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LEVELS OF AGRICULTURAL DEVELOPMENT AND STATUS OF AGRICULTURE IN TERMS OF CROPPING PATTERN AND PRODUCTION OF VARIOUS CROPS IN J&K.

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INTRODUCTION

Jammu and Kashmir is a hilly state having a varied topography with a large diversity in terms of culture, social and economic practices of its different regions (Jammu, Kashmir and Ladakh). Despite the structural changes taking place both at national and state level, agriculture has been the top priority at both the levels as this sector plays a strategic role in the process of economic development of Jammu and Kashmir and India, and on an average 70% of the population are still getting livelihood and employ ability from this sector coupled with its allied sectors as this sector contributes around 27% of the states income. Presently agriculture sector is contributing 13.7% of the GDP at national level and at state level it is contributing around 21.09%.

The state Jammu and Kashmir is fundamentally divided into three divisions namely as Jammu division, Kashmir division and Ladakh division having their own and distinct geographical outlook for their respective agro climatic zones which in turn determine their cropping pattern and productivity of crops. Jammu and Kashmir is well known for its Paddy crop followed by maize, oilseeds pulses, vegetables fodder and wheat where as in Jammu region the most eatable and produced crop is wheat which is followed by maize, paddy, pulses, oilseeds etc where as barley is the major cereal crop followed by wheat in Ladakh. Jammu and Kashmir has also got the monopoly in terms of Saffron crop(famous all over the world due to its quality) which is being produced in the district Pulwama 15KM away from Srinagar. At the same time Basmati Rice is being produced in R.S. Pura of Jammu division and Rajmesh of Bederwah, Kishtiwar constitute the economic significance of the state which are functioning under the various departmental interventions in quality improvement, productivity enhancement, marketing etc. The growth rate in respect to agriculture and allied sectors for the 12th five year plan

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has been targeted to be around 2.99% and as per the advances estimates growth rate for the financial year 2014-15 has been projected to be around 3.84% but at the same time the growth rate in the sector, particularly in the crop sub sector is on a decline as the percentage of deficit is continue on a high, to meet the requirements of the growing population which has resulted in the import of these gaps from the central pool.

LITERATURE REVIEW

For the realization of the topic of research, relevant information in the international scientific arena was collected through studies of diverse literature from text books/literature, international scientific journals, environmental progress report from different agencies, Internet websites, reports by governmental agencies, substantial knowledge was gathered and a review of what other scientist have written on issues concurring with the research topic is made. A last literature review was then undertaken to gather information on the research in the field of agriculture in different area.

The experiences of developed countries show that transfer of labour force from agriculture to non-agriculture, in particular the manufacturing sector took place. This had brought enhanced productivity growth in agriculture and hence higher income. However, India's manufacturing sector witnessed volatile growth and its share in GDP has almost remained constant at 15 per cent for the last three decades. Further, given the fact that the current economic growth pattern is driven by the service sector, labour absorption outside agriculture will be slow until rural education improves dramatically in the near future. Under these circumstances, higher growth in agriculture assumes great importance and is a matter of concern for policy planners and research scholars in recent times (Chand et al., 2007; Balakrishnan et al., 2008; Bhalla and Singh, 2009; Reddy and Mishra, 2009; Vaidyanathan, 2010).

Sustained agricultural growth, which is facilitated through constant policy and institutional support has the potential to augment growth in the rural economy and associated secondary activities like food processing and retail trading. However, agriculture-led rural industrialisation has not received due attention from policy makers in the country notwithstanding the fact that maintaining the growth of agricultural per se was lost sight of during the 1990s (Sen, 1992; Bhalla and Singh, 2001; Rao, 2003; Bhalla and Singh, 2009).

In fact, the growth performance of agriculture at the national level was splendid during the 1980s and its deceleration during the 1990s was attributed to the reduction in and/or stagnation of public expenditure on

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agricultural infrastructure , defunct extension services and biased economic reforms (Thamarajakshi, 1999; Balakrishnan, 2000; Hirashima, 2000; Mahendradev, 2000; Vyas, 2001; Rao, 2003).

However, there has been a renewed policy thrust from the government since mid 2000s to revive agricultural growth through various development programmes such as interest subvention on crop loans, the National Food Security Mission, the National Agriculture Development Programme (Rashtriya Krishi Vikas Yojana) and the Pulses Development Programme. These programmes are likely to affect agricultural growth and farmers' income in the country by providing greater flexibility to the state governments to allocate resources to the priority areas of development. Aside, patterns and trends in India's agricultural growth is a well-researched subject. Systematic efforts were made to analyse growth in crop output and its elements through decomposition analysis (Minhas and Vaidyanathan, 1965; Sagar, 1977; Sagar, 1980; Sarma and Subrahmanyam, 1984; Majumdar and Basu, 2005, Joshi et al., 2006).

Historical aspects of agricultural growth, disparity and impact on farmers' income and employment have been studied by several scholars. Some recent studies include those of Sawant and Achuthan (1995), Rao (1998), Bhalla and Singh (2001), Radhadrishna (2002), Bhalla and Singh (2009) and Vaidyanathan (2010). Some studies also looked at the effect of agricultural technology on growth of crop output and its instability (Cummings and Ray, 1969; Hazell, 1982; Ray, 1983; Mahendradev, 1987; Deshpande, 1988; Vaidyanathan, 1992; Chand and Raju, 2009). The present study contributes to the existing knowledge base on Indian agriculture in a way that it estimates the crop output growth model through econometric method. The study also discusses the trends and patterns in agricultural growth at the state levels.

OBJECTIVES OF THE STUDY:

- To study the development of agriculture in the state of Jammu and Kashmir.
- To find out the present status of Agriculture in terms of cropping pattern and production of various crops in Jammu and Kashmir.

RESEARCH METHODOLOGY

Looking at the nature of the objectives the present study is based on the secondary data which has been collected from annual publications of various Economic surveys of Jammu and Kashmir and National bulletins. The time series data was collected through Directorate of Economics and Statistics government of Jammu and Kashmir,

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Agriculture Department of Jammu and Kashmir (Kashmir Division and Jammu Division Separately). To collect the data regarding the cropping pattern/production in Jammu and Kashmir various annual economic surveys from 2011 to 2015 were brought under consideration.

employed various statistical tools like mean, standard deviation and coefficient of variation to find out the variability in the data under various agriculture crops in terms of area and production. Apart from this we have collected information from various reputed journals both at national and international level, books, Mechanizes etc.

$$\sigma = \sqrt{\frac{\sum x^2}{N}} \quad \sigma_{10} = \sqrt{(N_1 \sigma_{12} + N_2 \sigma_{22} + N_1 d_{12} + N_2 d_{22}) / (N_1 + N_2)}$$

$$\sigma_{12} = \text{Combined standard deviation}, d_1 = [X_1 - X_{10}] [d_2 = X_2 - X_1^2], C.V = \frac{\sigma}{x} \times 100$$

Where σ_{10} = combined standard equation ,

$$\text{Growth rate} = Y_c - Y_b / Y_b * 100$$

Where

Y_c = value of variable in current year, Y_b = value of variable in base year

RESULTS AND DISCUSSION

Agriculture in recent years has emerged as an important sector and growing sub-sector of the Jammu and Kashmir. The State is famous for its Agricultural produce both in India as well as abroad. The State offers a wide range of choice to the farmers for the cultivation of various chief crops such as Maize, Rice, Wheat, fruits and Vegetables etc. Jammu and Kashmir is home to growing all varieties of fresh and dry fruits. Fruits and vegetables contribute more than 30 percent to value of output from agriculture in Jammu and Kashmir. During the past few years, the demand for high value crops has been showing much faster growth. These crops have potential of income augmentation, employment generation, poverty alleviation and export promotion.

Table:1 Total Area Sown Under Different Food Crops Area (000' hectares)

SNo	Food Crops	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	GR
1	Maize	326.48	329.46	321.19	322.70	320.92	323.60	302.44	315.81	311.92	308.22	-5.59
2	Rice	249.80	236.20	259.82	250.04	259.01	252.52	263.25	257.63	259.80	261.66	4.74
3	Wheat	259.60	248.30	254.66	252.78	252.83	266.11	278.30	278.72	288.94	290.72	11.98
4	Pulses	26.75	28.96	27.54	30.90	29.27	29.06	30.15	30.00	30.30	28.91	8.07

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5	Fruits and vegetables.	73.78	74.78	76.30	76.86	76.50	83.95	88.37	87.42	89.32	87.19	18.17
Total area sown		936.41	917.70	939.51	933.28	938.53	955.24	962.51	969.58	979.47	976.39	

Source: Digest of Statistics, Directorate of Economics & Statistics, J&K Govt., 2013-14.

Table:2 Production of food grains

Quantity produced (000 Qtls.)

SNo	Food Crops	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
1	Maize	5381	4651	5326	5922	4535	4869	4745	6331	4870	5277
2	Rice	4223	4214	5048	4928	5574	5546	5620	5637	5011	5447
3	Wheat	3430	4055	4595	4782	4575	4983	4959	4835	2899	4463
4	Pulses	125	142	132	152	135	141	153	139	172	169
5	*FRUITS	1232.66	1321.56	1366.70	1400.22	1403.23	1504.01	1636.30	1690.99	1712.44	2221.98

Source: Digest of Statistics 2013-13, Directorate of Economics & Statistics, J&K Govt.,

*Directorate Of Horticulture(P & M), Jammu And Kashmir

During 2001-02, the total area sown under different food crops was 936.41 thousand hectares and during 2010-11, the area under food crops is 976.39 thousand hectares. The maximum area covered under food crops like Maize, Rice and Wheat was 326.48 thousand hectares , 249.80 thousand hectares and 259.60 thousand hectares of total area sown respectively. The area under fruits and vegetables and pulses was 73.78 and 26.75 thousand hectares which accounted 8.15 and 3.12 per cent of the total area sown. In 2010-11, the area under Maize was 308 thousand hectares (31.56), thus there is decrease in the area under Maize. The area under Rice and Wheat was 261.35 (26.76 per cent) and 290.72 (29.77 per cent) thousand hectares respectively. The area under fruits and vegetables was 87.19 thousand hectares which constitutes 8.90 per cent. Table shows that the area under maize suddenly decreased in 2010-11. Thus, it is clear that the area under fruits and vegetables increased while the area under other food crops Rice, Maize and Wheat has been fluctuated over the study period. Growth rate of maize was decreased during the 10 years to -5.59 while the growth rate of others crops increased during the period. The growth rate of Wheat and fruits & vegetables increased by 11.98 and 18.17 respectively this is due to some interest towards cashcrops. But overall if we look at the situation of growth rate it didn't reached to expectation.

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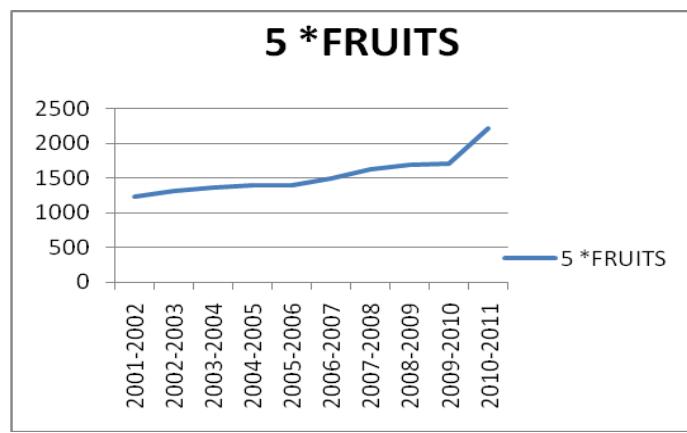
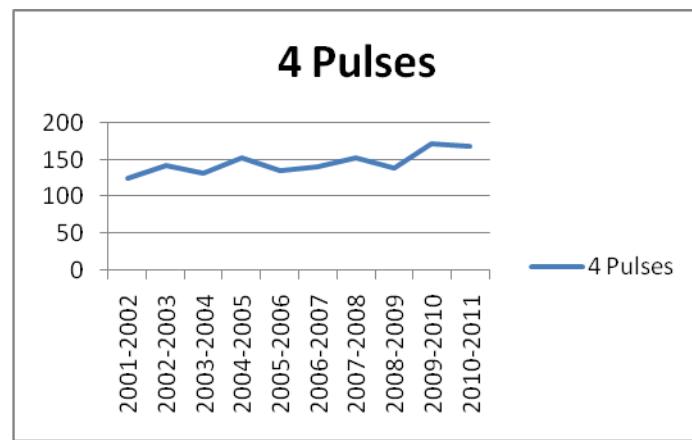
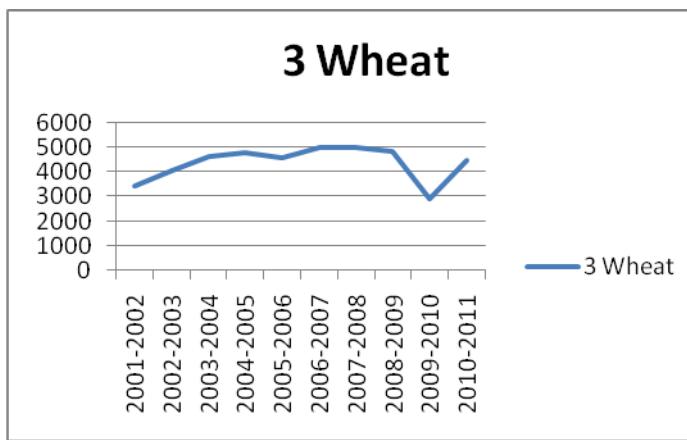
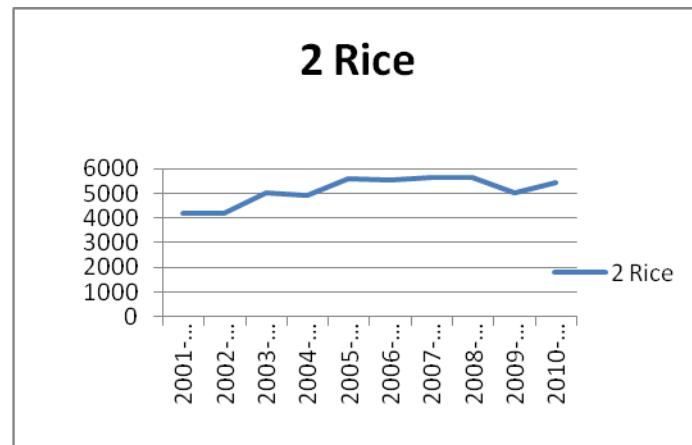
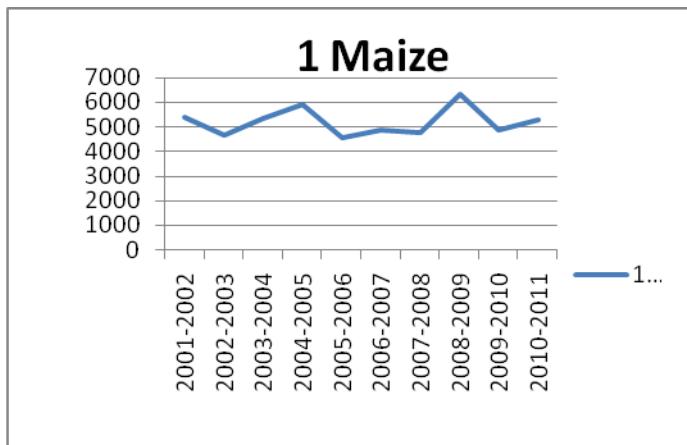


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Trends (Fluctuation) in the area of different Agricultural crops of Jammu and Kashmir from last ten years
2001-2002 to 2000-11.



Source: Directorate of Economics and Statistics government of Jammu and Kashmir Annual publication 2013-14.

PRESENT CROPPING PATTERN AND PRODUCTION OF DIFFERENT AGRICULTURE CROPS IN JAMMU AND KASHMIR:

The cropping pattern of a region reveals the proportion of area of land under different crops at a point of time, the rotation of crops and the area under double cropping. The cropping pattern changes in space and time. In fact, no cropping pattern can be good and ideal for all times to come. Cropping system is based on the climatic soil and the water availability has to be evolved for realizing the potential production levels through efficient use of available resources. The main aim of the cropping pattern system is to provide enough food for the family, fodder for the cattle and generate sufficient cash income for demotic and cultivation expenses. The objective is possible only by adopting the intensive farming which include multiple cropping and intercropping. There are limits to increase production of different agriculture crops through expansion of cultivable land as with the growing population the total area is being getting shrink day by day, hence the only way out is to put more emphasis on increasing the productivity levels by adopting the modern technologies besides diversification towards high value.

Table:3 Cropping pattern and Production of different agriculture commodities:

Details of Area, Production and Yield							
S. No.	Crop	Area(000 Ha)		Production(000qtlIs)		Yield(qtl/ha)	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
Jammu Division							
1	Rice(Kharif)	114.558	111.00	3201	2200	19.64	19.82
2	Maize(Kharif)	206401	200.00	7116.65	4500	34.479	22.50
3	Wheat(Rabi)	236.56	248.00	4500	5200	19.02	20.97
4	Pulses(kh+Rb)	30.02	32.74	367.30	480	12.24	14.66
Total Food grain		587.893	591.74	15185.04	12380	85.38	77.95
5	Oilseeds(Kh+Rb)	36.91	38.09	345.30	510	9.35	13.39
6	Vegetables(Kh+Rb)	32.91	32.07	6900	6980	212.3 ^a	213.46
7	Fodder Green(Kh+Rb)	32.50	20.00	8000	8000	400	400
Total Food Grain and other crops in Jammu Division		676.949	682.53	30430.34	27870	707.04	704.80
Kashmir Division							
1	Rice(Kharif)	158	158	5410	5500	34.10	34.80
2	Maize(Kharif)	100	100	2000	1200	20	12
3	Wheat(Rabi)	8.25	8.25	148	148	18	18
4	Pulses(kh+Rb)	24.50	24.50	223	152	9.10	6.70
Total Food grain		290.75	290.75	7781	7000	81.20	71.50
5	Oilseeds(Kh+Rb)	85.50	85.50	855	855	10	10
6	Vegetables(Kh+Rb)	30.03	30.06	8360	8500	278.38	282.76
7	Fodder Green(Kh+Rb)	34	34	13600	13600	400	400
Total Food Grain and other crops in Kashmir Division		440.28	440.31	30596	29955	769.58	764.26
Total Food Grain (J&K)		878.29	882.49	22966.04	19380	166.58	149.45
Total Food Grain and Other crops (J&K)		1117.23	1122.84	61026.34	57825	1476.62	1469.06

Source: Directorate of Economics and Statistics government of Jammu and Kashmir, Economic Survey 2015-16.

As from the above table it is being calculated that among the above food grains, the main food crops are Maize accounting 25.60% followed by Wheat 20.47% and Rice 22.77% which together accounts as 68.84% of the total cropped area in the state.

If we look at the table it clearly indicates area under the rice is continuously decreasing which has led to the downfall in the production of rice in Jammu but at the same time the new hope life line in this handicapped

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ecology is that there is a continuous rise in the productivity but there is no downfall in the area of Kashmir region in terms of but due to increase in the techniques of production, and productivity is on a rise.

Maize crop is almost the monopoly of Jammu division is continuously on a decline as it has shown a continuous decline in the field of area, production and productivity, wheat being the most cultivatable crop in Jammu region in terms of consumption and economic value is gradually on a high and is earning the status of foreign exchange earnings, and employment opportunity

Table:4 Detail about variability in terms of Area and production under different crops in Jammu and Kashmir from last one and a half decade (2000-2014)

Variability in terms of Area under different crops in J&K				Variability in terms of Production under different crops in J&K			
Crop	Mean	Standard Deviation	Coefficient of Variation	Crop	Mean	Standard deviation	Coefficient of variation
Rice	254.86	7.68	3.02	Rice	5015.65	629.14	12.56
Maize	318.17	7.94	2.50	Maize	50503.2	99.183	23.54
Wheat	270.45	17.42	6.44	Wheat	4218.21	99.0183	23.55
Pulses	28.770	1.30	4.56	Pulses	144.14	13.72	9.52
Barley	11.370	2.12	18.65	Others	218.36	11.205	11.21
Rice	254.86	7.68	3.02	Rice	5015.65	629.14	12.54
Sugarcane	1.1000	0.072	70.72	---	---	---	---
Spices	2.5400	0.29	11.60	---	---	---	---
Vegetables	81.62	6.64	11.80	---	---	---	---
Bajra	16.430	2.59	15.75	---	---	---	---
Others	3.050	3.27	107.12	---	---	---	---

Rice being the mostly and widely consumed crop in Jammu and Kashmir has shown less variation in terms of area (3.02%) but has slightly higher variation in terms of production (12.56%); the reason behind the low variation in terms of area is that there is no further scope in increasing the area as there is lot of crop diversification taking place to other commercial crops and the area under the crop is replaced by other such crops.

Sugarcane has got the highest coefficient of variation (70.72%) as there is a continuous decline in terms of area due to its low economic value at the same time spices (11.60%), vegetables (11.80%) has shown an increase in terms of area and production as these crops are gaining importance day by day and are subjected to income and employment generation. Wheat is the only food grain crop which has shown an upward trend in terms of area (with a coefficient of variation 6.44%) and has also shown an upward trend in terms of production, but at the same time the coefficient of variation of wheat 23.54% which is only increasing due to its continuous increase in

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output subjected to improved means of technology and there is further scope in the area and output under the crop which in the coming years will be seen. Barley and pulses (commercial crops) has shown in increase in area and production as these crops are getting importance due to the economic value and income generation. Looking at the present scenario the area under the food grain crops in Jammu and Kashmir is continuously decreasing as the state is not able to feed its own people. According to the provisional figures of census 2011; the state Jammu and Kashmir has got the population of 12.54 million for which the per capita consumption of food grain is not available on its own. Rice and Wheat being the mostly consumed food grain crops is subject to different constraints as the area under rice is on a decline because people are shifting to other commercial crops which has compelled to import from the rest of the states/nation. As per the data (right from 1947) the state Jammu and Kashmir has never been able to produce up to an extent so that it is going to feed its own people in terms of food grains as a result the gap between requirement and deficit is increasing.

CHALLENGES FOR THE DEVELOPMENT OF AGRICULTURE

- There is no law on minimum land ceiling for areas used for crop production. The State has not been enforcing a strict ban on use of irrigated land for nonagricultural purposes.
- State cultivation has not taken increasing cropping intensity, average yield by way of optimal use of inputs, and full adoption of recommended production technologies.
- Less credit flow in the beginning of the cropping season for the farming community with a guaranteed minimum price support.
- Lesser emphasis on post-harvest technologies, including handling, storage, transportation, processing and marketing.
- Lack of facility for insurance cover for major crops.

CONCLUSION:

Diversification is an integral part of the process of structural transformation of an economy and the economy of Jammu and Kashmir is no exception. Cropping pattern should aim at making the best use of the available land and outputs, self sufficiency in food grains as a result of higher output per unit of land and per worker should certainly be welcomed and worked for but there is no necessary merit in achieving it by raising food grains on an area which could generate higher incomes by raising fruit, mulberry, or any other cash crop. The area under fruits and vegetables increased at the cost of other food crops which showed a decreasing trend during the study period. Within crop groups, there is an increase in the area under Wheat, whereas area under Rice and Maize has been fluctuated. Due to an increase and a favorable price policy has resulted in an increase in area under wheat and

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fruits and vegetables. Even though with the introduction of cropping pattern in the state, production of food grains have tremendously increased.

The real difficulty in adopting a better cropping pattern is that farmers may not have adequate amount of capital to invest and therefore the farmers should know the new techniques. Government should come forward to help this. The state farmers should appreciate the importance of fruits and vegetables to improve the productivity of land, generate employment and improve their economic conditions. Initiatives are needed for the agricultural diversification, as diversification taken place in the Kashmir valley have shown a positive trend in terms of return. There should be the diversification, a proper balance between the propagation of cereal and non cereal crops and the mechanization of agriculture. We have to learn how to use water, we have to get better technologies whether from the domestic system or from anywhere else in the world. then we have to get better price and structure and good remuneration. We have to advice farmers which crop have is to shift from subsistence farming to commercial farming and Cash Crops viz fruits, vegetables. saffron etc besides promoting our traditional and unique crops like Kamand, Zagtmul, Kashmiri Chilli etc.

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