle but not unconquerable.

In a study by G. K. Chadha et. al. it is revealed that Nagaland have shown an increased diversification between the time period 1969-72 and 1995-97.³³ In the same, it is pointed out that other cereals have gained position in terms of ranking in Nagaland and they presume it to be the result of a risk management strategy. The study however, points out a gap, in the sense that, it remains to be seen as to how far, less developed states like Tripura, Meghalaya and Nagaland can sustain diversification into high risk, high value items such as fruits.³⁴ This brings in an issue of concern, recapitulating from what Pramod Kumar & P.S. Badal have cited earlier regarding the potentiality of Nagaland in terms of the productivity of fruits and vegetables. With the state showing signs of diversification along with potentialities in the cultivation of high value crops, it becomes necessary and imperative to

study the nature and pattern of cropping pattern and the extent of crop diversification in the state, given the advantages and capabilities of diversification. Moreover, unlike the rest of the country, the state has its uniqueness in the distribution and holdings of land resource which makes it even more interesting. The uneventful impact of the post-Green Revolution technologies on a region which has topographical advantage towards cultivation of high value crops tempts one to take a deeper look at the actual situation in the field. No doubt, the majority of the agriculturalists in the state are still clinging on to the age old traditional methods of cultivation which at the most gives them subsistence returns. Thus, from what W.E. Grimes had mentioned, the topographical advantage could be capitalized here by identifying those particular farm products that the region has comparative advantage over the rest of the country and diversify its agriculture towards cultivation of those crops. Moreover, diversifying not just in terms of crops but seasonal diversification could yet be another path to sustain its agricultural sector, its natural resources, and in promoting the overall economic performance.

A picture of the cropping pattern in North East India can be seen in the following data extracted from the paper titled "*Agricultural Diversification in North Eastern Region of India: Implications for growth and equity*".³⁵

In the period of study shown by the authors, the shares of cereals, oilseeds and pulses had all experienced a decline while fruits and vegetables are shown as the items with the majority of share all throughout. What can be understood from the table 2 given below is that the contribution from high value crops to agricultural growth in the region had been maximum during the time period that had been observed. This only reaffirms the claims that the north east region has congenial agro-climatic conditions for growing a number of high-value crops and has the potential to emerge as an important

Commodities	Share in value of output			Annual growth		Share in growth	
	TE 1982-83	TE 1992-93	TE 2002- 03	1980-81 to 1991- 92	1992-93 to 2002- 03	1980-81 to 1991- 92	1992- 93 to 2002- 03
Cereals	39.3	37.7	33.4	1.9	2.0	31.6	23.3
Pulses	1.3	1.6	1.5	4.8	2.3	2.7	1.4
Oilseeds	3.0	4.0	3.5	6.5	1.9	7.7	2.1
Fibers	2.0	1.4	0.8	-2.3	-2.4	-1.0	-0.4
Sugarcane	3.5	1.8	0.9	-3.9	-4.6	-3.3	-1.7
Fruits and vegetables	25.9	29.4	35.0	4.0	5.1	40.0	49.0
Condiments and spices	8.2	9.1	10.4	4.6	4.8	12.5	13.4
Drugs and narcotic	11.5	10.9	11.3	2.2	2.8	9.7	11.8
Other crop and by products	5.5	4.1	2.4	-0.03	1.6	0.0	1.2
Total	100.0	100.0	100.0	2.6	3.2	100.0	100.0

TABLE 2 : Share of High value crops in agriculture output and growth in NER.

Source: P.S BIRTHAL et.al. , "Agricultural Diversification in North Eastern Region of India: Implications for Growth and Equity". *Indian Journal of agricultural Economics*, Vol. 61, July-Sept. 2006, No. 3, table 2, p. 332.

centre for high value agricultural products. Diversifying towards high value crops is something which the region had almost embarked upon and this can be accelerated if certain impediments namely, infrastructure for production, marketing and processing, roads and transportation, etc.³⁵ could be overhauled.

The situation of the agricultural sector in Nagaland also looks promising when we look at some of the most recent initiatives declared by the state government. The project highlighted by the former Chief Minister of Nagaland, Dr. Shurhozelie Liezietsu in his first Budget presentation³⁶ comes with the title, "Fostering Climate Smart Highland Agriculture in Rural Areas of Nagaland". This is an externally aided project to be funded by the International Fund for Agriculture Development

(IFAD) with an approximated amount of Rs. 237.83 crores and is intended to cover 8 districts of the state. The interesting features of this project are that it would target 1.3 lakh rural households, focusing on improving the Jhum areas and developing value chains. In addition, the project would focus on restoration of ecological balance through fusion of modern technologies with the vast traditional knowledge base. Another such foreign aided project, as mentioned in the same presentation, is said to be funded by the Japan International Cooperation Agency (JICA). The objective of this one would be towards improving the forest ecosystem and promoting rural income through rehabilitation of Jhum areas and providing livelihood support in a project area covering over 79,000 hectares. Thus, with such and many other

initiatives, it only remains to be seen how far, the people in general and the farmers in particular are responsive to and receptive of the various opportunities that are brought to their doorsteps.

End Notes

- ¹ (a) Rao, J. Rajeshwar. "Crop Diversification in India: Policies, Programmes and Perspectives," *Agricultural Situation in India, Vol. LX*, August 2003, No.5. p.307
- (b) Grant, Rose, Mark. W. & Hazell, Peter B. R; "*Transforming the rural Asian economy: The unfinished Revolution*," Oxford Univ. Press, Hong Kong, 2000. p. 18
- ² Ibid, Pp. 19 & 20.
- ³ Hazra, C.R. "Crop Diversification of Agriculture in India," *Agricultural Situation in India*, August 2003, volume LX no.5, p. 281
- ⁴ Basu, Kaushik (ed.), A. Vaidyanathan "Performance of Indian agriculture since independence", *Agrarian Questions*, Oxford University press, New Delhi, 2000, Pp. 23, 24.
- ⁵ Rao, V.M. "Rainfed Agriculture," *State of the Indian Farmer- A millennium Study, Vol. 10*, Academic Foundation & Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India, New Delhi, 2004, p. 31.
- ⁶ The World Bank, "*India: Re-energizing the agricultural sector to sustain Growth and reduce poverty*," Oxford University press, New Delhi, 2005, p.4.
- ⁷ Op. cit. fn. No. 1.(b) p. 64
- ⁸ G.K. Chadha et. al. "Land Resources," *State of the Indian Farmer- A millennium study, Volume 2*, Academic Foundation, New Delhi, 2004, p. 150.
- ⁹ Op.cit. fn. No. 1 (b), Pp. 66 – 79.
- ¹⁰ Soanes, Catherine (ed.), "*The Compact Oxford Reference Dictionary*," Oxford University Press, New York, 2001, p. 240.
- ¹¹ Black, John (ed.), "*Oxford Dictionary of Economics*," Oxford University Press, New Delhi, 2004, p. 126
- ¹² Mruthyunjaya and Sonia Chauhan, "Crop diversification in Indian Agriculture: Silent revolution Revolution towards Agribusiness," *Agricultural Situation in India; vol. LX*, August 2003 No.5, p. 289
- ¹³ Kumar, Praduman and Surabhi Mittal, "Crop Diversification in India: Analysis by state and Farm size group," *Agricultural Situation in India, Vol. LX*, Aug. 2003, No. 5, p. 273.
- ¹⁴ Op. cit. fn. No. 8. p. 151
- ¹⁵ Ibid p. 255
- ¹⁶ Ibid p. 260
- ¹⁷ Op. cit. fn. No. 3, p. 283.
- ¹⁸ Op. cit. f.n no.12. p. 289.
- ¹⁹ Op.cit. fn 3 p. 286

- ²⁰ Ibid p. 283
- ²¹ Op. cit. fn. 1(a), p. 307
- ²² Ibid Pp. 315-316.
- ²³ Rao, P. Parthasarathy et. Al. “Diversification towards High Value Agriculture-Role of Urbanization and Infrastructure,” *Economic and Political Weekly*, June 30, 2006, p. 2747.
- ²⁴ Ibid p. 2749
- ²⁵ Ibid p. 2753
- ²⁶ Grimes,W.E. “Diversification of agriculture- its limitations and its advantages,” *Annals of the American Academy of Political and social science, Vol.142*, Farm Relief, Sage Publications, March 1929, p. 221.
- ²⁷ Ibid Pp. 216-217
- ²⁸ Mandal,Raju. “*Factors behind the Extent of Crop Diversification in the Plains of Assam: A Spatial Analysis*,” Unpublished paper presented in the 44th Annual Conference of The Indian Econometrics Society, University of Hyderabad, Jan. 2008. p. 3.
- ²⁹ Ibid p. 2
- ³⁰ Chand, Ramesh & Sonia Chauhan, “Socio Economic Factors in agricultural Diversification in India”, *Agricultural Situation in India*, vol. LVIII, February, 2002, No. 11, Pp. 52-53.
- ³¹ Kumar, Pramod & P.S. Badal, “Growth and instability of Horticultural crops in North-Eastern India,” *Agricultural Situation in India, Vol. LXI*, Oct. 2004, No. 7, p. 449.
- ³² Ibid Pp 449-450.
- ³³ Op. cit. fn. No. 8, p. 153, see table 4.1.
- ³⁴ Ibid. p.158.
- ³⁵ Birthal, P.S. et. Al. “Agricultural Diversification in North Eastern Region of India: Implications for Growth and Equity”, *Indian Journal of Agricultural Economics*, Vol. 61, July-Sept. 2006, No. 3, Pp.328-339.
- ³⁶ Ibid Pp. 338-339.
- ³⁷ Government of Nagaland, “*Budget Speech of Dr. Shurhodelie Liezietsu, Chief Minister (Minister in-charge, Finance for 2017-18)*,” Kohima, 28th March 2017, Pp. 6-7

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