

EVALUATION STUDY DIVERSIFICATION OF AGRICULTURAL CROPS, VALUE ADDITION AND MARKETING *under* RLTAP



On behalf of
Planning & Coordination Department
Government of Orissa

D. J. Research & Consultancy Pvt. Ltd.
N 1/69, IRC Village, Nayapalli, Bhubaneswar-15, Orissa
Website: www.djrc.org

FINAL REPORT

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EXECUTIVE SUMMARY

This summary briefly provides an overview of achievements and impact of Agricultural Diversification Programme in six districts of KBK. The findings are based on a large sample survey carried out in 41 villages randomly selected from the beneficiary villages in each district and randomly selected beneficiaries as well as non-beneficiaries of the programme. The exercise excludes development of horticulture, a very important component of agricultural diversification, as horticulture is by itself one of the programmes under RLATP. But it includes horticulture as a part of diversification to the extent crops under horticulture are grown by the beneficiaries already selected under agricultural diversification programme. An unbiased estimate of the differential impact of the programme is made here in terms of "Before and After" approach. Also an attempt is made to see how non-beneficiaries have benefited because of the 'demonstration effect' of the steps taken for the beneficiaries. This situation could provide some guidance regarding the 'with and without' situation.

The components under Agriculture Diversification include (i) Agro Service Centres, (ii) Additional Sales Centre, (iii) Crop Demonstration Programme, (iv) Supply of Power Tillers, (v) Supply of Implements to SHGs and (vi) Ragi Seed Exchange Programme. While three of them i), iv), and v) try to improve productivity and reduce cost through mechanization, ii) iii) and vi) provide technology for diversifying agriculture and increasing productivity through high yielding variety of seeds. Basically, therefore, the entire programme has principally concentrated on two areas, mechanization, and quality seeds. Involvement of SHGs to provide

agricultural implements that appears to have done extremely well in providing custom services to farmers at affordable cost adds another positive dimension to it.

Agricultural mechanization has the potential to improve agriculture productivity. As Orissa's agriculture is highly under capitalized and under mechanized it was envisaged that provision of Agro Service Centres, while increasing agricultural productivity and reducing cost per unit of output will help in increasing the income of the unemployed educated youth through their custom hiring services to farmers. It would also help in sensitizing farmers about the various farm machineries that will improve productivity. Within a span of 5 years (2001-02 to 2005-06) 56 Agro Service Centres have been opened in the six-surveyed districts.

With a view to acquainting farmers with new crops or new ways of growing crops to increase yield and returns, Crop Demonstration Programmes were implemented in farmers' fields where farmers observed for themselves the advantages. Paddy and ragi are the chief cereals of the tribals of the KBK region. Appropriately crop demonstration programme included paddy, ragi along with moong (pulses) and niger (oilseed). The demonstration programme was carried out in 0.5 acre of land per beneficiary in the year 2002-03. The total number of beneficiaries under paddy demonstration was 2120. Ragi Demonstration was taken up in Kalahandi, Malkangiri and Nawarangpur with 200 beneficiaries in each district. For production increase and quality improvement of pulses moong demonstration programme was also implemented in all the six districts. The farmers used to produce local variety of moong with low yield and returns. The HYV varieties like PDM-11 could suitably replace the local

varieties both in kharif and rabi. Oilseed production in the state has been going down. In order to boost production of oilseeds, niger, usually a dry land crop, was rightly chosen for demonstration. The total number of beneficiaries under niger demonstration was 400.

Power Tillers were supplied to the SC/ST farmers at a subsidized rate of 50% (25% RLTAAP + 25% Work Plan, Agriculture Department) to improve production and save money and time for cultivation. A total of 208 power tillers have been supplied across all the six districts (from 2001-02 to 2005-06). Due to poor financial condition and lack of sufficient purchasing power tribal farmers were not able to avail power tillers at even a subsidized rate. Therefore it is necessary to make an income assessment of farmers and their family condition based on which necessary changes can be incorporated in the subsidy rate and the scheme as a whole to make it more effective.

A total of 8682 SHGs are functioning actively in all KBK districts. The Agriculture Department provides implements to the SHGs at subsidized rates. The SHGs contribute 5% of the cost (Rs 51,500/-) i.e. Rs 2,575/- per kit. All the implements supplied have extensive working capacity with the benefits of saving time, cost and labour. SHGs provide these implements to farmers in their operating area on a rental basis. Thus by giving SHGs the charge of these implements the Agricultural Department has been successful in providing implement facility to farmers at affordable prices and have been able to intensify implement use. It has been observed that across all surveyed districts these implements have been well maintained by the SHGs. As the equipments relate to seasonal use, from discussions with beneficiaries as well as SHGs, it was learnt

that capacity utilization of these equipments has been very high, nearly 100%. **It is one of the most successful components of the programme.** Even if full cost recovery is pursued, the SHGs would be in a position to pay back the entire cost of these implements within a period of three years.

Agriculture Department exchanges HYV variety of ragi i.e. Bhairavi with traditional variety. A total of 9288 farmers have benefited from this exchange process from 2001-02 to 2005-06. However, farmers revert back to traditional varieties within a year or two of the exchange programme. This leads to a decline in yield rates after a short span, of yield increase. Agriculture Department provides seeds to the farmers through additional sales centres. A total of 57 additional sales centres have been opened between 2003-04 and 2005-06 and the subsidy availed per sales centre is Rs 10,000/-

Crop Diversification: The highlighting feature of cultivation in terms of cereals during Kharif is the decline in area, production and yield rate of ragi and diversification towards paddy. This is hard to understand when we take into consideration that ragi is covered under two components of the Crop Diversification programme i.e. Ragi Seed Exchange Programme and Ragi Crop Demonstration Programme. The primary reason for this is low level of acceptance of high yielding varieties provided by the Agriculture Department. The tribals do not find hybrid varieties of ragi palatable in comparison to the traditional varieties. Further, the Crop Demonstration Programme was undertaken in the year 2002-03 and the benefits that accrued initially have not continued up to the present

period. Farmers also find that paddy cultivation is slightly more remunerative than ragi cultivation.

The value of output in terms of cereals has gone up by about 44%. Among the major pulses there has not been a very significant change in terms of area under cultivation in the surveyed districts as a whole. However, the yield rates of all the pulses have gone up leading to a 50% increase in value of output, by itself a significant achievement.

One of the most positive changes seen is the diversification of new area brought under cultivation towards cotton. This change is most prominent in Bolangir and Kalahandi. Among oilseeds the area under Sesame has gone up by 24%. Though the area under groundnut has gone down, the yield has increased by 61%. The use of hybrid and improved seeds over traditional seeds has increased substantially and is one of the contributing factors towards increase in yield of different crops.

The Rabi period is marked by the absence of paddy in many districts and diversification into more pulses and vegetables though the area under cultivation is substantially less than that in the Kharif season. Most of the newly cultivated land has been diverted towards pulses, moong in particular, a low water intensive crop. The impact of the diversification process is seen in the case of oilseeds such as groundnut, sunflower and sesame where the area under cultivation has increased by 63%. The total change in area under cultivation among pulses is 64% and the value of output of pulses has increased by 94%.

Cost and Income: The cost of production relates to labour, seeds, ploughing, pesticides, fertilizers, transport and miscellaneous expenditures. Diversification has entailed higher level of input intensification. It has been observed that the increase in value of output, barring Nuapada, is to a large extent a function of increase in expenditure on seeds and fertilizers. The overall increase in cost in descending order is 89%, 67%, 66%, 42%, 36% and 29% in the case of Bolangir, Malkangiri, Kalahandi, Nuapada, Nawarangpur and Sonapur respectively. Income from agriculture, taking all the districts as a whole, has increased by 51% among beneficiaries and 45.5% among non-beneficiaries. On a per hectare basis, however, it is seen that while the beneficiaries have realized a net additional benefit of Rs 2304 per ha, the non-beneficiaries have gained only by Rs 1846/ha over their 'before' status. The most important aspect of crop diversification programme is the demonstration effect that the programme has on the 'non-beneficiaries' making them virtual beneficiaries of the programme. Overall, this is a very positive development.

There are however wide variations in benefit accrual across districts; as low as Rs.652/- per hectare in Nuapada and a high of Rs.3,922/- per hectare in Malkangiri. While the latter has done badly in watershed, it has done well benefiting from agricultural diversification. Marketing facility provided under RLATP, has done well for the farmers to have ready access and much better price as compared to the 'before' situation.

Marketing: Marketing facilities form a crucial part of the diversification process as they provide avenues for realizing proper value for the agricultural products. The three main centres for selling crops are markets, mandies and farm gates. There is variation in percentage of

households selling products at different centres in accordance with type of crop, accessibility and distance. Many new market yards have been established under RL TAP in 2002-03 and 2003-04 in various districts to facilitate the selling and procurement of crop products and to provide reasonable remunerations to farmers. Overall, mandies feature as a prominent selling center in Kalahandi and Nuapada. Access to markets is more in Malkangiri, Kalahandi and Sonepur. Farm gates are common selling centres across all the districts.

In Bolangir the average price of cotton is marginally higher in the mandi (Rs 2,100/qntl) as compared to price at farmgate (Rs 2,050/qntl). Price of paddy at the local market and mandi are the same (Rs 500/qntl) and slightly less at the farm gate (Rs 460/qntl). In Kalahandi there is not much difference in average paddy prices between farmgates and local markets (Rs 490/qntl and Rs 493/qntl respectively) but the maximum price at mandies is substantially higher i.e. Rs 570/qntl in comparison to Rs 490/- per quintal at farmgates. In Malkangiri average prices of paddy at farmgates, market and mandies are Rs 4,57,490/- and Rs 520/qntl. However, groundnut sold at markets fetches a much higher average price (Rs 1,200/qntl) in comparison to farmgates (Rs 750/qntl). In Nawarangpur paddy sold at farm gates averages Rs 467/qntl in comparison to Rs 500/qntl at mandies. Paddy in Nuapada is sold at almost the same rate (about Rs 475/qntl) both at markets and farmgates. In the above district moong fetches a higher average price in markets (Rs 2,350/qntl).

The most commonly used implement across all the districts is the plough. The highest percentage of households using plough is in Nawarangpur followed by Malkangiri. This percentage is lowest in Kalahandi where only

60% of the surveyed households are using plough. Another commonly used implement is the Sprayer with nearly 55% of the households across all the six districts using Sprayers. The use of sprayers is highest in the case of Sonepur (73%) and lowest in the case of Kalahandi (37%). The use of power tillers is marginally significant in the case of Nawarangpur (8.33%) and Malkangiri (6.67%).

The most common reason for taking loan is for agricultural purposes. The percentage of people availing loans for agriculture is highest in Nawarangpur (44% in the case of beneficiaries and 42% in the case of non-beneficiaries) followed by Sonepur. A positive impact of the diversification programme is apparent in the districts of Kalahandi, Malkangiri and Sonepur in that the percentage of non-beneficiaries availing loans is significantly higher than beneficiaries. **This suggests that beneficiaries have been utilizing a part of their increased additional incomes as agricultural investment.**

The programme on the whole had a positive impact in terms of motivating farmers from a static paddy oriented cropping system to a more diversified income generating cropping system. There would be more lasting changes if the intensity of follow-ups on crop demonstration to be undertaken in future is increased. Increase in subsidies and financial support is bound by funds available, however, quality of grass-root level implementation is much more important for realizing development programme targets. Instead of having agricultural diversification as a programme, it should form a component of agricultural planning for the district.

The findings of this study along with the study conducted in two other districts should be utilized while getting the study conducted on horticulture development in KBK region. All the three studies will provide guidance to the nature of future intervention in the region to have accelerated agricultural growth with diversification and agro-processing as a major strategy for development of the region.

INTRODUCTION AND BACKGROUND

Introduction

Change over from a production system of mono crop or a few crops to more crops over various seasons of a year or a few years can be defined as crop diversification. Pingali and Rosegrant feel, 'Initially, diversification implies the addition of other crops and other enterprises at the farm household levels'¹. Agricultural diversification is used as a strategy to reduce risks associated with traditional agriculture and improve returns to investment in commercial agriculture. Diversification with intensive use of inputs has the potential to increase profit with greater market orientation of products. Technology (quality seeds, fertilizers, and implements), market, information and higher level of farm management through intensive crop specific farmer training are some of the critical inputs to success of diversification interventions.

Effective management of natural resources helps in accelerating crop diversification. Policies that aid diversification strategies (water use, watershed development, control of soil erosion and arresting desertification etc.) if precede diversification implementation process, results are substantially close to targets. While price policy interventions in certain areas may limit diversification (Asia for rice crop), in other areas (in India and some countries of Africa and Latin America for example), proactive crop price policies have helped in substantial crop diversification.²

Agricultural Policy (1996) of Orissa emphasized agricultural diversification as a major policy shift to minimize sectoral risk and improve land productivity per ha and household farm income. Possibility of agricultural trade between regions and states and export potential has provided additional incentives to diversification. With a view to increasing income of poor farmers in underdeveloped KBK districts agricultural diversification programme has been taken up since 2002.

¹ Pingali Prabhu L and Mark W. Rosegrant, "Agricultural commercialization and diversification: processes and policies", Food Policy, Vol. 20 No.3 June 1995

² Christofer L. Delago (1995), 'Agricultural diversification and export promotion in sub-Saharan Africa', Food Policy, Vol. 20 No.3 June 1995

Cropping pattern changes are influenced by several factors that could be grouped under two heads, price and non-price. While price factor will include price for a particular product and inputs required, and price of competing crop (s), non-price factors will comprise rainfall, irrigation, technology, markets and infrastructure and subsidy on inputs. Although the price policy intended that government influence the non-price factors, in Orissa, price factor might have played an important role.³

Need of Crop Diversification

Diversification of crops refers to change or shift in crops, their variety and the cropping pattern. Crop diversification is necessary due to change in market, food habits, weather aberration, and availability of high value and efficient crops. Crop diversification is necessary due to some factors, which are stated below.

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

Why it is necessary in KBK?

KBK region is quite backward in terms of market facilities, communication facilities, employment opportunities, nutritional support and income of the peoples. As most of the population is tribal and dependant on agriculture, a change in condition of the people can be brought about most effectively through development of agriculture. For the development of agriculture it is necessary to sensitize the people in terms of changing their cropping pattern. Cropping pattern includes crop, variety, and the cropping system. Through development of agriculture, the income of the farmers will increase and the adverse food situation reversed. With respect to the KBK districts it

³ For detailed discussion on factors underlying changes in cropping patterns see Ashok Gulati and Tim Kelley (1999), 'Trade Liberalization & Indian Agriculture- Cropping Pattern Changes and Efficiency Gains in Semi-arid Tropics', Oxford University Press

is even more critical to diversify in order to increase the purchasing capacity of the population that is the lowest among all the regions in the State.

Initiation of RL TAP

In the year 1988 a special area programme, Area Development Approach for Poverty Termination (ADAPT) was formulated and implemented in 15 Blocks i.e. 8 Blocks in Kalahandi and 7 Blocks in Koraput district. But short-term strategies were not adequate to face the multifaceted backwardness of the total KBK region. Therefore a Long Term Action Plan (LTAP) planned for three undivided districts of KBK (Koraput, Bolangir and Kalahandi) started in the year 1993. But the fund supply in LTAP was found to be inadequate to meet all the expenses required to have developments envisaged for the region.

For the overall development of KBK region the Government of India prepared a Revised Long Term Action Plan in the year 1998 instead of Long Term Action Plan having a time period ranging from 1998-99 to 2006-07 with Rs.6251.08 crores under different heads. The RL TAP was prepared in a sub-plan mode to address the peculiar socio-economic problems of the backward region. The plan envisaged all-round socio-economic development of the KBK region with Central and State assistance.

General Scenario of KBK Districts

The KBK districts account for a population of nearly 73 lakhs over 47646 Sq.Km. of geographical area of the state. 91% of the people of this region still live in villages. In comparison to the State's population density of 236/Sq.Km. the region is sparsely populated having a density of 153/Sq.Km. As per the 2001 census about 28 lakh (38.41%) people of these districts belong to schedule tribe (ST) communities including four primitive tribal groups, i.e. Bonda, Dadai, Langia Soura and Dongaria Kandhas. In addition scheduled caste communities account for 16.26% (11.8 lakhs) population of the region. The total literacy of KBK is only 43.33%; female literacy being down to 29.10%. As per the 1997 BPL survey⁴, about 16.5 lakh (71.79%) rural

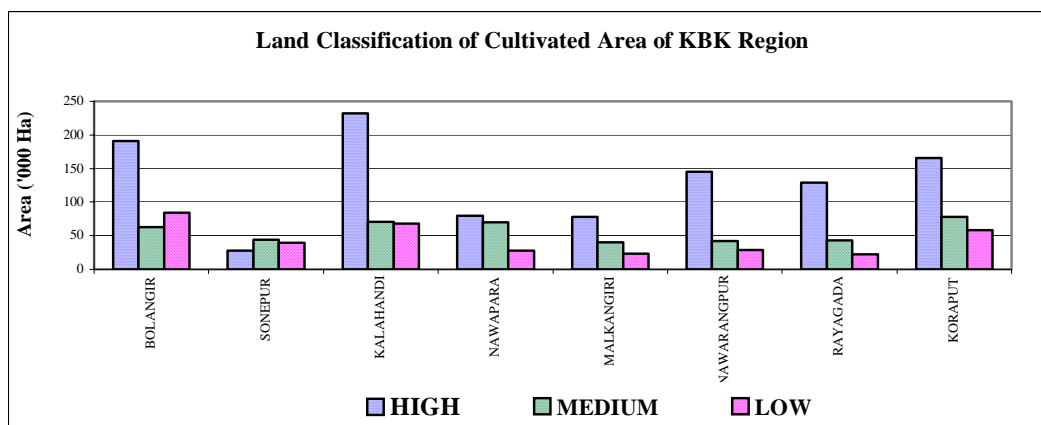
⁴ Panchayat Raj Department , Government of Orissa

families were living Below Poverty Line in this region. Results of the latest BPL survey are not yet published.

In the KBK region 10.64 lakh families are dependant on agriculture. The region has 18.51 lakh hectare of cultivated area which is 30% of the State’s net cultivable area. Irrigation facilities are underdeveloped to the extent that only 21.91% (4.06 lakh ha) of the total cultivated area is under irrigation. Agricultural productivity has remained rather low due to poor irrigation facilities and lack of use of new technology. Most of the agriculture is dependant on rainfall, which varies between 1378mm to 1522mm. Other socio economic indicators including population composition and density, net area irrigated and connectivity of villages to growth centres and service centres are far from satisfactory.

Land Classification

Of the total cultivated area of 18.6 lakh hectares in the KBK districts Uplands, Midlands and Low lands account for 10.49 lakh hectares, 4.51 lakh hectares and 3.51



lakh hectares respectively. In percentage terms Uplands form 57 percent of the total cultivated area of the KBK districts, followed by Midlands at 24 percent and Lowlands at 19 percent. Kalahandi contributes the highest to the Upland total whereas the Midland and Lowland contributions are highest in Koraput and Bolangir respectively. The net cultivated area is highest in Kalahandi and lowest in Sonapur. Further, Uplands, Midlands and Lowlands form 39 percent, 24 percent and 22.5 percent of the Uplands, Midlands and Lowlands of the State as a whole. Some of the Key Indicators of the KBK region are given in table 1.1

Table 1.1: Key Indicators of KBK Region (2005-06)

District	Rainfall (in mm)		Geo- graphical Area	Cultivated Area	Net Area Sown	Gross Cropped Area	Kharif Cropped Area	Rabi Cropped Area	Cropping Intensity (%)	Net Irrigated Area	Gross Irrigated Area	Kharif Paddy Area	Sugar cane	Fruits	Total Fertilizer cons. (Nutrient '000 mt)
	Normal	2005													
Bolangir	1289.8	1146.7	657	338	332	467.54	369.18	87.59	141	49.35	75.75	225.75	1.97	10.77	456.77
Sonepur	1418.5	1249.1	234	111	107	186.58	125.16	56.35	175	63.12	100.35	98.74	0.33	5.07	181.52
Kalahandi	1330.5	1398	836	371	360	582.97	404.76	165.08	162	126.22	208.12	236.87	1.37	13.13	569.83
Nuapada	1286.4	873.5	341	178	163	259.95	204.42	49.79	160	31.36	46.16	103.17	0.07	5.74	254.21
Malkangiri	1667.6	1384.8	619	141	127	198.39	160.98	30.18	156	39.11	48.83	95.02	0.01	7.23	191.16
Nawarangpur	1569.5	1599.6	529	216	208	306.64	246.22	38.78	148	12.06	28.43	167.4	4.43	21.64	285.00
Rayagada	1285.9	1222.9	758	194	143	229.33	168.76	45.38	160	32.71	55.70	46.38	0.21	15.19	214.14
Koraput	1567.2	1345	790	302	287	395.33	295.10	73.38	138	87.86	137.37	120.56	7.28	26.85	368.47
KBK			4764	1851	1727	2626.73	1974.58	546.53	152	441.79	700.71	1093.89	15.67	105.62	2521.1
Orissa	1451.2	1519.5	15571	6165	5691	8928.39	6140.2	2410.42	157	1922.7	2965.49	4153.77	36.71	377.77	8550.62

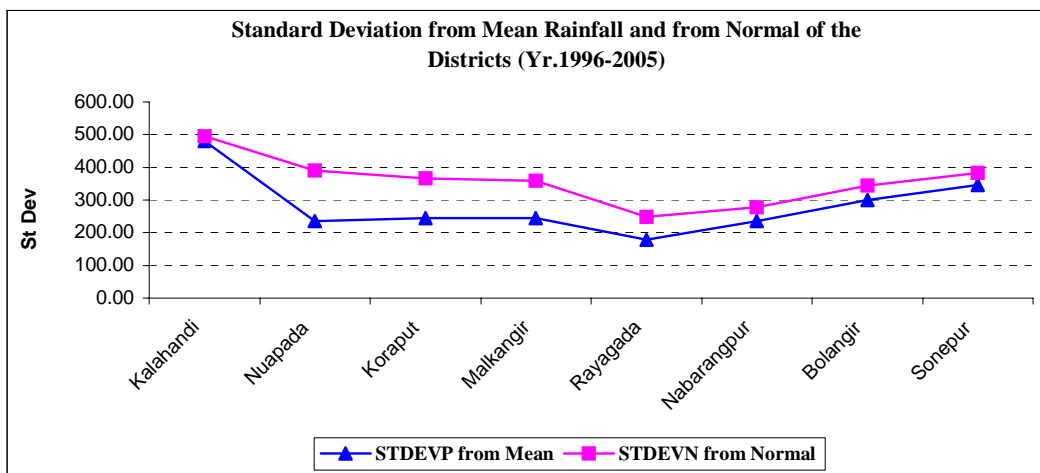
Area in '000 hectare

Source: Orissa Agriculture Statistics 2005-06

Rainfall

Kalahandi shows higher than normal rainfall for five years namely 1997, 2001, 2003, 2004 and 2005. The highest rainfall within this period was in the year 2001 whereas the lowest was in 2002. Within the period ranging from 1996 to 2005 Nuapada has had above normal rainfall in only 2003. The lowest rainfall in this period in the case of Nuapada was in the year 2002. 2001 was also a relatively better year with only about 47mm below normal. Though rainfall throughout this period has been erratic for both the districts, Nuapada has been more severely hit by lower than normal rainfall.

Bolangir has shown above normal rainfall in 1997, 2001, 2003 with severe drought years in between including 1998 and 2002. Sonepur had its highest rainfall for the period between 1996 to 2005 in the year 1997, which was around 385 mm higher than normal. Koraput has shown below normal in all the years from 1996 to 2005 except 2001 where the rainfall was above normal. In a continuation of the trend displayed by most of the KBK districts Koraput faced a severe drought in 2002. Similarly, Malkangiri and Nabarangpur also recorded their lowest rainfall between 1996 to 2005 Rayagada also shows its third lowest rainfall for the above period in 2002. This has had serious repercussions not only in the decline in crop production of the KBK region as whole but also in terms of decrease in intensity of diversification.⁵ (for details see Annexure 1.1)



⁵ Illustrated in detail in Annexure 3.1 (Diversification index)

Cropping Intensity

The change in cropping intensity is positive between the four-year period ranging from 1997-98 to 2001-02 in all districts except Bolangir and Nawarangpur. In Bolangir this is due to the fact that though the net sown area has remained constant there has been a decline in the gross cropped area. In Nawarangpur both the gross cropped area and net sown area have increased but the increase in net sown area has been sharper leading to decline in cropping intensity. For the same period the increase in cropping intensity is highest in the case of Nuapada, closely followed by Rayagada.

Table 1.2: **Cropping Intensity**

District	1997-98	2001-02	2005-06	% Change 1997/98 to 2001/02	% Change 2001/02 to 2005/06
Bolangir	136	130	141	-4.41	8.46
Sonepur	155	161	175	3.87	8.70
Kalahandi	142	151	162	6.34	7.28
Nuapada	133	154	160	15.79	3.90
Koraput	134	135	138	0.75	2.22
Malkangiri	147	158	156	7.48	-1.27
Nawarangpur	148	139	148	-6.08	6.47
Rayagada	140	162	160	15.71	-1.23
KBK	140	145	152	3.57	4.83
Orissa	141	151	157	7.09	3.97

Source: Data taken from Various Orissa Agriculture Statistics

In the second period ranging from 2001-02 to 2005-06 there has been a marginal decline in cropping intensity in Malkangiri and Rayagada. However, both districts show a higher cropping intensity in 2005-06 as compared to 1997-98. Bolangir shows a positive change in the second period as the gross cropped area in 2005-06 was higher than the 1997-98 period with net sown area remaining relatively constant. The KBK region as whole shows higher percentage change in the second period as compared to the first. In the second period the region had a higher increase as compared to the State.

Status of Irrigation

The percentage of Kharif irrigated area to Kharif cropped area has declined in the case of Bolangir, Sonepur, Nuapada, Nawarangpur and Rayagada between 1996/97 to 2005/06. In Bolangir, Sonepur and Nuapada, this is because the Kharif area under irrigation has declined whereas the Kharif cropped area has increased. In

Nawarangpur the area under irrigation during Kharif season has remained constant but the Kharif cropped area has increased. Though the Kharif area under irrigation in Rayagada has increased this rise is not commensurate with the increase in Kharif cropped area. Taking the KBK region as a whole there has been an about 3.5% increase in the Kharif irrigated area to total Kharif cropped area. In the case of Rabi, Bolangir and Sonepur show a 10% and 1.5% decrease in terms of Rabi irrigated area to Rabi cropped area. This is primarily due to the increase in Rabi cropped area in 2005-06 with which the increase in Rabi irrigated area has not been able to keep pace. Kalahandi shows a high percentage increase from 16% to nearly 50% in terms of Rabi irrigated area to Rabi cropped area. The Rabi irrigated area in Kalahandi has gone up from 19.5 thousand hectares to 82 thousand hectares. The percentage increase from 47% to 67% in the case of Rabi irrigated area to Rabi cropped area in Koraput is due to a 10.5 thousand hectare increase in Rabi irrigated area and a decline by about 9 thousand hectares in the Rabi cropped area between 1996-97 to 2005-06. Overall, the KBK region has shown an increase from 21.57% to 27.79% in terms of Kharif and Rabi irrigated area to Kharif and Rabi cropped area between 1996-97 to 2005-06.

Table 1.3: Comparison between Gross Cropped Area and Gross Irrigated Area (1996-97)

(Area in 000 hectares)

District	Gross Irrigated Area			Gross Cropped Area			% of Irrigated Area to Cropped Area		
	Kharif	Rabi	Kharif + Rabi	Kharif	Rabi	Kharif + Rabi	Kharif	Rabi	Kharif + Rabi
Bolangir	53.23	25.34	78.57	324.34	62.46	386.8	16.41	40.57	20.31
Sonepur	64.83	35.17	100	110.74	51.34	162.08	58.54	68.50	61.70
Kalahandi	62.89	19.54	82.43	381.86	122.93	504.79	16.47	15.90	16.33
Nuapada	29.16	9.69	38.85	174.14	37.82	211.96	16.75	25.62	18.33
Koraput	70.15	39	109.15	293.77	82.16	375.93	23.88	47.47	29.03
Malkangiri	13.74	11.07	24.81	144.3	50.74	195.04	9.52	21.82	12.72
Nawarangpur	12.03	12.35	24.38	220.29	33.93	254.22	5.46	36.40	9.59
Rayagada	31.46	8.67	40.13	152.9	66.43	219.33	20.58	13.05	18.30
KBK	337.49	160.83	498.32	1802.34	507.81	2310.15	18.73	31.67	21.57
Orissa	1559.44	703.64	2263.08	5992.32	2018.01	8010.33	26.02	34.87	28.25

Source: Orissa Agriculture Statistics, 1996-97

Table 1.4: Comparison between Gross Cropped Area and Irrigated Area (2005-06)
(Area in 000 hectares)

District	Gross Irrigated Area			Gross Cropped Area			% of Irrigated to Cropped Area		
	Kharif	Rabi	Kharif + Rabi	Kharif	Rabi	Kharif + Rabi	Kharif	Rabi	Kharif + Rabi
Bolangir	49.35	26.4	75.75	369.18	87.59	456.77	13.37	30.14	16.58
Sonepur	63.12	37.23	100.35	125.16	56.35	181.51	50.43	66.07	55.29
Kalahandi	126.22	81.9	208.12	404.76	165.08	569.84	31.18	49.61	36.52
Nuapada	31.36	14.8	46.16	204.62	49.79	254.41	15.33	29.72	18.14
Koraput	87.86	49.51	137.37	295.1	73.38	368.48	29.77	67.47	37.28
Malkangiri	39.11	9.72	48.83	160.98	30.18	191.16	24.29	32.21	25.54
Nawarangpur	12.06	16.37	28.43	246.22	38.78	285	4.90	42.21	9.98
Rayagada	32.71	22.99	55.7	168.76	45.38	214.14	19.38	50.66	26.01
KBK	441.79	258.92	700.71	1974.78	546.53	2521.31	22.37	47.38	27.79
Orissa	1922.7	1042.79	2965.49	6140.2	2410.42	8550.62	31.31	43.26	34.68

Source: Orissa Agricultural Statistics, 2005-06

Fluctuations in Area, Yield and Production of Rice in KBK Districts

Between 1997-98 and 2001-02 the area under cultivation of rice has declined in Bolangir and Sonepur and increased in rest of the districts. Yield rates between this period have increased for all districts except Kalahandi which shows a marginal decline in yield rate.

Table 1.5: Status of Area, Yield and Production of Rice

District	1997-98			2001-02			2005-2006		
	Area	Yield	Prod	Area	Yield	Prod	Area	Yield	Prod
Bolangir	219.74	1234	271.24	207.9	1527	317.49	228.77	1335	305.52
Sonepur	116.62	1820	212.26	116.45	1884	219.44	119.39	2143	255.93
Kalahandi	230.16	1379	317.49	261.4	1376	359.73	287.83	1082	311.53
Nuapada	105.54	944	99.64	111	1262	140.05	107.4	974	104.62
Koraput	110.51	1189	131.42	141.02	1496	210.92	137.83	1641	226.17
Malkangiri	85.03	729	62.02	98.06	1084	106.33	95.02	1363	130.81
Nawarangpur	149.29	1128	168.43	165.82	1270	210.63	168.53	1227	206.84
Rayagada	60.37	1254	75.72	65.79	1514	99.59	50.89	1425	72.53
KBK	1077.26	1242	1338.22	1167.44	1425	1664.18	1195.66	1350	1613.95
Orissa	4496.77	1390	6204.58	4499.78	1589	7148.98	4479.26	1554	6962.97

(A= Area in `000 ha, Y= Yield rate kg/ha, P= Production in `000mts)

Source: Orissa Agricultural Statistics of different years

**Table 1.6: Percentage Change in Area, Yield and Production of Rice
in KBK Districts**

District	Percentage change (1997-98 to 2001-02)			Percentage change (2001-02 to 2005-06)			Percentage change (1997-98 to 2005-06)		
	Area	Yield	Prod	Area	Yield	Prod	Area	Yield	Prod
	Bolangir	-5.39	23.74	17.05	10.04	-12.57	-3.77	4.11	8.18
Sonepur	-0.15	3.52	3.38	2.52	13.75	16.63	2.38	17.75	20.57
Kalahandi	13.57	-0.22	13.30	10.11	-21.37	-13.40	25.06	-21.54	-1.88
Nuapada	5.17	33.69	40.56	-3.24	-22.82	-25.30	1.76	3.18	5.00
Koraput	27.61	25.82	60.49	-2.26	9.69	7.23	24.72	38.02	72.10
Malkangiri	15.32	48.70	71.44	-3.10	25.74	23.02	11.75	86.97	110.92
Nawarangpur	11.07	12.59	25.05	1.63	-3.39	-1.80	12.89	8.78	22.80
Rayagada	8.98	20.73	31.52	-22.65	-5.88	-27.17	-15.70	13.64	-4.21
KBK	8.37	14.73	24.36	2.42	-5.26	-3.02	10.99	8.70	20.60
Orissa	0.07	14.32	15.22	-0.46	-2.20	-2.60	-0.39	11.80	12.22

In the second phase ranging from 2001-02 to 2005-06 shows a decline in yield rates in many districts such as Bolangir, Kalahandi, Nuapada Nawarangpur and Rayagada. This is primarily because 2001 was a peak year in terms of annual rainfall. In the first period the KBK region as a whole shows increase in yield area and production. The increase in terms of percentage is even higher than the increase in the State as a whole. However, in the second period (2001-02 to 2005-06) the percentage decrease in yield rate and production is higher in comparison to Orissa

Fluctuations in Area, Yield and Production of Ragi

Though the yield rates of ragi have gone up for all the districts (except Nuapada where ragi production was absent in 1997-98) in the first period (1997-98 to 2005-06) there has been a decline in the area under cultivation in Bolangir, Kalahandi, Koraput, Malkangiri, Nawarangpur, Rayagada and the KBK region as a whole. For the same period production has gone up in all the districts as the increase in yield rates have more than compensated for the loss in area.

Table 1.7: Variation in Area, Yield and Production of Ragi in KBK Districts

District	1997-98			2001-02			2005-2006		
	Area	Yield	Prod	Area	Yield	Prod	Area	Yield	Prod
Bolangir	4.08	294	1.2	3.6	489	1.76	3.59	428	1.54
Sonepur	0.01	267	0.003	0.02	440	0.01	0.02	550	0.01
Kalahandi	7.84	709	5.56	7.82	899	7.03	6.61	638	4.22
Nuapada				5.47	396	2.17	2.93	860	2.52
Koraput	64.86	643	41.69	62.33	687	42.8	72.23	686	49.54
Malkangiri	10.45	336	3.51	9.57	519	4.97	7.1	524	3.72
Nawarangpur	11.63	517	6.01	10.12	746	7.55	8.29	876	7.26
Rayagada	32.56	585	19.04	29.23	663	19.39	25.03	823	20.6
KBK	131.43	586	77.013	128.16	669	85.68	125.8	711	89.41
Orissa	197.77	650	128.53	196.01	738	144.59	189.94	747	141.81

Area in '000 hectares, Yield Kg/ha, Production in '000 mts

Source: Orissa Agriculture Statistics of different years

Table 1.8: Percentage Change in Area, Yield and Production of Ragi in KBK Districts

District	Percentage Change (1997-98 to 2001-02)			Percentage Change (2001-02 to 2005-06)			Percentage Change (1997-98 to 2005-06)		
	Area	Yield	Prod	Area	Yield	Prod	Area	Yield	Prod
Bolangir	-11.76	66.33	46.67	-0.28	-12.47	-12.50	-12.01	45.58	28.33
Sonepur	100.00	64.79	233.33	0.00	25.00	0.00	100.00	105.99	233.33
Kalahandi	-0.26	26.80	26.44	-15.47	-29.03	-39.97	-15.69	-10.01	-24.10
Nuapada				-46.44	117.17	16.13			
Koraput	-3.90	6.84	2.66	15.88	-0.15	15.75	11.36	6.69	18.83
Malkangiri	-8.42	54.46	41.60	-25.81	0.96	-25.15	-32.06	55.95	5.98
Nawarangpur	-12.98	44.29	25.62	-18.08	17.43	-3.84	-28.72	69.44	20.80
Rayagada	-10.23	13.33	1.84	-14.37	24.13	6.24	-23.13	40.68	8.19
KBK	-2.49	14.16	11.25	-1.84	6.28	4.35	-4.28	21.33	16.10
Orissa	-0.89	13.54	12.50	-3.10	1.22	-1.92	-3.96	14.92	10.33

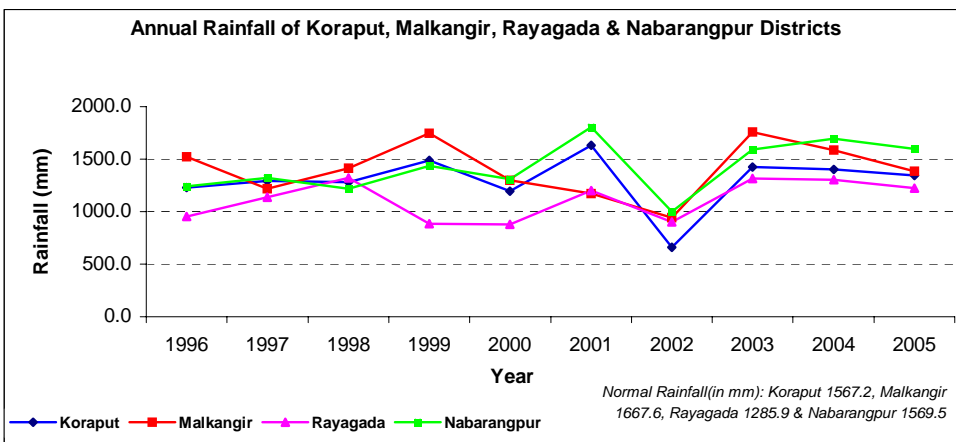
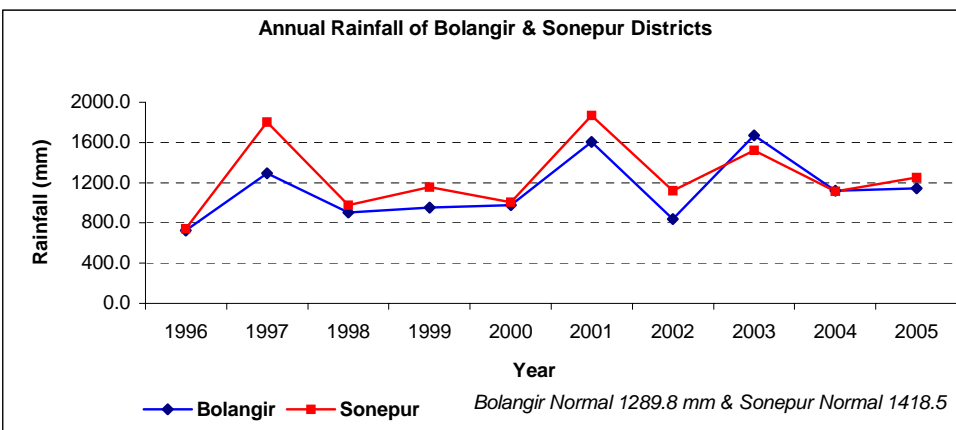
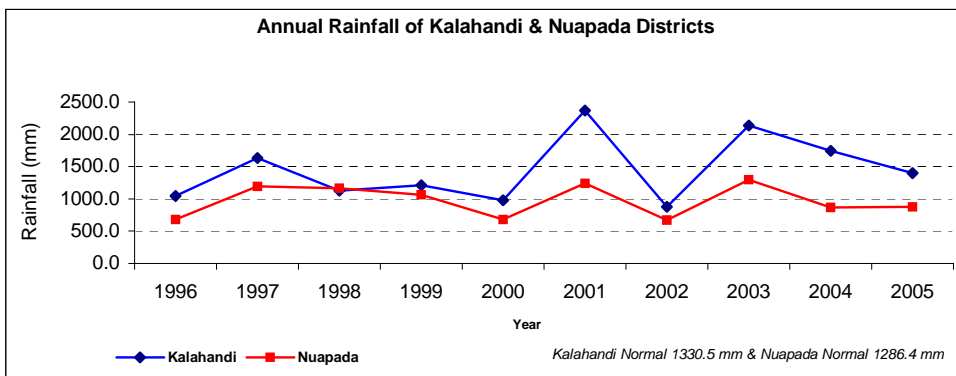
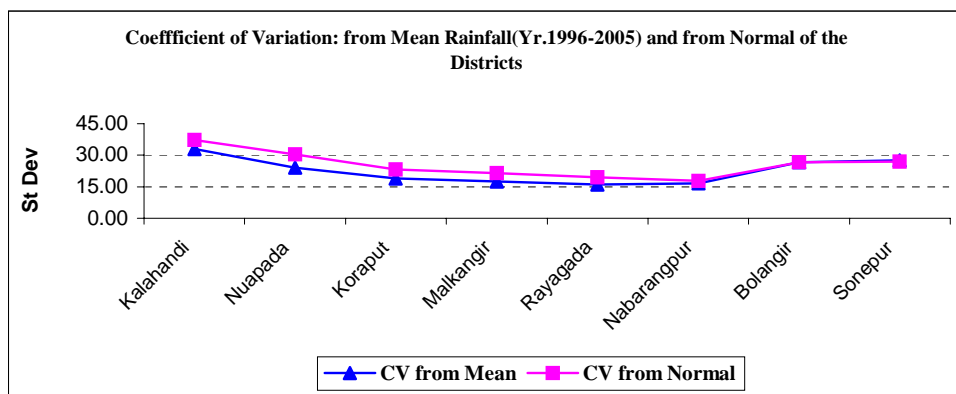
Area in '000 hectares, Yield Kg/hectare, Production in '000 mts

Source: Orissa Agriculture Statistics

This is a positive indicator in terms of diversification as the decrease in terms of area can be diverted towards other crops and yet have increased production. In the second period (2001-02 to 2005-06) the area under cultivation has declined in all districts except Sonepur, the KBK region and Orissa as a whole. Between 2001-02 to 2005-06 some of the districts such as Bolangir and Kalahandi show a decline in yield rates but the KBK region as a whole has shown improved yield rate. For the same period though the production in Orissa has marginally declined it has increased for the KBK region as a whole.

ANNEXURE

Annexure 1.1: District-wise Annual Rainfall



OBJECTIVE AND METHODOLOGY

Objectives of the Study

- To evaluate the extent to which the objectives of the programme /schemes have been achieved.
- To identify the constraint faced by the implementing agency and the extent to which the achievements were affected by the constraints.
- To identify the constraint faced by the beneficiaries and the extent to which the constraint affect the benefits.
- To ascertain special efforts, if any made by the implementing agency to short fall and accelerate the achievements.
- To identify Best Practices
- To recommend special measures to improve outcomes/achievements of the programme

Scope of the Study

This study deals with Diversification of Agricultural Crops under RLTA in 6 KBK districts, namely Bolangir, Kalahandi, Malkangiri, Nawarangpur, Nuapada and Sonepur , in which different activities undertaken in order to achieve the objectives of the programme have been analyzed. The total study analyzes the socio-economic condition, standard of living of the people, their income and expenditure, etc. Thus, the evaluation aims at comparing the over all development of the tribal people in the KBK districts in pre and post diversification programme status. The study will help the government to rethink its strategies and make necessary changes in the programme and plan accordingly. It will also help the research organizations, NGOs, researchers and other people involved in different development activities.

Study Methodology

The study has been based on secondary and primary data collected from different sources. The secondary data based on physical and financial achievement till 2005-06 has been collected from District and State levels in order to have a clear picture of the programme.

Primary data has been collected from the ground level through questionnaire method. The questionnaire of the beneficiary deals with over all development of agriculture and increase in standard of living in pre and post period of Agriculture Diversification. Three blocks each from Kalahandi, Nuapada, Sonepur, Malkangiri and Nawarangpur have been randomly selected. However, in the case of Bolangir 4 blocks have been selected due to unavailability of beneficiaries. In all 41 villages have been selected, 6 villages each from Bolangir, Malkangiri and Nuapada districts, 8 villages each from Kalahandi and Nawarangpur districts and 7 villages from Sonepur district . From each village beneficiaries and non-beneficiaries of the programme have been interviewed so as to select 48 beneficiaries and 20% non-beneficiaries (12 households out of a total of 60) from each district. In the KBK districts 288 beneficiaries and 72 non-beneficiaries have been selected under the study. The evaluation is based on a direct questionnaire method both for beneficiaries and non-beneficiaries. Those farmers who have not received any benefit from the RLTA scheme have been classified as non-beneficiaries. Additional information has also been collected from the district head and other related government officials.

Study Limitation

The study is based on secondary and primary data; the former, published and unpublished, collected from the government sources and the latter from the primary survey conducted. Data and information from beneficiaries and non-beneficiaries were collected through interviews and by recall method that suffers from recall-memory problems about various details. All efforts were made to probe and obtain adequate information for analysis.

Table 2.1: Details of Sampling

District	Block	No. of Villages	Number of Farmer Households		
			Beneficiary	Non-beneficiary	Total
Bolangir	Belpara	1	8	2	10
	Bolangir	2	16	4	20
	Gudvella	1	8	2	10
	Patnagarh	2	16	4	20
	Sub Total	6	48	12	60
Kalahandi	Bhawanipatna	5	28	5	33
	Kesinga	2	15	4	19
	Lanjigarh	1	5	3	8
	Sub Total	8	48	12	60
Malkangiri	Korkunda	2	14	6	20
	Malkangiri	2	18	2	20
	Mathili	2	16	4	20
	Sub Total	6	48	12	60
Nawarangpur	Nandahandi	3	20	5	25
	Nawarangpur	3	12	3	15
	Tetuntikhunti	2	16	4	20
	Sub Total	8	48	12	60
Nuapada	Boden	2	16	4	20
	Khariar	2	16	4	20
	Sinapali	2	16	4	20
	Sub Total	6	48	12	60
Sonepur	Sonepur	2	16	4	20
	Tarava	2	16	4	20
	Ulunda	3	16	4	20
	Sub Total	7	48	12	60
KBK	Total	41	288	72	360

OBJECTIVE AND METHODOLOGY

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	Sub Total	7	48	12	60
KBK	Total	41	288	72	360

ORGANISATION LAYOUT AND ACHIEVEMENTS**Introduction**

Agriculture sector plays a crucial role in the State's economy as it contributes by more than ¼ to the Net State Domestic Product (NSDP) and provides employment, directly or indirectly to nearly two third of the total work-force. It is the largest private sector of the State's economy. Agriculture in Orissa continues to be characterized by low productivity due to traditional agricultural practices, inadequate capital formation and low investment, inadequate irrigation facilities and uneconomic size of holdings. Nearly 62% of the cultivable land is rain fed and exposed to the vagaries of the monsoon. The per capita availability of cultivated land which was 0.39 hectares in 1950-51 has declined to 0.16 hectare in 2002-03. Recognizing the importance of this sector to the State's economy, the State Government came up with a comprehensive Agricultural Policy (1996) according agriculture the status of an industry. It emphasized, among others, diversification of crops and agricultural activities as a strategy to accelerate sector's growth while minimizing the risk to farmers. The small and marginal farmers, through appropriate crop diversification, were to spread their risks. The Tenth Plan has also emphasized promoting integrated development of agriculture and horticulture through area expansion of commercial crops including fruit crops, vegetables, spices, root and tuber crops and floriculture.

Organizational Structure

The Department of Agriculture is in charge of a Minister of Cabinet rank. He is assisted by a Principal Secretary for administration, programme implementation and coordination of programmes. The Principal Secretary also looks after Horticulture, Soil Conservation and Watershed Mission. The Secretary (Agriculture) is the administrative head of four Directorates under his purview. Above the Principal Secretary, there is an Agricultural Production Commissioner of the rank of Chief Secretary, who overviews, among other departments, the functioning of Department of Agriculture for accelerating growth of agriculture and related sectors.

a) Directorate of Agriculture & Food Production

The Directorate is headed by a Director with 27 Deputy Directors working below him at the Range Level who give assessment reports on implementation of agricultural programmes in the districts under their jurisdiction. At the District and Sub-division level there are District Agricultural Officers (DAO) and Additional District Agricultural Officers (ADAO). At present there are 47 DAOs and ADAOs in the Directorate. At the Block level Agricultural Extension Officers (AEO) and Junior Agricultural officers (JAO) coordinate activities and report on progress to the DAO and ADAO. Village Agricultural Workers (VAW) help promote agricultural programme implementation at the Gram Panchayat level.

Based on reports on progress of implementation, prospects and constraints provided by DDA/DAO/JAO & VLWs the Director submits a monthly report to the Secretary at the government level. The report contains information on crop coverage, agricultural inputs required and supplied stages of agricultural operation, crop yield and production and progress of implementation of various agricultural schemes.

b) Directorate of Horticulture

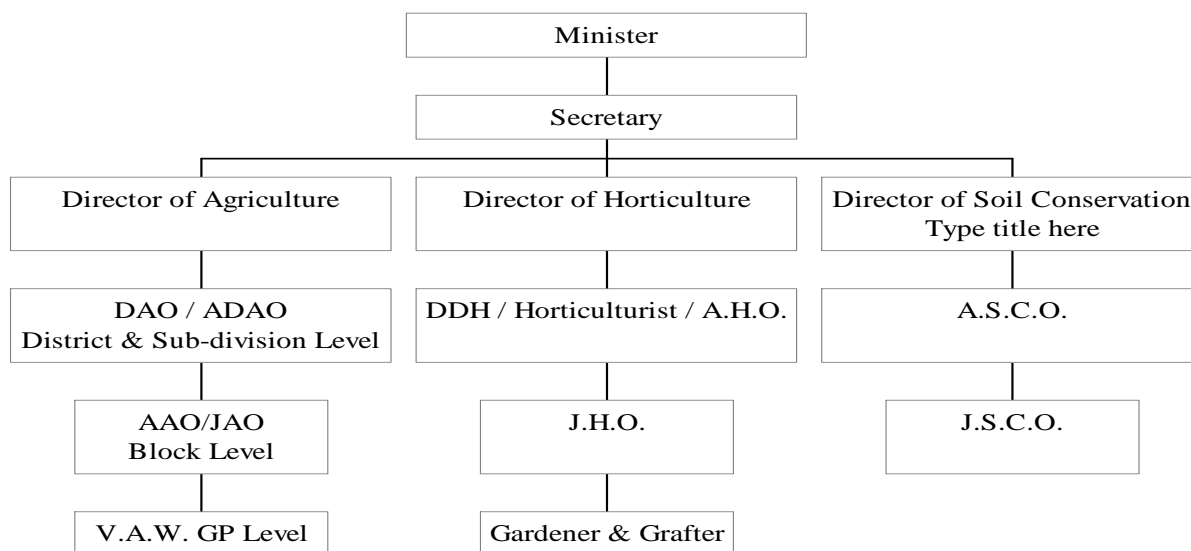
Director of Horticulture is the administrative head of this directorate. At the district and sub-division level coordination and supervision is done by designated Deputy Director Horticulture or/and Horticulturist/Assistant Horticulture Officer. Further below the administrative set-up are Junior Horticulture Officers who look after the Block level set-up. The Gram Panchayat level is managed by Grafter and Gardeners. Information flows from the Gram Panchayat level upwards and based on such information the Director furnishes report to the Secretary where government intervention is required. Such reports covers information relating to crop coverage and produce, monthly progress report on implementation of various schemes.

c) Directorate of Soil Conservation

The Director is the administrative head of the Soil Conservation Department and assisted by 20 Soil Conservation officers at the Range level followed by Assistant

Soil Conservation officers at the District and sub-division level. The block level is managed by Junior Soil Conservation Officer (JSCO). Information on implementation of various schemes are assimilated at the Directorate level and furnished to the government every month

Organisation Chart of Agriculture Department



Programme Achievements

Allocation of funds

A total of Rs.272.26 lakhs were allocated for the KBK districts under RLTAAP Diversification of Agricultural crops. By 2005-06 all the funds allocated had been utilized.

Table 3.1: Allocation and Expenditure of Funds Towards Diversification of Agricultural Crops under RLTAAP in KBK districts (Rs. in lakhs)

Year	Allocated	Cumulative allocated	Expenditure	Cumulative Expenditure	% Cumulative Expenditure to Allocated
2001-2002	20	20	20	20	100
2002-03	176.51	196.51	85.29	105.29	53.58
2003-04	0	196.51	73.22	178.51	90.84
2004-05	75.75	272.26	93.75	272.26	100
2005-06	0	272.26	0	272.26	100
Grand Total	272.26	272.26	272.26	272.26	100

Source: Planning and Coordination Department, Government of Orissa

Cumulatively, 100% of the funds were utilized by 2001-02, 53.58% by 2002-03, 90.84% by 2003-04 and 100% of the funds by 2004-05.

Components under Agriculture Diversification

The components under Agriculture Diversification include opening of (1) Agro Service Centres, (2) Additional Sales Centre, (3) Crop Demonstration Programme, (4) Supply of Power Tillers, (5) Supply of Implements to SHGs and (6) Ragi Seed Exchange Programme.

An attempt has been made to record achievements made under each component.

Agro Service Centre

Agricultural mechanization is a major factor in improving agricultural productivity. As Orissa's agriculture in the past was highly under capitalized and under mechanized it was envisaged that provision of Agro Service Centres will help farmers to have access to various mechanized services at reduced lower cost per unit of output as compared to traditional services for cultivation and harvest. These services would increase productivity of land and labour while helping unemployed educated youth to provide custom hiring services to farmers and earn income. It will also help in sensitizing other farmers through demonstration effect about the use of various farm machineries. Within a span of 5 years (2001-02 to 2005-06) 56 Agro Service Centres have been opened in the six-surveyed districts of which Sonepur has the highest (23), followed by Kalahandi (17), Nawarangpur (10), Bolangir (5) and Malkangiri (1). The amount of subsidy availed per Agro Service Centre is Rs. 2 lakhs out of the total investment of about 5 lakhs. This subsidy is provided through the Agricultural Production and Industrial Corporation Limited (APICOL). The eligibility criterion for opening of Agro Service Centre is that the beneficiary should have a minimum of 10 acres of land. This is a major constraint of this component, as most of the farmers do not have 10 acres of land and belong to BPL category. Due to this, they are not able to fulfill the above criterion. Tractors, Power tillers, Rotavetors, Levelers, Water pumps and other agricultural equipments are supplied to the farmers on rent through these Centres. For smooth functioning of these Centres beneficiaries need to extend their

area of coverage. They also need to build up capacity for the maintenance of equipment. One of the challenges facing Agro Service Centres is that due to existence of parallel markets many farmers opt to hire equipment from other places, as the hiring rates are cheaper than the charges of Agro Service Centres. After the harvesting season Agro Service Centres become partially redundant as there are not many farmers availing equipments. However, even if the equipment is not in use, around 10% of the total cost is required for maintenance. Due to lack of proper repairing facilities nearby the cost of repair goes up when the equipments are repaired at distant markets. Delay in sanctioning of loans to beneficiaries by financial institutions hampers the spread of Agro Service Centres.¹

Crop Demonstration Programme

With a view to acquainting farmers with new crops or new ways of growing crops to increase yield and returns Crop Demonstration Programmes were implemented in farmers' fields where farmers experienced for themselves the advantages. Paddy and ragi are the chief cereals of the tribals of the KBK region. Appropriately, Crop Demonstration Programmes included paddy, ragi along with moong and, dry-land oilseed, niger. The demonstration programme was taken up on the basis of 0.5 acre per beneficiary in the year 2002-03. In the Demonstration Programme HYV seeds like Khandagiri, Lalata and Swarna were tried. The total number of beneficiaries under paddy demonstration was 2120 across the six districts with Kalahandi having the highest (480) and Malkangiri the lowest (200). Thus, in total 1060 acre of land was under the Demonstration Programme. The total subsidy availed was Rs 10 lakhs spread over the districts of Kalahandi (Rs 3 lakhs). Malkangiri (Rs 1.21 lakhs), Nuapada (Rs 1.5 lakhs), Sonapur (Rs 1.62 lakhs) and Nawarangpur (Rs 2.5 lakhs).

Ragi Demonstration was taken up in Kalahandi, Malkangiri and Nawarangpur with 200 beneficiaries in each district. Ragi being the second major food source after paddy the acceptance of ragi demonstration programmes was high. The traditional ragi duration is of five months whereas the demonstrated Bhairavi variety is of 3 ½ month duration. Further, the hybrid variety contains 8% to 10% protein in comparison

¹ For example, Shri Vishnu Prasad Gupta a beneficiary of Agro Service Centre, took a loan of 1.4 lakhs from State Bank of India (Nawarangpur Branch). Due to delay in the processing of his documents the opening of his Agro Service Centre was delayed by a year.

to 6% to 8% in the case of the traditional variety. The net area under ragi demonstration was 300 acres at 0.5 acre per beneficiary. The total subsidy availed was around Rs 0.9 lakhs. For increase in production and quality improvement of pulses moong (green gram) demonstration programme was implemented in all the six districts. The farmers earlier used to produce local variety of moong with low yield and returns. The HYV varieties like PDM-11 can suitably replace the local varieties both in Kharif and Rabi. The Agricultural Department through demonstration programmes assures the farmers that with about the same expenditure as in the case of the local variety they will get 120% more production through use of HYV seed variety. The total number of beneficiaries under moong demonstration was 2330 in 1165 acre of land, half an acre per beneficiary. The total subsidy availed was Rs 4.23 lakhs out of which the highest was availed by Kalahandi (Rs 1.96 lakhs) and the lowest by Nawarangpur (Rs 0.33 lakhs).

Oilseeds production in the state has been going down during the last decade. In order to boost production of oilseeds, niger, usually a dryland crop, was rightly chosen for demonstration. The total number of beneficiaries under niger demonstration was 400 the highest being in Kalahandi (200) followed by Malkangiri (75), Nawarangpur (75) and Nuapada (50). A total of Rs 0.93 lakhs was availed as subsidy across all the districts in which niger demonstration was taken up.

These demonstration programmes were primarily aimed at the introduction of high yielding varieties of crops. The programmes also highlighted the use of fertilizers, pesticides and demonstrated improved cropping pattern. Though these programmes have been effective to an extent, lack of follow up provision of HYV seeds, propagation by extension officials, and non-record of demonstration results and its dissemination did not help in increasing substantial area under these crops. It is vital to continue these programmes for successive years so that the beneficiaries do not revert back to use of traditional varieties.

Supply of Power Tiller

Power Tillers have been supplied to the SC/ST farmers at a subsidized rate of 50% (25% RLTA + 25% Work Plan, Agriculture Department) to improve production and

save money and time. An estimate based on discussion with farmers has shown that ploughing of 1 acre of land by bullocks (including labour charges) costs Rs 600. In the case of power tiller this cost comes to Rs 450 with better tillage. A total of 208 power tillers have been supplied across all the six districts during 2001-02 to 2005-06 with Kalahandi (57), Bolangir (11), Malkangiri (16), Sonapur (85) Nawarangpur (29) and Nuapada (10). The total subsidy availed across all the six districts was Rs 94.77 lakhs out of which Rs 30.89 lakhs was availed by Kalahandi and Rs 44.66 lakhs by Sonapur. Due to very poor financial condition tribal farmers are not able to avail power tillers at even a subsidized rate. Therefore it is necessary to make changes in the financing pattern so that the tribal farmers in groups can approach for bank loan and avail subsidy to purchase power tillers. They also need training to maintain the equipment. In this regard a maintenance programme is likely to be effective.

Supply of Agricultural Implements to SHGs

A number of SHGs are functioning actively in all KBK districts. The Agriculture Department provides to some of these SHGs implements such as Power Thresher cum Winnowers, Low-lift Hand Pumps, Hand-Winnowers, Power Sprayers, Hand Compression Sprayers, Puddlers, and Pulse threshers at subsidized rates. The SHGs contribute 5% of the total cost (Rs 51500) i.e. Rs 2575. Out of these some implements such as Power Sprayers are not used very widely due to inadequate knowledge and low scale operations. All the implements supplied have the benefits of saving time, cost, labour and have extensive working capacity. SHGs provide these implements to farmers in their operating area on a rental basis. Thus by giving SHGs the charge of these implements the Agricultural Department has been successful in providing implement facility to farmers at affordable prices and intensify implement use. 444 beneficiaries have benefited under this scheme. 100 sets of implements including Power Threshers, Hand Pumps, Hand Winnowers, Power Sprayers, Hand Compression Sprayers, and Pulse and Pedal Threshers were distributed between 2001/02 to 2005/06. In terms of numbers Kalahandi accounted for the highest (30) set of implements followed by Bolangir (20), Malkangiri (20), Nawarangpur (20) and Sonapur (10). Total subsidy availed under this component was Rs 47.91 lakhs. It has been observed in the above-mentioned districts that these implements were well maintained by the SHGs. As the equipments relate to seasonal use, from discussions

with beneficiaries as well as SHGs, it was learnt that capacity utilization of these equipments is very high, nearly 100%. This is a highly successful scheme.

Ragi Seeds Exchange

Ragi is an important staple food specifically for the tribal people. The Agriculture Department exchanges HYV variety of ragi i.e. Bhairavi with the traditional variety grown by farmers. The period to maturity of the hybrid variety is shorter and the protein content is higher in comparison to the traditional variety. The total number of beneficiaries covered under this component was highest in the year 2004-05 (3829) followed by 2003-04 (3161). A total of 9288 farmers have benefited from this exchange process from 2001-02 to 2005-06. Out of this total the highest number of beneficiaries was in Kalahandi (4052) followed by Nawarangpur (2906), Malkangiri (1881), Sonapur (284) and Bolangir (165). The total subsidy availed was Rs 3.59 lakhs. However, farmers have reverted back to traditional varieties within a year or two of the exchange programme due to improper follow-up. The yield rate reverts back to the previous level.

Opening of Additional Sales Centre

Agriculture Department provides seeds to the farmers through additional sales centres. A total of 57 Additional Sales Centres were opened between 2003-04 and 2005-06 in Bolangir, Nuapada, Sonapur and Kalahandi. No Additional Sales Centre was opened in Malkangiri. The subsidy availed per Sales Centre was Rs 10000. The total subsidy availed amounted to Rs 5.7 lakhs. The district wise distribution of total subsidy was Rs 1.4 lakhs, Rs 1.3 lakhs, Rs 1.2 lakhs and Rs 1.8 lakhs in the cases Bolangir, Nuapada, Sonapur and Kalahandi respectively. It has been found that the number of Sales Centres is not enough to fulfill the demands of the farmers. However, the Sales Centres have been able to meet the requirement of approximately 15-20 farmers requiring quality seeds. The impact of the components implemented have been analyzed in the next chapter. (for details see Annexure 3.1)

**Annexure 3.1: Achievements under Agriculture Diversification in 6 surveyed Districts of
KBK region from 2001-02 to 2005-06**

Component/ District		Bolangir	Kalahandi	Malkangiri	Nawarangpur	Nuapada	Sonepur	Total
Agro Service Centres	No. of beneficiaries	5	17	1	10	0	23	56
	No. of sales centres opened	5	17	1	10	0	23	56
	Total subsidy utilized (Rs in lakhs)	10	34	2	20	0	46	112
Paddy Demonstration	No. of beneficiaries	440	480	200	400	240	360	2120
	Total subsidy utilized (Rs in lakhs)	-	3	1.21	2.5	1.5	1.62	9.83
Ragi Demonstration	No. of beneficiaries	0	200	200	200	0	0	600
	Total subsidy utilized (Rs in lakhs)	0	0.25	0.4	0.26	0	0	0.91
Niger Demonstration	No. of beneficiaries	0	200	75	75	50	0	400
	Total subsidy utilized (Rs in lakhs)	0	0.33	0.4	0.12	0.08	0	0.93
Moong Demonstration	No. of beneficiaries	750	805	75	100	350	250	2330
	Total subsidy utilized (Rs in lakhs)	-	1.96	0.4	0.33	1.13	0.41	4.23
Supply of Power Tillers	No. of Power Tillers Supplied (one/benef.)	11	57	16	29	10	85	208
	Total subsidy utilized (Rs in lakhs)	4.29	30.89	4.4	7.83	2.69	44.65	94.75
Supply of Implements to SHGs	No. of Beneficiaries	200	104	20	20	0	100	444
	No. of Implements supplied	20	30	20	20	0	10	100
	Total subsidy utilized (Rs in lakhs)	9.77	15.05	10.3	9.7	0	3.09	47.91
Ragi Seed Exchange	No. of Beneficiaries	165	4052	1881	2906	0	284	9288
	Quantity of seeds exchanged (Qtls)	5.28	185.25	90.6	113.44	0	6	400.57
Additional Sale Centres	No. of Beneficiaries	1209	0	0	0	0	1099	2308
	No. of Sales centres opened	14	18	0	0	13	12	57
	Total subsidy utilized (Rs in lakhs)	1.4	1.8	0	0	1.3	1.2	5.7

Source: District Agriculture Offices

IMPACT OF DIVERSIFICATION

Ideally impact of a programme should be assessed independent of influence of other concurrent programmes/schemes being implemented in the same area. However, it is difficult to isolate the impact of a particular programme in question when the multicollinearity among programmes is high. If a number of programmes of a particular genre are being implemented simultaneously within a region, the impact of the programme concerned will certainly be influenced and the additional benefits before and after programme implementation will show the direction of the impact. Agricultural diversification is not independent of watershed development, irrigation, general extension improvement and better planning and implementation of all agriculture related components ongoing in KBK project area. The assessment therefore makes an attempt to estimate the overall impact on beneficiaries of Agricultural Diversification. The following analysis highlights positive indicators in terms of diversification and provides an overall assessment of the impact of the programme.

Changes that have occurred in crop composition, area coverage, yield, output and value of output in respect of beneficiaries and non-beneficiaries are analyzed for all the six districts taken together as well as for individual districts. Input intensification and cost of production, additional net income accrual from agriculture and from all household activities associated with the above changes are also analyzed for measuring total impact of the programme on beneficiaries and the demonstration effect changes in respect of beneficiaries. To facilitate understanding, season-wise analysis has been preferred.

Seasons and Crop Diversification

The major crops grown across all the six surveyed districts of the KBK region are paddy, ragi and maize in terms of cereals and biri, kulthi and moong in the case of pulses. Paddy cultivation dominates the cropping pattern to such an extent that achievements made in terms of diversification sometimes become overshadowed due to the small weightage of crops diversified into. Diversification towards commercial crops has taken place in the form of groundnut, cotton and sugarcane. From the primary sample survey cotton emerges as a crop with high value per unit but its production is limited to mainly two KBK districts Bolangir and Kalahandi.

Kharif

The highlighting feature of cultivation in terms of cereals among beneficiaries in the Kharif season is marked by a decline in the area, production and yield rate of ragi and diversification towards paddy. This is hard to understand when we take into perspective that ragi is covered under two components of the Crop Diversification Programme i.e. Ragi Seed Exchange Programme and Ragi Crop Demonstration Programme. One primary reason for this is the low level of acceptance of high yielding varieties provided by the Agriculture Department. The tribals do not find hybrid varieties of ragi palatable in comparison to the traditional varieties. The price in the market for high yielding variety is not very remunerative. Further, although the Crop Demonstration Programme was undertaken in the year 2002-03, the benefits that would accrue in that period or in subsequent period have not continued up to the present period. Farmers also find that paddy cultivation is slightly more remunerative than ragi cultivation. The area under ragi was only 7.67% of the area under paddy pre-implementation which has decreased to 4.11% of the area under paddy at present. So, in terms of coverage ragi does not influence the net cereal production to a high extent. Consequently, the value of output in terms cereals has gone up by about 44%. Among the major pulses comprising of arhar, biri, moong and chana there has not been a very significant change in terms of area under cultivation in the surveyed districts as a whole. However, the yield rates of all the pulses have gone up leading to a 50% increase in value of output.

One of the most positive changes seen is the diversification of new area brought under cultivation towards cotton. Among the sample households the area under cultivation has gone up from a mere 3 hectares to about 40 hectares. This change is most prominent in Bolangir and Kalahandi. Among oilseeds the area under til has gone up by 24%. Though the area under groundnut has gone down, the yield has increased by 61%. This inclination towards til over groundnut is also commensurate with the district figures where the area under groundnut between 2001-02 and 2004-05 has increased from 52000 hectares to 58000 hectares whereas in the case of til the area has increased from 82000 hectares to 100000 hectares among the six surveyed districts. Sugarcane has also increased in terms of area and yield. A positive impact of the various programmes undertaken by the Agriculture Department is an increase in the yield rates of most of the crops.

Table 4.1: Crop-wise change in Area, Output, Yield and Value among Beneficiaries in Kharif Season of six surveyed districts

Kharif	Before (Pre Implementation)				After (Post Implementation)				Percentage Change (After to Before)			
	Area (ha)	Output (Qtls)	Yield (Qtls/ha)	Value (Rs)	Area (ha)	Output (Qtls)	Yield (Qtls/ha)	Value (Rs)	Area	Output	Yield	Value
Cereals	454.42	6516	14.34	2973323	465.85	8769	18.8	4275814.0	2.52	34.58	31.10	43.81
Pulses	7.89	20	2.53	31935	8.52	26	3.1	48035.0	7.98	30.00	22.53	50.41
Oilseeds	11.54	55	4.77	79250	11.74	57	4.9	76955.0	1.73	3.64	2.73	-2.90
Vegetables	1.82	25	13.73	13900	2.03	164	80.8	157000.0	11.54	556.00	488.49	1029.50
Fibres	3.04	39	12.83	78100	39.88	490	12.3	997400.0	1211.84	1156.41	-4.13	1177.08
Sugarcane	6.07	500	82.33	497000	8.10	740	91.4	680150.0	33.44	48.00	11.02	36.85
Total	484.78			3673508	536.12			6235354.0	10.59			69.74

Source: Primary Data Survey

Table 4.2: Crop-wise change in Area, Output, Yield and Value among Beneficiaries in Rabi Season of six surveyed districts

Crops	Before (Pre Implementation)				After (Post Implementation)				Percentage Change (After to Before)			
	Area (Ha)	Output (Qtls)	Yield (Qtls/ha)	Value	Area (Ha)	Output (Qtls)	Yield (Qtls/ha)	Value	Area	Output	Yield	Value
Cereals	8.1	162	20.0	74450	9.86	263	26.67	133900	21.73	62.35	33.35	79.85
Pulses	60.32	226	3.7	350380	98.74	335	3.39	633960	63.69	48.23	-8.38	80.93
Oilseeds	9.55	87	9.1	118400	15.59	166	10.65	220552	63.25	90.80	17.03	86.28
Vegetables	3.24	362	111.7	71050	7.61	722	94.88	302100	134.88	99.45	-15.06	325.19
Total	81.21			614280	131.8			1290512	62.30			110.09

Source: Primary Data Survey

Rabi

The Rabi period is marked by the absence of paddy in many districts and diversification into more pulses and vegetables though the area under cultivation is substantially less than that in the Kharif season.

In comparison to the Kharif season the area under paddy is substantially less. As during the Kharif season the area under ragi has also declined in the Rabi season. Most of the newly cultivated land has been diverted towards pulses, moong in particular. The total change in area under cultivation among pulses is 64%. Moong is also one of the crops under the Demonstration programmes. The value of output of pulses has increased by 94%. Another positive impact of the diversification process is seen in the case of oilseeds such as groundnut, sunflower and til where the area under cultivation has increased by 63%. Increase in area under cultivation is also evident in vegetables such as brinjals and onions. (for details see Annexure 4.2, 4.3, 4.4, 4.5)

Districtwise Status during Kharif

Bolangir: The main crops grown in Bolangir, post and pre implementation are paddy, biri, chana, kulthi, moong, groundnut and cotton. Wheat and sugarcane (beneficiaries) have

Table 4.3: Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Bolangir District

Kharif	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	-8.20	37.82	50.13	53.00
Cereals	-5.68	40.95	49.43	56.18
Biri	-82.22	-50.00	181.25	-76.13
Kulthi	-81.43	-75.00	34.62	-64.84
Moong	18.18	33.33	12.82	41.48
Pulses	-40.00	-30.00	16.67	-14.93
Groundnut	100.00	333.33	116.67	328.70
Oilseeds	100.00	333.33	116.67	328.70
Brinjal	-100.00	-100.00	-100.00	-100.00
Cabbage	-100.00	-100.00	-100.00	-100.00
Tomato	-20.00	100.00	150.00	124.62
Vegetables	-55.56	-12.00	98.00	5.04
Cotton	1575.00	2566.67	59.20	2581.30
Fibres	1575.00	2566.67	59.20	2581.30
Kharif	10.65			140.87

been introduced post implementation. The area under paddy has declined by about 8 percent in the case of beneficiaries and 17 percent in the case of non-beneficiaries. This decrease has resulted due to diversification from paddy towards cotton. However, high percentage increase in the yield rates for both the groups has more than compensated the area reduction effect and there has been a 37.82% and 7.55%

increase in the production of paddy in the case of beneficiaries and non-beneficiaries respectively. The increase in paddy yield rate is primarily because of the use of hybrid varieties of seeds. There has been a nearly 17-fold increase in the area under cotton. Increase in area in conjunction with increase in yield rate has led to a nearly 2567% increase in output. The yield rate post implementation in the case of cotton is higher in the case of beneficiaries as compared to non-beneficiaries. Groundnut is the principal oilseed cultivated. In the case of beneficiaries the discontinuation of brinjal and cabbage has been due to a diversification towards groundnut. There has been an about 117% increase in the yield rate which along with two fold increase in area under cultivation has contributed to a 333% increase in production. Sugarcane has been introduced post implementation in the case of beneficiaries. Some of the area under pulses such as kulthi and biri has been diverted towards sugarcane in the case of beneficiaries. Non-beneficiaries have not undertaken sugarcane cultivation. Further, since the area under pulses and vegetables is a fraction of the area under other major crops, particularly paddy, they do not influence the sample total in terms of area and production very much. Overall there has been a 141% increase in the value of output of Kharif crops in the case of beneficiaries.

Table 4.4: **Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Bolangir District (% change after to before)**

Kharif Crops	Area	Output	Yield	Value
Paddy	-17.23	7.55	29.94	24.40
Cereals	-12.31	16.04	32.23	35.25
Kharif	16.44 ¹			154.40

Kalahandi: Kalahandi is marked by more than a 1081% increase in area under cotton in the case of beneficiaries and 266% in the case of non-beneficiaries. In actual terms the increase of about 24 hectares in the case of beneficiaries has been due to a 12-hectare decline in the area under paddy along with additional area cultivated being diverted towards cotton. Though the area under paddy has declined yet the use of high yielding seeds along with input intensification specifically fertilizers has led to 29.57% increase in yield rate and consequently an about 14% increase in production. Farmers have started diversifying from ragi towards maize as the returns from

Table 4.5: **Kharif Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Kalahandi District**

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	-12.22	13.74	29.57	20.47
Ragi	-25.00	-40.00	-20.00	-66.67
Cereals	-11.80	13.84	29.07	20.89
Arhar	50.00	80.00	20.00	101.01
Pulses	50.00	80.00	20.00	101.01
Cotton	1081.82	896.97	-15.64	914.59
Fibres	1081.82	896.97	-15.64	914.59
Kharif	15.57			127.46

maize are higher as compared to ragi. In the case of non-beneficiaries the status of ragi has remained constant. Maize has been introduced post-implementation for both the groups with a yield rate of 7.06 qntl/ha. This is less (by 36%) than the state yield

Table 4.6: **Kharif Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Kalahandi District**

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	-5.00	17.59	23.78	23.13
Cereal	-4.27	17.89	23.15	23.42
Tomato	0.00	20.00	20.00	50.00
Vegetables	0.00	16.67	16.67	38.89
Cotton	266.00	225.00	-11.20	230.73
Kharif	25.11			89.45

of 10.99 qntl/ha (2004-05) as maize has been newly introduced in most of the sample villages. The status of sesame (til) has remained constant. Arhar is the chief pulse crop and has increased in yield, output and area in the case of beneficiaries and has been introduced post implementation in the case of non-beneficiaries. Sugarcane figures only in the case of beneficiaries, post-implementation. Banana has been introduced in the case of beneficiaries. The overall summation for Kharif shows 127.46 and 89.45 percent increase in value of output in the cases of beneficiaries and non-beneficiaries respectively.

Malkangiri: In Malkangiri, among both beneficiaries and non-beneficiaries, the area under ragi has come down and has been replaced by paddy and marginally by maize. This is primarily because ragi has a lower market value than paddy and maize. Even though ragi seed exchange is one of the major components under crop diversification programme, farmers revert to traditional varieties after a year or two of

Table 4.7: **Kharif Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Malkangiri District**

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Maize	25.00	64.81	31.85	69.05
Paddy	19.29	53.98	29.08	65.07
Ragi	-45.20	-54.13	-16.30	-51.54
Cereals	4.76	41.77	35.37	51.42
Groundnut	-66.67	-57.14	28.57	-49.05
Til	36.00	50.00	10.29	25.45
Oilseeds	-6.98	-18.18	-12.78	-18.31
Kharif	4.18			67.34

Table 4.8: **Kharif Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Malkangiri District**

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Maize	0.00	66.67	66.67	80.00
Paddy	2.04	48.87	45.89	58.09
Ragi	-33.33	66.67	150.00	14.51
Cereals	-1.75	50.99	53.69	59.28
Til	37.50	16.67	-15.15	-6.20
Kharif	3.08			50.84

being introduced to high yielding varieties leading to decline in yield rates. Consequently, the yield rate of ragi has come down by more than 16% in the case of beneficiaries. In the case of maize the area under cultivation has increased by

25% in the case of beneficiaries and remained static in the case of non-beneficiaries. Though, the yield rate of groundnut has increased there has been a decrease in production due to diversion of area under groundnut towards sesamum. There has been a 50% and 16.67% increase in the production of sesamum in the cases of beneficiaries and non-beneficiaries respectively due to increase in area under cultivation and yield rates. The percentage increase in the total Kharif value of output is about 17% higher in the case of beneficiaries as compared to non-beneficiaries.

Nawarangpur: The area, yield and output have gone up in the case of paddy though this increase is less in the case of non-beneficiaries. About 42% of the ragi area has now been diverted towards paddy. In spite of a 12.7% increase in yield rate in the case of beneficiaries the production of ragi has come down by 37% due to decrease in area under cultivation. Maize, biri and alasi have been introduced post-implementation in the case of beneficiaries. The status of kulthi has remained the same in the case of

Table 4.9: Kharif Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Nawarangpur District

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	15.28	34.41	16.59	42.91
Ragi	-43.99	-36.89	12.66	-31.81
Cereals	4.42	32.51	26.92	41.11
Pulses	12.50	50.00	11.11	108.33
Til	0.00	-33.33	-33.33	-38.46
Oilseeds	100	0.00	-50.00	7.69
Guruji	200	100	-33.33	240
Millets	200	100	-33.33	240
Sugarcane	13.33	23.00	8.53	23.74
Kharif	6.29			35.84

Table 4.10: Kharif Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Nawarangpur District

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	3.08	18.36	14.83	27.06
Ragi	-60.00	-14.29	114.29	1.21
Cereals	-2.60	17.86	21.01	26.67
Til	0.00	0.00	0.00	-11.11
Sugarcane	50.00	133.33	55.56	133.33
Kharif	1.28			49.07

beneficiaries. The increase in area under guruji has led to doubling of production among beneficiaries. The total Kharif area under cultivation has increased by 6.29% in the case of beneficiaries and by 1.28% among non-beneficiaries.

Nuapada: Paddy is the only cereal in the case of beneficiaries and the only crop in the case of non-beneficiaries showing positive indicators in terms of increase in area under cultivation, yield and thus output. Arhar, kulthi and guruji have been introduced post-implementation. Nuapada has the highest yield in terms of arhar in comparison to other

districts at 9.88 qntl/ha. Guruji is the only millet and has been introduced post implementation. The overall increase in area and value of output in the Kharif season is 17% and 63.93% in the case of beneficiaries.

Table 4.11: Kharif Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Nuapada District

Kharif Crops	Percentage Change(After to Before)			
	Area	Output	Yield	Value
Paddy	13.82	52.24	33.75	62.37
Cereals	13.82	52.24	33.75	62.37
Pulses	250.00	166.67	-23.81	144.44
Kharif	17.01	53.00	30.76	63.93

Table 4.12: Kharif Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Nuapada District

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	19.57	76.92	47.97	90.59
Cereals	19.57	76.92	47.97	90.59

Sonepur: In Sonepur mono-cropping in the form of paddy has increased yield, area and production by 12.56%, 39.78% and 24.18% respectively in the case of beneficiaries.

Table 4.13: Kharif Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Sonepur District

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	12.56	39.78	24.18	47.97
Cereals	12.56	39.78	24.18	47.97
Kharif	12.56			47.97

Table 4.14: Kharif Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Sonepur District

Kharif Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	10.96	87.29	68.79	99.66
Cereals	10.96	87.29	68.79	99.66

Rabi

Bolangir: Wheat and biri have been introduced into Bolangir during-implementation in the case of beneficiaries with a very small area under cultivation. Kulthi and moong show a 25% and 136.36% increase in the area under cultivation and a 60% and 4.36% increase in yield respectively. As a result the production of kulthi and

Table 4.15: Rabi Season Crop-wise Change in Area, Output, Yield and Value of output of Beneficiaries of Bolangir District

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Arhar	-100.00	-100.00	-100.00	-100.00
Chana	-50.00	-50.00	0.00	-29.41
Kulthi	25.00	100.00	60.00	-23.08
Moong	136.36	146.67	4.36	168.21
Pulses	60.00	44.83	-9.48	118.87
Groundnut	-37.50	-31.25	10.00	-14.63
Oilseeds	50.00	50.00	0.00	48.48
Rabi	55.30			92.32

moong has gone up by 100% and 147% respectively. The area under arhar has seen a shift

towards moong. In the case of beneficiaries, though there has been an increase in the yield rate of groundnut the area has declined sharply decreasing production. This has been due to

Table 4.16: **Rabi Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Bolangir District**

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Moong	400.00	300.00	-20.00	311.00
Pulses	400.00	300.00	-20.00	311.00
Groundnut	-100.00	-100.00	-100.00	-100.00
Sunflower	-100.00	-100.00	-100.00	-100.00
Rabi	66.67			-14.38

diversification towards sunflower. Overall oilseeds have increased in terms of area under cultivation by 50% in the case of beneficiaries. Apart from this beneficiaries have also diversified into fruits and vegetables such as brinjal and watermelon. Such a diversification is absent in the case of non-beneficiaries and the value of output during the rabi season has declined by more than 14 percent for the non-beneficiary group. Overall the increase in area and value of output for rabi is 55% and 92% respectively among beneficiaries.

Kalahandi: The cropping status of Kalahandi is marked by the absence of wheat during rabi. Paddy is cultivated both in the case of beneficiaries and non-beneficiaries but only on a fraction of the area cultivated in Kharif. Many pulses such as arhar, biri, boota, chana, kulthi, masur and moong are being cultivated with either increased or static production among both the groups. Niger has been

Table 4.17: **Rabi Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Kalahandi District**

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Arhar	14.29	20.00	5.00	44.44
Chana	50.00	166.67	77.78	184.21
Moong	48.57	81.08	21.88	83.29
Pulses	41.41	75.00	23.75	76.51
Oilseeds	10.00	33.33	21.21	11.11
Onion	100.00	46.67	-26.67	56.00
Vegetables	66.67	38.89	-16.67	40.00
Rabi	45.54			81.55

introduced whereas sunflower has maintained the same status in the case of beneficiaries.

Table 4.18: **Rabi Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Kalahandi District**

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Moong	233.33	100.00	-40.00	167.33
Pulses	333.33	133.33	-46.15	170.63
Rabi	109.09			35.31

Onion cultivation is marked by a two-fold increase in area under cultivation promoting increase in production by 47%. Overall the area under rabi crops has increased by 45.54% and value of output by nearly 82% among beneficiaries.

Malkangiri: Malkangiri is marked by the introduction of bajra in the case of beneficiaries and the relative absence of diversification in the case of non-beneficiaries with only kulthi and moong being cultivated. Paddy is grown during the rabi season with reduction in area but increase in yield, which as a whole boosts production. Cultivation of maize has remained static in terms of area, yield and production. The area under arhar has increased by 200 percent, which has increased the production by the same percentage inspite of a static yield. Chana has been introduced during implementation. Cultivation of groundnut has shown increase in area and yield boosting production whereas production of til has remained constant. There has also been diversification in terms of cauliflower and tomato, both newly introduced. Among beneficiaries the area under rabi crops has increased by 52%.

Table 4.19: **Rabi Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Malkangiri District**

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Paddy	-35.71	11.71	73.77	20.27
Ragi	0.00	100.00	100.00	60.00
Cereals	-31.61	12.28	64.18	20.53
Arhar	200.00	200.00	0.00	200.00
Moong	133.33	100.00	-14.29	118.33
Pulses	250.00	175.00	-21.43	161.18
Groundnut	185.71	292.00	37.20	275.00
Til	0.00	0.00	0.00	-8.33
Oilseeds	136.84	260.71	52.30	233.54
Rabi	51.79			265.58

Table 4.20: **Rabi Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Malkangiri District**

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Kulthi	-100.00	-100.00	-100.00	-100.00
Moong	Newly introduced			
Rabi	0.00	0.00	0.00	200.00

The value of output has tripled in the case of non-beneficiaries due to shift from kulthi to moong cultivation.

Nawarangpur: There has been a decline in the production of ragi in the case of beneficiaries due to diversification towards til. Paddy has replaced ragi in the case of non-beneficiaries. Since paddy gives higher returns than ragi the non-beneficiary farmers are now earning about 9 times in comparison to what they

Table 4.21: **Rabi Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Nawarangpur District**

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Ragi	-40.00	-37.50	4.17	-37.50
Cereals	-22.22	-6.25	20.54	3.77
Chana	175.00	71.43	-37.66	78.85
Moong	-33.33	0.00	50.00	35.29
Pulses	154.29	100.00	-21.35	112.50
Rabi	121.25			186.42

Table 4.22: Rabi Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Nawarangpur District

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Ragi	-100	-100	-100	-100
Cereals	0.00	900.00	900.00	820.00
Kulthi	-53.33	-50.00	7.14	-48.72
Pulses	-53.33	-50.00	7.14	-48.72
Rabi	10.00			357.55

earned in the case of ragi with the same amount of area under coverage. In the case of beneficiaries maize cultivation has maintained the same status both pre and post implementation. Arhar, kulthi and moong have been introduced whereas chana has shown an over 70 percent increase in production. Non-beneficiaries have not diversified into the above pulses except for kulthi, which despite increase in yield has lost its area under cultivation and consequently there has been a substantial decrease in production. A heartening fact is the introduction of various vegetables in both the groups such as brinjal, cabbage, and tomato. Apart from these onion and potato have also been introduced but they are confined to the beneficiary group. Overall the area under cultivation has increased by 121% and 10% in the case of beneficiaries and non-beneficiaries respectively.

Nuapada: Paddy, which was earlier grown only during the Kharif season has now been introduced in the rabi season in the case of beneficiaries. Chana and kulthi show an increase in yield and production in the case of beneficiaries. Use of traditional seeds after a year or two of employing hybrid seeds has led to a decline in the yield rate of onion by 39%. However, onion production has gone up despite a decline in yield rate due to a two-fold increase in area under

Table 4.24: Rabi Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Nuapada District

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Chana	-40.00	-28.57	19.05	-27.27
Pulses	93.33	125.00	16.38	385.08
Rabi	100.00			387.77

Table 4.23: Rabi Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Nuapada District

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Chana	9.76	29.63	18.11	48.53
Kulthi	0.00	25.00	25.00	68.18
Masur	50.00	0.00	-33.33	18.67
Moong	141.67	-7.14	-61.58	45.29
Pulses	54.93	7.89	-30.36	45.98
Groundnut	-10.00	-40.00	-33.33	-43.33
Oilseeds	0.00	-40.00	-40.00	-41.38
Onion	100.00	21.64	-39.18	42.02
Vegetables	100.00	21.64	-39.18	42.02
Rabi	59.77			47.86

cultivation. In the case of non-beneficiaries onion has been newly introduced. Chilly has been introduced post-implementation. Overall there has been a nearly 60% increase in area under rabi crops among beneficiaries.

Sonepur: Among cereals paddy and wheat have been introduced in the case of beneficiaries. The pulses comprising of biri, chana, kulthi and moong all show a positive growth in production. The crops cultivated by non-beneficiaries are confined to chana, moong and groundnut and as such much diversification has not taken place for this

group. In the case of beneficiaries cultivation of groundnut has remained static and

Table 4.25: Rabi Season Crop-wise Change in Area, Output, Yield and Value of Beneficiaries of Sonepur District

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Arhar	40.00	0.00	-28.57	-10.62
Biri	200.00	300.00	33.33	253.42
Chana	187.50	46.15	-49.16	25.41
Kulthi	100.00	100.00	0.00	220.00
Moong	73.91	62.50	-6.56	126.45
Pulses	90.32	55.56	-18.27	92.05
Oilseeds	50.00	8.00	-28.00	9.60
Brinjal	-50.00	0.00	100.00	20.00
Onion	100.00	66.67	-16.67	66.67
Vegetables	50.00	71.88	14.58	95.95
Rabi	96.57			93.54

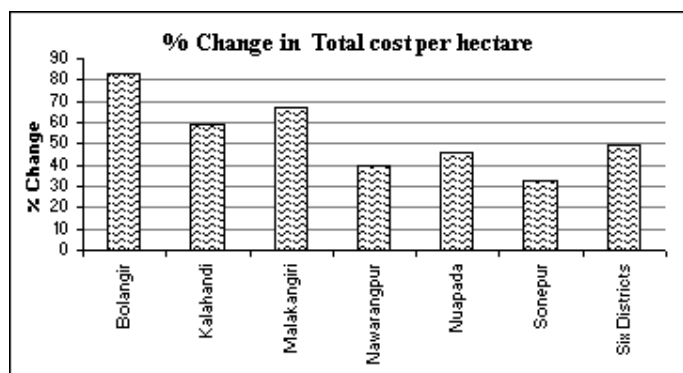
Table 4.26: Rabi Season Crop-wise Change in Area, Output, Yield and Value of Non-Beneficiaries of Sonepur District

Rabi Crops	Percentage Change (After to Before)			
	Area	Output	Yield	Value
Moong	-5.26	10.00	16.11	7.40
Pulses	15.79	20.00	3.64	13.49
Groundnut	0.00	0.00	0.00	-33.33
Oilseed	0.00	0.00	0.00	-33.33
Rabi	14.29			0.58

sunflower has been newly introduced. The area under onion has doubled and the output has increased by about 67% in the case of beneficiaries. Tomato and sugarcane have been introduced post implementation. There has been a 96.57% increase in area under rabi crops in the case of beneficiaries and only 14.29% in the case of non-beneficiaries.

Input Use and Cost of Production

The cost of production relates to labour, seeds, ploughing, pesticides, fertilizers, transport and miscellaneous expenditures.



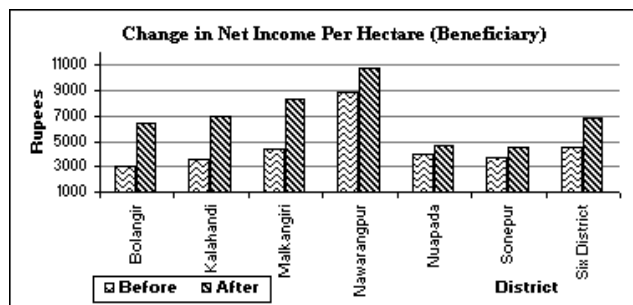
Among beneficiaries the increase in expenditure on labour is highest in Bolangir and lowest in Sonepur. In the case of non-beneficiaries the highest increase is in the case of Nuapada and the lowest in the case of Kalahandi.

Use of high yielding varieties of seeds is an important component towards increasing yield,

production and in turn value of output. The increase in cost under seeds is highest in Bolangir at 64 percent and lowest in the case of Nawarangpur with a marginal increase of 8.86 percent. Increase on ploughing costs is greatest in the case of Malkangiri and lowest in the case of Sonepur among beneficiaries. Non-beneficiaries' additional cost on ploughing in the case of Kalahandi is around 10% and the highest in Sonepur. The highest increase in terms of fertilizer cost has been in the case of Bolangir and lowest in the case of Sonepur. The range varies from 47% to 141% in the case of beneficiaries. Among non-beneficiaries the highest increase is in the case of Nuapada and lowest in Kalahandi. A point to note is that the increase in value of output, barring Nuapada, is to a large extent a function of increase in expenditure on fertilizers. The increase in expenditure on transport is highest in Kalahandi at 70% and lowest in Sonepur and Nuapada at around 26%. The variation on transport cost is in the range of 26% to 58%. The overall increase in cost in descending order is 89%, 67%, 66%, 42%, 36% and 29% in the case of Bolangir, Malkangiri, Kalahandi, Nuapada, Nawarangpur and Sonepur respectively among beneficiaries. (for details see annexure 4.6)

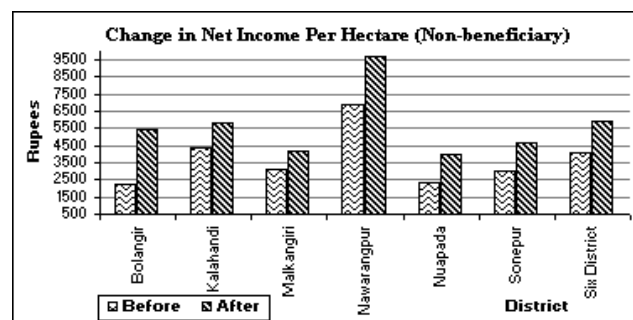
Income Status

In Bolangir the value of output in the case of beneficiaries has increased by 99 percent and this change is highest among all the six surveyed districts. Though the increase in cost of



cultivation per hectare is also highest in the case of Bolangir, the net income has increased by 107 percent. Non-beneficiaries have also benefited indirectly through the programme. Though their value of

output is less than beneficiaries, their cost of cultivation per hectare is nearly half of the cost incurred by beneficiaries resulting in a 139% increase in income. In Kalahandi the increase in Value of output per hectare is 83 percent and the increase in cost incurred is 66 percent. Increase in income is 96 percent in the case of beneficiaries whereas in the



case of non-beneficiaries this increase is only 35%. In Malkangiri the value of output in the case of beneficiaries 81 % where as for non-beneficiaries this increase is only 48%. The increase in cost incurred by both the groups is nearly the same. In Nawarangpur the increase in the value of output is relatively less as compared to other districts and the increase in cost incurred is greater than the increase in value of output. However, the net income has increased by 22%. Nuapada shows the least increase in net income at 16%. The main reason for this is that the increase in Value of output is substantially less than the increase in cost incurred. In Sonepur the increase in Value of output, cost incurred and net income is 26%, 29% and 23% respectively. (for details see annexure 4.7)

The per capita monthly income from agriculture in all districts both pre and post implementation is greater in the case of beneficiaries in comparison to non-beneficiaries. The pre implementation income among beneficiaries is highest in the case of Nawarangpur whereas post implementation it is highest in the case of Kalahandi. The percentage change in income for the beneficiary group is highest in the case of Bolangir and lowest in the case of Nawarangpur. The difference between beneficiaries and non-beneficiaries pre implementation is highest in Nuapada whereas post implementation it is highest in Malkangiri. Overall, the percentage change in income from agriculture taking all the six districts together is 85% in the case of beneficiaries and 77% in the case of non-beneficiaries.

Table 4.27: District wise Monthly Net Per capita Income from Agriculture

(Figures in Rs)

District	Beneficiary		Non-Beneficiary		Difference Between Beneficiary & Non-beneficiary		% change in respect of beneficiaries	% change among non-beneficiaries
	Before	After	Before	After	Before	After		
Bolangir	77	189	44	139	33	50	145	216
Kalahandi	137	329	109	203	28	126	140	86
Malkangiri	100	234	59	82	41	152	134	39
Nawarangpur	227	310	192	281	35	29	37	46
Nuapada	88	144	36	84	52	60	64	133
Sonepur	125	190	86	146	39	44	52	70
Total	127	234	90	160	37	74	84	78

Source: Primary Data Survey

Additional Sources of Income

Beneficiaries and non-beneficiaries have adopted different means of livelihood apart from agriculture, which include daily labour, business in the form of shops, pisciculture and carpentry. In all the districts the secondary occupation resorted to by the highest number of households is daily labour. Though no investment is required for this activity the income received from wage per household is not very high.

In Bolangir 32 households are engaged in daily labour with a yearly per household income of Rs 12087. The highest income in this district is derived from pisciculture at Rs 20000 per household. 20 households do not have any additional source of income. In Kalahandi 19 households have resorted to daily labour with a per household income of about 6000 rupees. 6 households are engaged in small businesses with an average investment per household of Rs 44500, which is a one-time investment. The average income from business is 11700 rupees. A few households have members as carpenters and servicemen.

In Malkangiri 26 households have members engaged as daily labourers. The average yearly income from daily labour is about 4900 rupees. NTFP collectors are averaging just above 3200 rupees per household per year. Self-employed earners have invested Rs 1 lakh per household which is a one time investment, and expected returns are 12500 rupees per head per year. 22 households have not undertaken any additional activity.

In Nawarangpur daily labour has been resorted to by 30 households with a yearly income of 4000 rupees per household. One household each has taken up dairy farming and carpentry. Though the initial investment in dairy farming is Rs 1.5 lakhs, the yearly returns are round about 50% of the investment at 74500 rupees.

Nuapada has the highest (34) number of households dependant solely on agriculture. The yearly remuneration from daily labour is about 5100 rupees per household. Carpentry, NTFP collection and Dairy Farming have been taken by one household each with yearly incomes of Rs 8400, Rs 6000 and Rs 18000 respectively.

In Sonepur 31 households are engaged in daily labour with a yearly income of Rs 6000 per household. Traditional works have been undertaken by 7 households though the yearly

income from these works averages to only Rs 3100 per household. 18 households have not adopted any secondary activities. (for details see annexure 4.8)

District-wise Distribution of Income from Agriculture and Secondary Occupations

Incomes have been derived from agriculture and other occupations classified under business, daily labour, pisciculture, service and NTFP collection among all the districts. Bolangir has the lowest contribution to total income from agriculture (58%) and the highest in terms of daily labour. Daily Labour contributes the highest to net income after agriculture across all districts except Kalahandi.

Table 4.28: Details of income earned through Agriculture and Secondary Occupations*

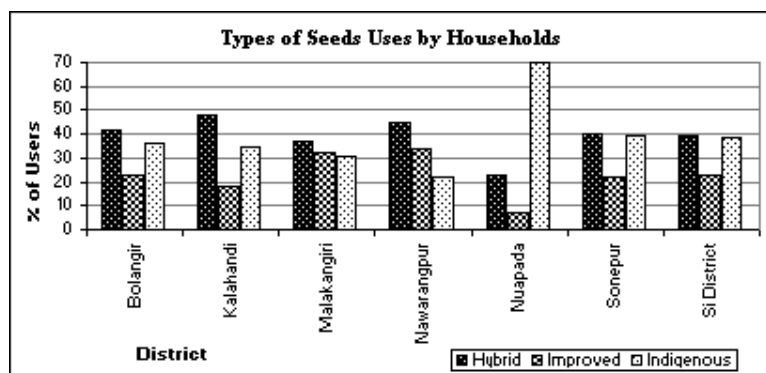
District	Details	Agriculture	Business	Daily Labour	Pisciculture	Service	NTFP	Others	Total
Bolangir	No of households	60	6	32	1	1		2	
	Income (in Rs)	712126	61200	386780	20000	18000	0	15000	1213106
	% of total income	58.70	5.04	31.88	1.65	1.48	0.00	1.24	100.00
Kalahandi	No of households	60	6	19	0	0	0	5	
	Income (in Rs)	1251895	70400	114440	0	0	0	218000	1654735
	% of total income	75.66	4.25	6.92	0.00	0.00	0.00	13.17	100.00
Malkangiri	No of households	60	3	26	1	3	9	2	
	Income (in Rs)	827859	7300	128000	1250	36000	29140	25000	1054549
	% of total income	78.50	0.69	12.14	0.12	3.41	2.76	2.37	100.00
Nawarangpur	No of households	60	6	30	0	4	0	4	
	Income (in Rs)	1293078	84000	120100	0	28800	0	100600	1626578
	% of total income	79.50	5.16	7.38	0.00	1.77	0.00	6.18	100.00
Nuapada	No of households	60	1	19	0	1	1	3	
	Income (in Rs)	497803	4500	98500	0	14400	6000	32400	653603
	% of total income	76.16	0.69	15.07	0.00	2.20	0.92	4.96	100.00
Sonepur	No of households	60	4	31			1	9	
	Income (in Rs)	735520	27800	186500			4800	33000	987620
	% of total income	74.47	2.81	18.88	0.00	0.00	0.49	3.34	100.00
Total		5318281	255200	1034320	21250	97200	39940	424000	7190191
Percentage to Total		73.97	3.55	14.39	0.30	1.35	0.56	5.90	100.00

* Numbers of Households feature more than once as different members are engaged in different occupations
Source: Primary Data Survey

In all districts except Bolangir the percentage contribution to net income from agriculture ranges from 74.5% in the case of Sonepur to 79.5% in Nawarangpur. The contribution from Businesses are significant enough in the case of Bolangir (5%), Kalahandi (4.25%) and Nawarangpur (5.16%). The contributions from NTFP collection are below 1 percent in all districts except Malkangiri (2.76%). Other activities comprise of carpentry, dairy farming and traditional works and contribute quite significantly in Kalahandi (13.17%).

Seed Utilization

The use of Hybrid and Improved seeds over Indigenous seeds has increased substantially and is one of the contributing factors towards increase in yield of different crops. Among beneficiaries the percentage of hybrid seeds users is highest in Nawarangpur (47%)



followed by Kalahandi (46%), Bolangir (42%), Sonepur (39%), Malkangiri (37%) and Nuapada (25%). The use of Hybrid seeds by Non-beneficiaries is marginally less in Bolangir and

substantially less in Nawarangpur and Nuapada in comparison to beneficiaries whereas in the case of Malkangiri and Sonepur percentage of non-beneficiaries using Hybrid seeds is fractionally more. Kalahandi emerges as an anomaly where only 46% of beneficiaries are using Hybrid seeds in comparison to 58% among non-beneficiaries. The use of both Hybrid and Improved seeds is substantially greater than the use of indigenous seeds in all districts except in the case of Nuapada where 70% of both beneficiaries and non-beneficiaries are using indigenous seeds.

Use of Implements

The most commonly used implement across all the districts is the plough. In Nawarangpur about 88% of the households are using the plough followed by Malkangiri (85%) and Sonepur (83%). This percentage is lowest in Kalahandi where only 60% of the surveyed households are using plough. Another commonly used implement is the Sprayer with

nearly 55% of the households across all the six districts using Sprayers. The use of sprayers is highest in the case of Sonapur (73%) and surprisingly lowest in the case of Kalahandi (37%) despite cotton being a major diversified crop, the use of power tillers is marginally significant in the case of Nawarangpur (8.33%) and Malkangiri (6.67%).

Table 4.29: District-wise Percentage of Users of Various Agricultural Implements

District/ Implement	Bolangir	Kalahandi	Malkangiri	Nawarangpur	Nuapada	Sonepur	Total
Caswel	1.67	0.00	0.00	0.00	0.00	0.00	0.28
Crusher	0.00	1.67	0.00	1.67	0.00	0.00	0.56
Leveller	0.00	5.00	0.00	0.00	0.00	0.00	0.83
Plough	83.33	60.00	85.00	88.33	80.00	83.33	80.00
Power Tiller	1.67	3.33	6.67	8.33	0.00	3.33	3.89
Rotavator	0.00	0.00	0.00	1.67	0.00	0.00	0.28
Sprayer	66.67	36.67	45.00	61.67	45.00	73.33	54.72
Thresher	1.67	5.00	1.67	1.67	0.00	1.67	1.94
Tractor	0.00	13.33	6.67	11.67	3.33	8.33	7.22
Water pump	1.67	0.00	1.67	5.00	0.00	5.00	2.22
Winnower	10.00	18.33	31.67	36.67	15.00	23.33	22.50

Source: Primary Data Survey

Credit Facilities

The most common reason for taking loan is for agricultural purposes. The percentage of people availing loans for agriculture is highest in Nawarangpur (44% in the case of beneficiaries and 42% in the case of non-beneficiaries) followed by Sonapur. A positive impact of the diversification programme is apparent in the districts of Kalahandi, Malkangiri and Sonapur in that the percentage of non-beneficiaries availing loans is significantly higher than beneficiaries.

Implementing agencies indicated these districts have been successful in fulfilling substantial agricultural requirements of the farmers through various schemes and programmes. The percentage of people availing loans for business purposes is 4.17% in both Kalahandi and Nawarangpur. Livestock related loans are availed by 10.42% of the beneficiary farmers in Nuapada whereas in the case of non-beneficiaries this figure is higher in the case of Kalahandi (8.33%). Personal loans are relatively insignificant in most districts except in Nawarangpur where 8.33% of non-beneficiaries have taken loans for personal reasons.

Table 4.30: Percentage of Households taking Loans for Various Purposes

District	Beneficiary/ non-beneficiary	Agriculture	Business	Livestock	Personal	Total
Bolangir	Beneficiary	18.75				18.75
	Non-beneficiary	8.33				8.33
Kalahandi	Beneficiary	18.75	4.17		2.08	25
	Non-beneficiary	25.00		8.33		33.33
Malkangiri	Beneficiary	20.833	2.083	2.083		24.99
	Non-beneficiary	25.00				25
Nawarangpur	Beneficiary	43.75	4.17	2.08	2.08	52.08
	Non-beneficiary	41.67			8.33	50
Nuapada	Beneficiary	8.33		10.42	2.08	20.83
	Non-beneficiary					0
Sonepur	Beneficiary	31.25	2.08			33.33
	Non-beneficiary	41.67				41.67
Total	Beneficiary	23.61	2.08	2.43	1.04	29.16
	Non-beneficiary	23.61		1.39	1.39	26.39

Overall the impact of the programme is mixed. While substantial crop diversion has taken place and net income per ha of cropped area has increased by 50.98%, there is wide variation in benefit accrual across districts and beneficiaries. The programme needs to be redrawn in the general planning framework for agriculture in the region to have better spatial impact.

ANNEXURE

Annexure 4.1

A Note on Diversification Index

Diversification index is a mathematical expression of the intensity of crop diversification. Calculation of Diversification Index¹ is as follows:

DI = $1 - \frac{\sum (A_{ij} / \sum A_{ij})^2}{\sum A_{ij}}$ (Where A_{ij} is the area under production of the i^{th} crop in the j^{th} year and the value ranges between 0 to 1. The higher the value the greater is the diversification.)

In the year 2005-06 the highest diversification was in the case of Nuapada. Overall Nuapada and Malkangiri show higher diversification indexes in 5 and 3 years respectively and all the districts show a decline in the index value in the year 2002-03 possibly because of a drastic decline in annual rainfall across all the six districts. Among all the districts Sonapur has shown the least diversification for most of the years.

Comparison between 1996-97 and 1997-98

There is a sharp increase in the index value in the case of Bolangir between 1996-97 and 1997-98. This is because the area under cultivation had gone up most possibly because the rainfall in 1997 was around 500mm higher than 1996. Further the area under paddy increased but not in the same proportion as the increase in cropped area. This gave more area for diversification into other crops. Sonapur, which has the highest percentage of rice under cultivation to total area cultivated shows an increase in the index value for the same period. In Sonapur though the rainfall increased substantially in 1997 in comparison to 1996 there was insignificant change in the area under cultivation. There was however a decline in the area under rice cultivation giving crops such as condiments and spices area to expand. In Kalahandi the diversification index did not changed much as the area under cultivation had not increased significantly. Though rice area has increased moong another

¹ Area of all major crops (common among all districts) was summed for each district for 10 years i.e. 1996-97 to 2005-06. Thereafter the formula was applied to each individual crop and consequently the index was calculated for that particular district and year.

principal crop declined giving more diversification into oilseeds and condiments. In the case of Nuapada the area under cultivation had increased over the previous year. There has not been any significant increase in area under rice and the overall increase in area has been distributed into pulses and to some extent oilseeds. This led to a significant increase in the index for Nuapada. In Nawarangpur the index increased to quite an extent as there has been some increase in area under cultivation along with decline in area under rice. The diversification has taken mostly towards maize and to some extent towards oilseeds and pulses. The area under cultivation in Malkangiri has declined. However the area under rice has not decreased in the same proportion. The decline in pulses has to some extent been compensated by groundnut. Thus, the over all index has not changed significantly. This is because of high weightage given to paddy in Kharif in the overall cropping pattern of a year and only marginal changes in Kharif cropping pattern. However, cropping pattern changes take place over a longer period taking into account crop suitability, availability of planting materials, markets for the product, prices in the markets and finally the return on investment.

Comparison between 2000-01 and 2001-02

In Bolangir there has been a substantial change in the area under cultivation. Also area under rice has declined giving scope for crops like vegetables (other vegetables have increased in area from 2.69 '000 hectares to 17 000 hectares), moong, sesamum and cotton. In Sonapur the increase in area has been mostly covered by rice and other vegetables. Consequently there has been no noticeable change in the index value. In Kalahandi there has been a substantial increase in the area under cultivation and a slight decrease in area under rice. The increase in cultivated area has given scope for diversifying primarily into vegetables and cotton besides small increments in other crops. In Nuapada though there has been an increase in area under cultivation most of it has been covered by rice and vegetables with little diversification into other crops. Consequently the index has increased marginally in comparison to the increase in the index value for other districts in the same period. Nawarangpur shows an increase in area under cultivation, which has been absorbed mainly by rice and biri. Diversification has been taken up towards vegetables but not enough to increase the index value very significantly. Malkangiri shows the highest increase in the index value for this period as the increase in land area has been very

substantial (nearly 50000 hectares) which has been diversified into sesamum, groundnut, vegetable and pulses.

Comparison between 2001-02 and 2002-03

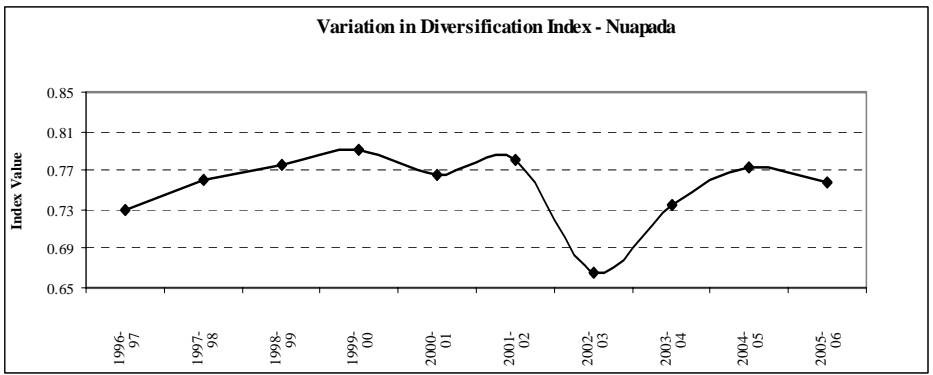
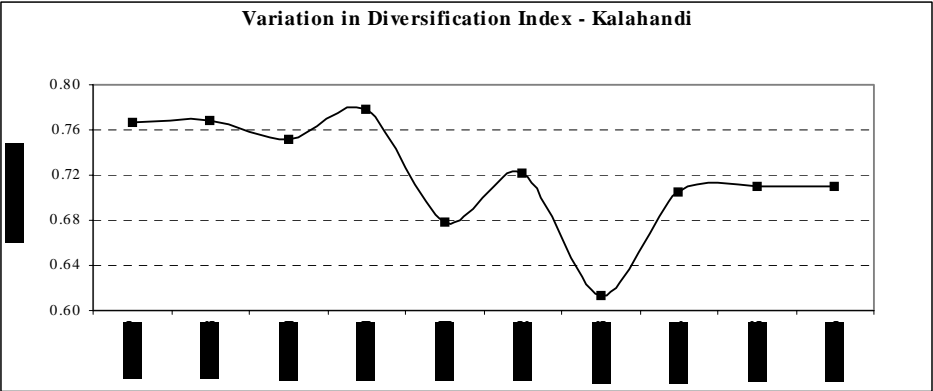
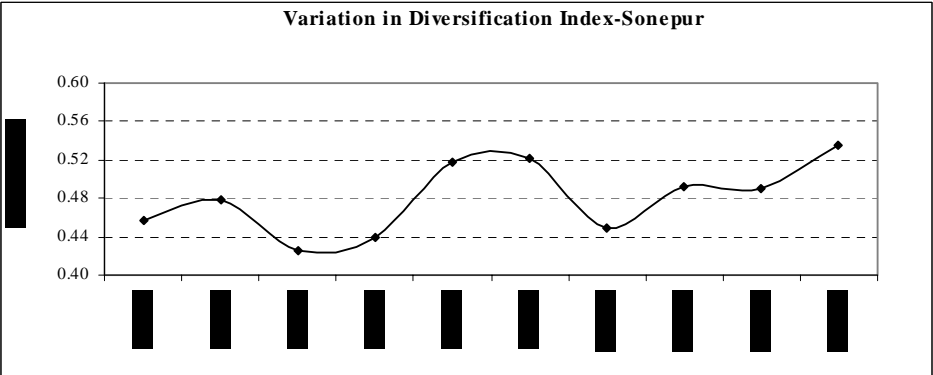
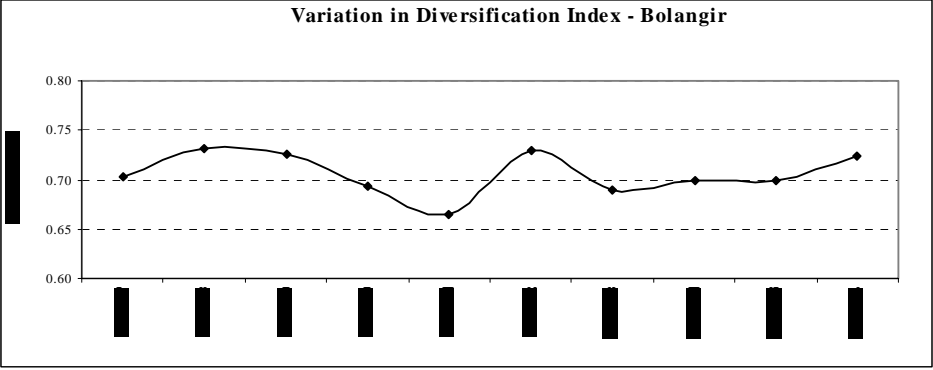
This period shows a sharp decline in the diversification indexes in all districts primarily because rainfall in 2002 was the lowest in the period ranging from 1996-97 to 2005-06 for most districts. In Bolangir the land area under cultivation declined with a minute increase in area under rice cultivation and the area under other major crops such as pulses and oilseeds. In Sonepur the area under cultivation declined but rice area increased whereas there was decline in the area under other crops. Kalahandi shows the second highest decrease in the diversification index for this period by over 15%. Total cultivated area declined and simultaneously almost all other crops declined in terms of area coverage such as pulses, cotton and oilseeds. Similarly, in Nuapada and Nawarangpur the decrease in area under cultivation and cropping intensity led to a decline in the index value. Malkangiri shows the highest decline in the index value by over 18% as the land area under cultivation saw a decline by over 31%.

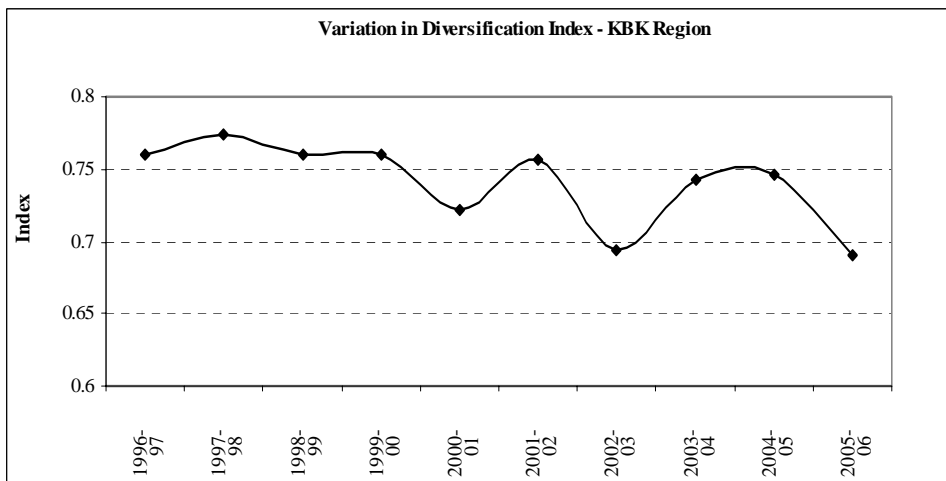
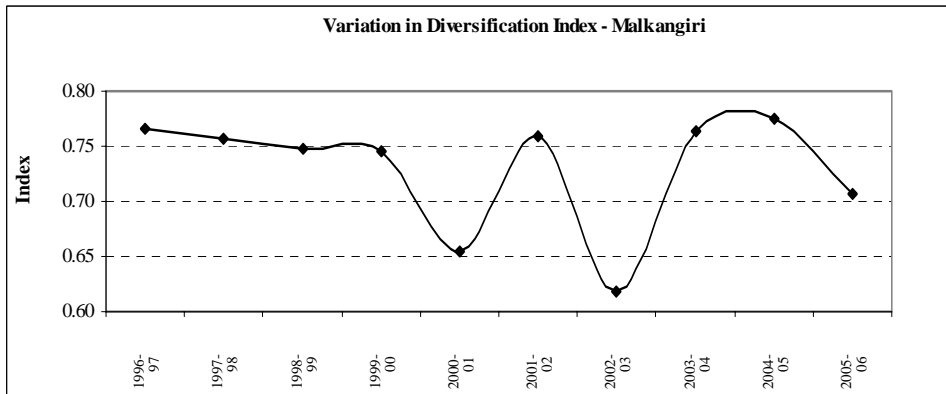
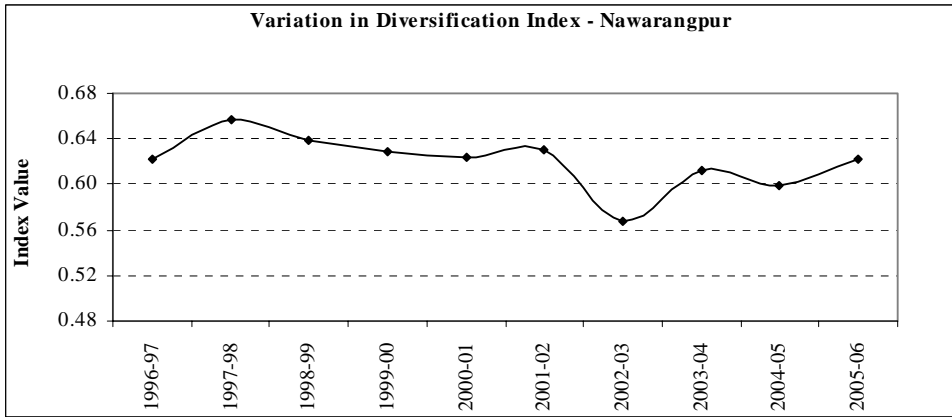
Comparison of Diversification Index Values

Districts	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Bolangir	0.70	0.73	0.73	0.69	0.66	0.73	0.69	0.70	0.70	0.72
Sonepur	0.46	0.48	0.42	0.44	0.52	0.52	0.45	0.49	0.49	0.54
Kalahandi	0.77	0.77	0.75	0.78	0.68	0.72	0.61	0.71	0.71	0.71
Nuapada	0.73	0.76	0.77	0.79	0.77	0.78	0.67	0.74	0.77	0.76
Nawarangpur	0.62	0.66	0.64	0.63	0.62	0.63	0.57	0.61	0.60	0.62
Malkangiri	0.77	0.76	0.75	0.75	0.65	0.76	0.62	0.76	0.78	0.71
KBK	0.76	0.77	0.76	0.76	0.72	0.76	0.69	0.74	0.75	0.69

Formula Source: EPW (2005-January 6 Patterns and Determinants of Agricultural Growth in the Two Punjabs-page 5621

Data Source: Orissa Agriculture Statistics





Annexure 4.2: Crop-wise change in Area, Output, Yield and Value Among Beneficiaries in Kharif Season

Kharif	BEFORE (Pre Implementation)				AFTER (Post Implementation)				Percentage Change (After to Before)			
	Area (ha)	Output (Qtls)	Yield (Qtls/ha)	Value (Rs)	Area (ha)	Output (Qtls)	Yield (Qtls/ha)	Value (Rs)	Area	Output	Yield	Value
Maize	1.62	54	33.35	26950	3.85	138	35.88	74460	137.65	155.56	7.59	176.29
Paddy	420.56	6245	14.85	2844748	442.19	8486	19.19	4131501	5.14	35.88	29.23	45.23
Ragi	32.24	217	6.73	101625	18.19	118	6.49	57923	-43.58	-45.62	-3.57	-43.00
Cereals	454.42	6516		2973323	465.85	8769		4275814	2.52	34.58		43.81
Arhar	2.43	5	2.06	9900	3.85	11	2.86	22300	58.44	120.00	38.83	125.25
Biri	0.91	2	2.2	4775	0.26	1	3.8	2890	-71.43	-50.00	72.73	-39.48
Chana	1.21	4	3.29	5800	1.21	4	3.29	5800	0.00	0.00	0.00	0.00
Moong	1.11	3	2.69	7100	1.32	4	3.04	10045	18.92	33.33	13.01	41.48
Pulses	7.89	20		31935	8.52	26		48035	7.98	30.00		50.41
Groundnut	4.05	31	7.66	39500	2.02	25	12.35	30325	-50.12	-19.35	61.23	-23.23
Til	7.49	24	3.2	39750	9.31	31	3.33	44830	24.30	29.17	4.06	12.78
Oilseeds	11.54	55		79250	11.74	57		76955	1.73	3.64		-2.90
Tomato	1.01	11	10.87	6500	2.03	164	80.85	157000	100.99	1390.91	643.79	2315.38
Vegetables	1.82	25		13900	2.03	164		157000	11.54	556.00		1029.50
Cotton	3.04	39	12.84	78100	39.88	490	12.29	997400	1211.84	1156.41	-4.28	1177.08
Fibres	3.04	39		78100	39.88	490		997400	1211.84	1156.41		1177.08
Sugarcane	6.07	500	82.33	497000	8.1	740	91.39	680150	33.44	48.00	11.02	36.85
KBK	484.78			3673508	536.12			6235354	10.59			69.74

Source: Primary Data Survey

Annexure 4.3: Crop-wise Change in Area, Output, Yield and Value among Beneficiaries in Rabi Season

Rabi	Before (Pre Implementation)				After (Post Implementation)				Percentage Change (After to Before)			
	Area (Ha)	Output (Qtls)	Yield (Qtls/ha)	Value	Area (Hectares)	Output (Qtls)	Yield (Qtls/ha)	Value	Area	Output	Yield	Value
Maize	1.01	42	41.50	19000	1.01	42	41.50	21000	0.00	0.00	0.00	10.53
Paddy	5.67	111	19.58	51750	6.68	207	30.99	103140	17.86	86.49	58.23	99.30
Ragi	1.42	9	6.35	3700	1.01	7	6.92	2800	-28.57	-22.22	8.89	-24.32
Cereals	8.10	162		74450	9.86	263		133900	21.75	62.35		79.85
Arhar	4.66	21	4.51	27200	4.25	17	4.00	33850	-8.70	-19.05	-11.34	24.45
Chana	14.37	56	3.90	52610	20.65	85	4.12	81460	43.66	51.79	5.65	54.84
Kulthi	2.23	6	2.69	9410	3.00	12	4.01	15400	34.55	100.00	48.65	63.66
Moong	36.23	131	3.62	243290	66.60	204	3.06	472980	83.80	55.73	-15.27	94.41
Pulses	60.32	226		350380	98.74	335		633960	63.69	48.23		80.93
Groundnut	6.72	81	12.05	94400	10.12	143	14.13	180450	50.60	76.54	17.22	91.15
Sunflower	2.02	3	1.48	18000	3.85	18	4.68	30750	90.00	500.00	215.79	70.83
Til	0.81	3	3.71	6000	1.21	4	3.29	7000	50.00	33.33	-11.11	16.67
Oilseeds	9.55	87		118400	15.59	166		220552	63.14	90.80		86.28
Brinjal	0.61	22	36.23	11000	0.89	47	52.77	26500	46.67	113.64	45.66	140.91
Onion	2.02	332	164.01	55550	4.82	448	92.99	99300	138.00	34.94	-43.30	78.76
Patato	0.00	0	0.00	0	0.08	2	24.70	1200				
Tomato	0.20	3	14.82	1500	1.05	125	118.75	123600	420.00	4066.67	701.28	8140.00
Vegetables	3.24	362		71050	7.61	722		302100	135.00	99.45		325.19
Sugarcane	0.00	0	0.00	0	0.32	12	37.05	12000				
KBK Rabi	81.21			614280	132.33			1308012	62.94			112.93

Source: Primary Data Survey

Annexure 4.4: Crop-wise change in Area, Output, Yield and Value among Non-beneficiaries in Kharif

Kharif	Before				After				Percentage Change (After to Before) (Non-Beneficiaries)			
	Area (ha)	Output (Qtls)	Yield (Qtls/ha)	Value (Rs)	Area (ha)	Output (Qtls)	Yield (Qtls/ha)	Value (Rs)	Area	Output	Yield	Value
Maize	0.40	15	37.05	7500	0.51	26	51.38	14500	25.00	73.33	38.67	93.33
Paddy	76.85	1178	15.33	542240	78.83	1602	20.32	787585	2.58	35.99	32.57	45.25
Ragi	3.44	12	3.49	8240	1.94	13	6.69	8560	-43.53	8.33	91.84	3.88
Wheat	0.00				0.40	9	22.23	4800				
Cereals	80.69	1205		557980	81.68	1649		815445	1.23	36.85		46.14
Arhar	0.00				0.22	1	4.49	1980				
Moong	0.40	5	12.35	2150	0.40	5	12.35	2150	0.00	0.00	0.00	0.00
Pulses	0.40	5		2150	0.63	6		4130	55.00	20.00		92.09
Groundnut	0.00				0.51	6	11.86	11200				
Til	1.82	7	3.84	11800	2.43	8	3.29	10980	33.33	14.29	-14.29	-6.95
Oilseeds	1.82	7		11800	2.94	14		22180	61.11	100.00		87.97
Brinjal	0.10	1	9.88	800	0.10	1	9.88	800	0.00	0.00	0.00	0.00
Tomato	0.30	5	16.47	2800	0.30	6	19.76	4200	0.00	20.00	20.00	50.00
Vegetables	0.40	6		3600	0.40	7		5000	0.00	16.67		38.89
Cotton	2.02	24	11.86	48000	9.43	100	10.60	204550	366.00	316.67	-10.59	326.15
Fibres	2.02	24		48000	9.43	100		204550	366.00	316.67		326.15
Guruji	0.61	1	1.65	700	0.61	1	1.65	800	0.00	0.00	0.00	14.29
Millets	0.61	1		700	0.61	1		800	0.00	0.00		14.29
Sugarcane	1.62	60	37.05	60000	2.43	140	57.63	140000	50.00	133.33	55.56	133.33
Total Kharif	87.57	1308.00		684230	98.12	1917		1192105	12.04	46.56		74.23

Source: Primary Data Survey

Annexure 4.5: Change in Area, Output, Yield and Value among Non-beneficiaries in Rabi Season

Crop	Area (hectares)	Output (Qtls)	Yield (Qtls/ hectare)	Value	Area (hectares)	Output (Qtls)	Yield (Qtls/ hectare)	Value	Area	Output	Yield	Value
Paddy	2.43	50	20.58	25000	2.63	60	22.80	29600	8.33	20.00	10.77	18.40
Ragi	0.20	1	4.94	500	0.00	0	0.00	0				
Cereals	2.63	51		25500	2.63	60		29600	0.00	17.65		16.08
Arhar	0.30	1	3.29	1000	0.30	1	3.29	1000	0.00	0.00	0.00	0.00
Chana	2.02	7	3.46	5500	3.04	7	2.31	6160	50.00	0.00	-33.33	12.00
Kulthi	1.42	4	2.82	3950	0.69	2	2.91	2000	-51.43	-50.00	2.94	-49.37
Masur	0.00	0	0.00	0	0.81	1	1.24	1590				
Moong	4.86	13	2.68	25460	10.97	31	2.83	68223	125.83	138.46	5.59	167.96
Pulses	8.60	24		35910	15.81	42		78973	83.76	75.00		119.92
Groundnut	0.81	10	12.35	11500	0.40	5	12.35	5000	-50.00	-50.00	0.00	-56.52
Sunflower	0.40	3	7.41	3600	0.61	3	4.94	2400	50.00	0.00	-33.33	-33.33
Oilseed	1.21	13		15100	1.01	8		7400	-16.67	-38.46		-50.99

Crop	Area (hectares)	Output (Qtls)	Yield (Qtls/hectare)	Value	Area (hectares)	Output (Qtls)	Yield (Qtls/hectare)	Value	Area	Output	Yield	Value
Brinjal	0.00	0	0.00	0	0.14	6	42.34	4000				
Cabbage	0.00	0	0.00	0	0.08	1	12.35	500				
Onion	0.00	0	0.00	0	0.28	2	7.06	925				
Tomato	0.00	0	0.00	0	0.06	1	16.47	360				
Vegetables	0.00	0		0	0.57	9		5785				
Total	12.45	88		76510	20.02	119		121758	60.81	35.23		59.14

Source: Primary Data Survey

Annexure 4.6: Percent Change in cost per hectare under different heads

District		Labour	Seeds	Ploughing	Pesticides	Fertilizer	Transport	Other	Total
Bolangir	Beneficiary	63.93	63.81	45.51	375.76	141.47	58.38		88.70
	Non-Beneficiary	41.37	42.04	25.27	508.49	44.14	34.33		45.26
	Total	61.14	61.44	43.04	381.17	124.90	54.39		83.02
Kalahandi	Beneficiary	67.95	42.92	28.83	171.16	85.24	69.77		66.43
	Non-Beneficiary	25.73	20.86	9.79	47.42	34.41	36.75		27.15
	Total	59.71	39.16	25.45	141.35	74.70	63.51		58.83
Malkangiri	Beneficiary	39.00	51.28	65.40	303.07	97.88	65.48	90.04	67.10
	Non-Beneficiary	50.40	27.55	44.26	179.17	143.05	36.99	49.12	62.66
	Total	40.49	49.00	61.49	281.91	102.75	60.23	84.83	66.66
Nawarangpur	Beneficiary	26.38	8.86	20.60	357.27	53.15	40.84	136.60	35.60
	Non-Beneficiary	33.19	46.22	35.44		73.29	20.74	147.19	57.59
	Total	27.63	15.52	23.37	459.18	56.99	37.72	137.46	39.96
Nuapada	Beneficiary	27.58	37.75	37.44	137.28	83.45	26.21		42.47
	Non-Beneficiary	74.20	19.49	47.04	329.49	181.58	90.89		67.85
	Total	34.04	34.99	38.87	153.66	95.88	36.16		46.12
Sonepur	Beneficiary	24.30	12.25	18.90	64.29	47.02	26.02		28.93
	Non-Beneficiary	59.75	34.33	54.00	123.81	104.24	30.84		61.08
	Total	29.21	15.22	23.21	68.89	53.58	26.66		33.03
ALL Six Districts	Beneficiary	39.90	30.23	30.39	179.57	75.21	46.86	107.29	50.36
	Non-Beneficiary	36.80	30.91	29.51	156.52	68.06	34.27	107.52	46.89
	Total	39.33	30.33	30.24	176.80	74.00	44.68	107.10	49.76

Source: Primary Data Survey

Annexure 4.7: Evaluation of Net income from Agriculture of Beneficiaries and Non-Beneficiaries (in Rupees per hectare)

District	Beneficiary/ Non-beneficiary	Before				After				Percentage Change (After to Before)			
		Area (ha)	Value/ha	Cost/ha	Net income/ha	Area (ha)	Value/ha	Cost/ha	Net income/ha	Area	Value	Cost	Net income
Bolangir	Beneficiary	84.84	5691.96	2597.76	3094.20	100.24	11312.57	4901.89	6410.68	18.16	98.75	88.70	107.18
	Non-Beneficiary	10.45	5424.24	3144.87	2279.37	12.78	10016.96	4568.33	5448.64	22.28	84.67	45.26	139.04
	Total	95.29	5662.60	2657.76	3004.84	113.02	11166.10	4864.18	6301.92	18.61	97.19	83.02	109.73
Kalahandi	Beneficiary	125.40	6389.18	2835.05	3554.13	153.75	11699.72	4718.29	6952.16	22.60	83.12	66.43	95.61
	Non-beneficiary	22.37	8206.66	3875.91	4330.75	30.79	10772.19	4928.08	5844.11	37.65	31.26	27.15	34.94
	Total	147.77	6664.29	2992.60	3671.00	184.54	11544.96	4753.29	6767.29	24.88	73.24	58.83	84.31
Malkangiri	Beneficiary	83.44	7271.46	2922.11	4349.35	93.32	13154.06	4882.73	8271.33	11.84	80.90	67.10	90.17
	Non-beneficiary	13.56	5797.50	2723.12	3074.38	13.97	8598.46	4429.32	4169.15	2.99	48.31	62.66	35.61
	Total	97.00	7065.38	2894.29	4171.08	107.29	12560.98	4823.70	7737.27	10.60	77.78	66.66	85.50
Nawarangpur	Beneficiary	88.33	14210.15	5354.52	8855.00	98.14	18084.88	7260.62	10824.27	11.11	27.27	35.60	22.23
	Non-beneficiary	22.96	12473.72	5566.13	6907.59	23.77	18438.74	8771.82	9666.92	3.53	47.82	57.59	39.95
	Total	111.28	13851.96	5398.17	8453.79	121.90	18153.87	7555.23	10598.64	9.54	31.06	39.96	25.37
Nuapada	Beneficiary	73.08	5750.86	1729.63	4021.23	93.04	7137.56	2464.14	4673.42	27.31	24.11	42.47	16.22
	Non-beneficiary	11.74	4001.40	1701.57	2299.00	15.99	6806.88	2856.13	3950.75	36.21	70.11	67.85	71.78
	Total	84.82	5508.69	1725.75	3782.94	109.03	7089.06	2521.64	4567.42	28.54	28.69	46.12	20.74
Sonepur	Beneficiary	113.04	6693.51	2971.89	3721.63	139.09	8424.71	3831.77	4592.93	23.05	25.86	28.93	23.41
	Non-beneficiary	19.03	5767.19	2743.12	3024.07	21.26	9040.11	4418.52	4621.58	11.70	56.75	61.08	52.83
	Total	132.06	6560.05	2938.93	3621.12	160.34	8506.29	3909.55	4596.73	21.41	29.67	33.03	26.94
ALL Six Districts	Beneficiary	568.13	7609.04	3089.15	4519.89	677.57	11468.85	4644.83	6824.02	19.27	50.73	50.36	50.98
	Non-beneficiary	100.11	7611.39	3560.66	4050.00	118.55	11126.12	5230.23	5895.89	18.42	46.18	46.89	45.58
	Total	668.23	7609.39	3159.79	4449.00	796.12	11417.82	4732.00	6685.82	19.14	50.05	49.76	50.28

Source: Primary Data Survey

Annexure 4.8: Additional Income Other than Agriculture (Yearly)

District	New Activity Type	No. of HH	Investment (in Rs)	Income (in Rs)	Investment per unit (in Rs)	Income Per unit (in Rs)
Bolangir	No add. Activity	20				
	Business	6	12700	61200	2117	10200
	Daily Labour	32		386780		12087
	Pisciculture	1	10000	20000	10000	20000
	Self Employed	2	5000	15000	2500	7500
	Service	1		18000		18000
Kalahandi	No add. Activity	33				
	Business	6	267001	70400	44500	11733
	Carpenter	1		6000		6000
	Contractor	2	80000	60000	40000	30000
	Daily Labour	19		114440		6023
	Self Employed	2	50000	152000	25000	76000
	Service	4				
Malkangiri	No add. Activity	22				
	Business	3	30000	7300	10000	2433
	Daily Labour	26		128000		4923
	NTFP collectors	9		29140		3238
	Pisciculture	1		1250		1250
	Self Employed	2	200000	25000	100000	12500
	Service	3		36000		12000
Nawarangpur	No add. Activity	18				
	Business	6	124000	84000	20667	14000
	Carpenter	1	3000	4500	3000	4500
	Daily Labour	30		120100		4003
	Dairy farm	1	150000	74500	150000	74500
	Political leader	1	5000	3600	5000	3600
	Self Employed	1	5000	18000	5000	18000
	Service	4		28800		7200
Nuapada	No add. Activity	34				
	Business	1	2000	4500	2000	4500
	Carpenter	1	3000	8400	3000	8400
	Daily Labour	19		98500		5184
	Dairy farm	1	14500	18000	14500	18000
	NTFP collectors	1		6000		6000
	Political leader	1		0		0
	Self employed	2	6000	14400	3000	7200
	Service	1		14400		14400
Sonepur	No add. Activity	18				
	Business	4	7500	27800	1875	6950
	Carpenter	1	1500	7200	1500	7200
	Daily Labour	31		186500		6016
	NTFP collectors	1		4800		4800
	Self employed	1	400	3600	400	3600
	Traditional work	7		22200		3171

Source: Primary Sample Survey

MARKETING

Marketing facilities form a crucial part of the diversification process as they provide avenues for realizing proper value for the agriculture products to farmers. The three main centers for selling crops are local markets, mandies and farm gates. There is variation in percentage of households selling products at different centers in accordance with type of crop, accessibility and distance to market.

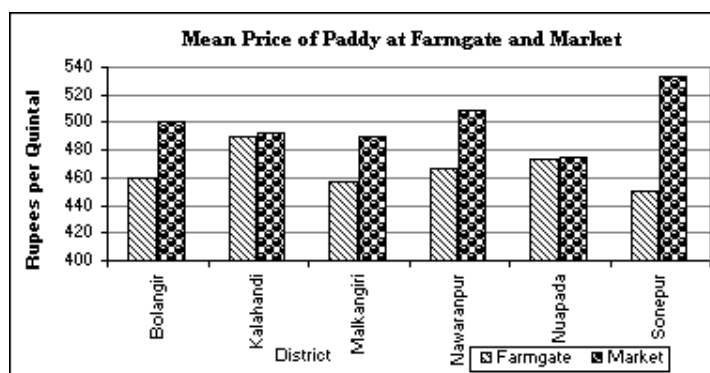
Cotton is one of the chief commercial crops but its cultivation is mostly concentrated in Kalahandi and Bolangir. In the sale of cotton in Kalahandi the situation is completely in contrast with Bolangir. In Bolangir 90.5% of the households sell cotton at their farm gates and only 9.5% sell cotton at markets. In Kalahandi almost entire production (98%) of the cotton is sold at nearby mandies and only 2% is sold at farm gates. In Bolangir, paddy is sold at the farm gate by 91% of the farmers. This percentage in the case of Kalahandi, Nawarangpur, Sonapur and Malkangiri is 50%, 59%, 46% and 41% respectively. Further in Kalahandi Paddy is sold at markets and mandies in 22.5% of the cases. In Nawarangpur 33% of the farmers sell paddy at the market and only 8 percent in mandies. Malkangiri has the highest percentage (53%) of farmers selling their paddy at markets. In the case of Bolangir, Malkangiri and Sonapur groundnut is sold at markets in 25%, 46% and 54% of the cases respectively. In Nuapada the entire groundnut is sold at farm gates. Among pulses one of the common crops marketed is chana. In Bolangir and Nawarangpur all the chana is sold at the farm gates, whereas in Nuapada farm gates and mandies are selling centers in 28.5% and 71.5% of the cases. In Sonapur chana is sold at markets in 33% of the cases and in the balance 67% of the cases it is sold at farm gates. Ragi is another chief crop of the KBK region. In Kalahandi all the ragi is sold at markets whereas in Nawarangpur and Malkangiri market are selling centers in 33% and 46% of the cases respectively. Overall mandies feature as a prominent selling center in Kalahandi and Nuapada only. Access to markets is more in Malkangiri, Kalahandi and Sonapur.

Still a large proportion of products of small farmers for a number of commodities relating to diversified crops is sold at farmgates. It is the middlemen who take advantage of the situation and reap benefits of the market. The transport arrangement to market small volume of produce is not facilitating and rural transport cost is much

higher than the urban transport cost. As transaction cost in rural areas is high, substantial portion of benefits that could have been derived by the farmers engaged in diversifying their cropping pattern in fact goes to middlemen. (for details see annexure 5.1)

District wise Sale of Produce

In Bolangir the average price of cotton is marginally higher in the mandi (Rs 2100/qntl) as compared to price at farmgate (Rs 2050/qntl). Price of paddy at the local market and mandi are the same (Rs 500/qntl) and 8% less at the farm gate (Rs 460/qntl). In Kalahandi there is not much difference in average paddy prices between farmgates and local markets (Rs 490/qntl and Rs 493/qntl respectively) but the maximum price at mandies is substantially higher i.e. Rs 570/qntl in comparison to Rs 490/qntl at farmgates. In Malkangiri average prices of paddy at farmgates, market and mandies are Rs 457/qntl, Rs 490/qntl and Rs 520/qntl. In Nawarangpur paddy sold at farm gates averages Rs 467/qntl in comparison to Rs 500/qntl at mandies. Paddy in Nuapada is sold at the almost the same rate (about Rs 475/qntl) both at markets and farmgates. In the above district moong fetches a higher average price in Markets (Rs 2350/qntl). However, groundnut sold at local markets fetches a much higher average price (Rs 1200/qntl) in comparison to farm gates (Rs 750/qntl). (for details see



annexure 5.1)

The disposal of the produce after the harvest and the return obtained have a significant effect on production and on the welfare of the cultivator.

Production in agriculture being seasonal, the crop is harvested during a short period and consumed gradually. While commodities like cotton and groundnut require large storage space which the average cultivator lacks, fruits, vegetables and sugarcane are of a perishable nature. The farmer has, therefore, to dispose of his surplus immediately either at the village or at the mandi. In the absence of staying power the large number of small farmers compete with each other and the markets witness conditions of occasional glut and scarcity. A major part of the commercial crops like cotton, jute, sugarcane and oilseeds has to be marketed immediately as the farmers are

in need of cash for meeting their dues and other expenses. As regards food grains the marketable surplus varies by crops and regions but may be placed at about 20 to 30 per cent under normal conditions. The total quantity and value of the marketed produce, even in a predominantly subsistence economy as in Orissa is considerable. (for details see Annexure 5.2)

Storage and Warehousing¹

Another difficulty that the societies encounter relates to storage facilities. Most of the surplus produce in an area is assembled and sold at the mandi or market. Release of goods and their dispatch either on consignment or sale can be arranged more quickly from the godowns at the mandi than from those located in the rural areas. It would, therefore, be an advantage to develop storage facilities at mandi centres. Some godowns space-temporary, semi-temporary or permanent are available in every mandi. This accommodation is often unsatisfactory as it fails to provide adequate protection to goods from damage and deterioration by moisture, rodents, insects, pests, etc. Moreover, even for getting such space, fairly high rent has to be paid. So it is necessary to develop the infrastructure of mandi by which farmers will get more benefit.

Establishment of Market Yards under RLTA

Under RLTA scheme in KBK district marketing facilities have been provided so that farmers can get a reasonable price for their produce. In Malkangiri district 8 market yards are functioning in different places under the Malkangiri RMC. In Nawarangapur district two market yards are functioning at Raighar and Umerkote under the Nawarangapur RMC. Bolangir district has two RMCs, at Bolangir and Kantabanjhi with 1 and 2 market yards respectively. Sonepur district has an RMC at Dunguripalli where there is a single market yard. Kalahandi district has three RMCs at Mukhiguda, Junagarh and Bhawanipatna with 2 market yards, 1 market yard and 1 market yard under these RMCs respectively. In Nuapada one market yard has been established at Boden under the Khariar Road RMC. A market yard has also been established at Kotpad under Jeypore RMC of Koraput district. The total project cost of market yards established under RLTA in the KBK Districts is 420 lakhs @ of 20 lakhs per market yard. This cost also includes 20 lakhs in terms of support services under the Orissa

¹ Source: from ws.ori.nic/diorissa/market.htm

State Agri-Marketing Board. The Government share for the above market yards is 90% amounting to a total of 396 lakhs. The RMC share is 10% of the total cost amounting to a total of Rs. 24 lakhs. In Malkangiri district market yards have been constructed without any sharing of cost by the RMC and the total cost has been borne by the Government. This district has been given special assistance due to most undeveloped and extremist prone area. Farmers face problems in selling their produce by covering a long distance from their farm gate. So to facilitate the farmers it is necessary to establish more market yards in those districts having least number of market yards. (for details on Financial expenditure see annexure 5.3)

Facilities at Established Market Yards in the surveyed districts (2002-03)

Bolangir: Under Bolangir RMC Tusura subsidiary market yard has been established with two godowns of 250 MT and 500 MT capacity. There are two covered pindies and an auction hall. The market yard also has an open auction pindi along with a paddy cleaner, mini grader, weighing scale and moisture meter. Three tube wells have also been provided. Under Kantabanji RMC, Mandal and Moribahal subsidiary markets have been established. The Moribahal subsidiary market yard has a godown of 500 MT capacity, 4 open pindies, an auction hall and four farmers' information centres. The Mandal subsidiary market yard has a godown of 500 MT capacity, four open pindies, a covered pindi and a tube well.

Kalahandi: In 2002-03 Ladugaon and Bandanakana subsidiary market yards were established. In the same year Charbahal and Biswanathpur subsidiary market yards were established under Junagarh and Bhawanipatna RMC. Through these market yards 5 godowns with a total capacity of 2100 MT, 2 open auction pindies, one open pindi, 7 drying platforms and 2 auction halls have been constructed. Further facilities such as farmers restshed and farmers' information centres have also been established.

Malkangiri: In Malkangiri RMC Padia, MV-72, Bhejangiwada, MV-79, Potteru, Korukonda, Bhejaguda subsidiary market yards were established in 2002-03. As a whole these market yards provide facilities for storage in 4 godowns with a total capacity of 400 MT. There are 72 open pindies, 16 covered pindies, 8 tube wells, 12 shop rooms and 7 internal roads in total. Farmers rest shed and sanitation facilities have been provided in all the market yards.

Nawarangpur: Under Nawarangpur RMC Raigarh and Umarkotte subsidiary market yards have been established. In Raigarh subsidiary market yard there are 25 godowns, 24 numbers with a capacity of 20 MT and one with a capacity of 1000 MT. There are 8 open pindies and 24 shop rooms. There is also a staff quarter and an office building with electrification and sanitation facilities. Umerkote subsidiary market yard has 33 godowns one with a capacity of 1000 MT and the rest with capacity of 20 MT each. There is also a drying platform along with four open pindies four covered pindies, four auction pindies along with four shop rooms. Further grading facilities include a mechanized paddy cleaner and a cooling chamber. Electrification and water facilities have also been provided.

Nuapada: Under Khariar road RMC Boden subsidiary market yard has been established with 12 open pindies, two covered pindies, 2 tube wells and a watchman shed.

Sonepur: In Dunguripalli principal market yard 21 godowns 16 with a capacity of 25 MT and 5 with a capacity of 50 MT have been constructed. There are also five open pindies one covered pindi, one auction hall. One mechanized paddy cleaner with a capacity of 5 tonnes per hour, 3 small paddy cleaners, one automatic weighing and bagging machine, a weigh bridge with a capacity of 25 MT, a min grader, four weighing scales and two moisture meters have been provided. Water facilities include a tube well and a bore well. Sanitation and electrification facilities have also been provided.

Facilities provided to KBK Districts under RLTA in 2003-04 in terms of Marketing

Grading Facilities and Cooling Chambers

The introduction of proper grades and standards is another matter with regard to which the assistance is provide by the RMCs. Grading of farmers' produce before sale on the basis of well defined grades in a regulated market will help in the proper valuation of their produce which will enable them to claim a price commensurate with the quality offered, thus providing an incentive to improve its quality, Grade standards are also necessary as a basis for the issue of negotiable receipts by development of public storage facilities.

Two mini grading units have been established each at Nawarangpur, Malkangiri, Dunguripalli, Bolangir, Kantabanjhi, Mukhiguda, Kesinga, Bhawanipatna, Khariar Road, Jeypore, Dumuriput and Gunupur whereas in Birmaharajpur and Junagarh 1 and 3 grading units have been established respectively. The total Project cost is 15 lakhs at 0.5 lakhs per unit. The cost for the installment of these units is totally borne by the Government. Even though efforts have been made to help farmers by the establishment of these grading units the number of units is still insufficient. In total 8 cooling chambers or cold rooms have been opened at market yards in Koraput, Jeypore and Nawarangpur. The total project cost for these Cooling chambers is 40 lakhs which has been sanctioned by the Government @ rate of Rs 5 lakhs per cooling chamber.

Electrification of Market yards

Electrification is necessary for the operation of many market facilities such as grading, operation of mechanized paddy cleaners and functioning of cooling chambers. A total of 8 market yards have been electrified at (Dunguripalli Sonepur) (1), Bolangir (2), Kantabanjhi (2), Kesinga (2) and Kahariar Road (1) at a total project cost of 12 lakhs @ of 1.5 lakhs per market yard.

Mechanized Paddy Cleaners

Six mechanized paddy cleaners have been installed at Nawarangpur, Bolangir, Junagarh, Khariar Road, Jeypore and Gunupur at a total cost of 66 lakhs @ 11 lakhs per installation.

Additional Market Yards

A total cost of Rs 47.77 lakhs was provisioned for the development of market yards out of which 43 lakhs had been sanctioned in 2003-04.

(for details see Annexure 5.4)

Cotton: Marketing and Value Addition²

Though the contribution of Orissa towards India's total cotton production is barely 0.5%, the cotton produced in the state is of exportable quality.

The marketing of cotton is undertaken mainly through three types of agencies

1. Corporations and Cooperatives
2. Private Traders
3. Contract Farming

In Orissa the buying and selling of cotton is regulated by the Regulated Market Committees established as per Orissa Agriculture produce and Market Act 1956. Five market yards have been established under five RMCs equipped with godowns, auction, halls, farmers restsheds, farmers information centres and grading laboratories. The procurement centers for cotton include Kesinga and Utkela under Kesinga RMC, Karalada under Bhawanipatna RMC, Gunupur, Muniguda and Rayagada under Rayagada RMC. In Bolangir District cotton procurement centers include Kantabanjhi and Jogimunda under Kantabanjhi RMC. The firms buying this cotton include Eco Farm (India) Pvt., Kesinga, Bioorganic farm, natural organic, Amita group, Kamadhenu Ginning mill, V.V. Cottons, Boirays, Ambika Agro industries, Jaydurga Ginning mill, Natural organic Pratima Agro Industry, and Cotton Corporation of India. The price of cotton in Bhawanipatna RMC was 2150/qntl. In Kantabanjhi the lowest price was Rs 2025/qntl whereas highest was Rs. 2110/qntl. Under Rayagada RMC the price varied from Rs. 1950/qntl to 2010 Rs/qntl. In Kesinga the variation was from Rs. 2150/qntl to Rs.2200/qntl and in Junagarh RMC it varied from Rs. 2080quintal to 2150/qntl. The area under cotton was 16970 hectares in Rayagada, 550 hectares in Koraput, 16040 hectares in Kalahandi, 770 hectares in Nuapada and 19600 hectares in Bolangir. (Year 2006-07)

Of the total procurement of cotton at 594084 quintals above, 92% of the cotton is procured by Private traders and 5% by the CCI.

The advantages of the RMCs are proper weighing of cotton, help in grading, payment of proper price due to auction in the form of cash or cheque, storage space and knowledge about rates at different markets.

² Source: Orissa State Agricultural Marketing Board, Bhubaneswar

Table 5.1: Procurement of Cotton by different Agencies in KBK Districts 2005-06

Sl. No.	District	Area achieved in hect.	Procurement in quintals			
			CCI	Konark Spinning Mill	Pvt. Traders	Total
1	Rayagada	16970	23795		297637	321432
2	Koraput	550			3944	3944
3	Kalahandi	16040	3095.3	12152.67	110185	125433
4	Nuapada	770			6807	6807
5	Bolangir	19600	5154.37	852.1	130461.23	136467.7
Total		53930	32045	13004.77	549034.2	594084
% to Total Procurement			5.39	2.19	92.42	

Source: Orissa State Agricultural Marketing Board, Bhubaneswar

The distance factor is a major constraint of RMCs. The farmers of villages far from the RMC market yards are not able to avail the benefits as transportation cost would reduce their remuneration. Further, small quantity makes use of transport facilities unviable. Sometimes, farmers have already made a contract with traders or landlords and are forced to sell their cotton to them. Further Banks do not provide loans on time. Sometimes there is a nexus between RMC employees and traders and agents leading to malpractice.

ANNEXURE

Annexure 5.1: Selling of Crops at Different Centres

District	Product	No. of HH	Centre for selling (percent)		
			Market	Farm gate	Mandi
Kalahandi	Banana	1	0	100	0
	Biri	1	100	0	0
	Cotton	43	0	2	98
	Kuluthi	1	0	100	0
	Maize	2	100	0	0
	Moong	12		83	17
	Onion	1	0	100	0
	Paddy	31	22.5	100	22.5
	Pulses	2	50		50
	Ragi	3	100	0	0
Vegetable	3	100	0	0	
Nawarangpur	Alasi	2	50	50	0
	Arhar	1	100	0	0
	Chana	2	0	100	0
	kuluthi	1	0	100	0
	Maize	2	0	100	0
	Moong	1	0	100	0
	Onion	2	50	50	0
	Paddy	49	33	59	8
	patato	1	0	100	0
	Ragi	10	10	90	0
	Sugarcane	2	50	50	0
	Til	1	100	0	0
	Vegetable	5	40	60	0
Sonepur	Arhar	2	100	0	0
	Chana	3	33	67	0
	Groundnut	3	67	33	0
	Moong	21	38	62	0
	Mustard	1	100	0	0
	Onion	1	100	0	0
	Paddy	17	54	46	0
	Sunflower	1	100	0	0
	Vegetable	3	100	0	0
Wheat	1	100	0	0	
Bolangir	Biri	1	0	100	0
	Brinjal	1	0	100	0
	Chana	2	0	100	0
	Cotton	21	9.5	90.5	0
	Groundnut	4	25	75	0
	Moong	22	0	100	0
	Paddy	22	9	91	0
	Pulses	1	0	100	0
	Sugarcane	1	100	0	0
	Sunflower	1	0	100	0
Malkangiri	Arhar	1	0	100	0
	Vegetables	2	100	0	0
	Groundnut	11	45.5	45.5	9.00

District	Product	No. of HH	Centre for selling (percent)		
			Market	Farm gate	Mandi
	Maize	5	40	60	0
	Moong	3	34	66	0
	Paddy	34	53	41	0
	Ragi	13	46	54	0
	Til	22	59	41	0
				Market	Farm gate
Nuapada	Chana	7	0	28.5	71.5
	Chilli	1	100	0	0
	Groundnut	3	0	100	0
	Kuluthi	4	50	25	25
	Moong	10	0	20	80
	Mustard	1	0	100	0
	Onion	3	33.3	33.3	33.3
	Pulses	1	0	0	100

Annexure 5.2: District wise sale price of produce at different Centres
(in Rupees per quintal)

Bolangir				
Place of selling	Product	Minimum	Maximum	Mean
Farm gate	Brinjal	500	500	500
	Cotton	2000	2200	2050
	Moong	2200	2200	2200
	Paddy	400	500	460
Mandi	Cotton	2000	2200	2100
	Paddy	500	500	500
Market	Paddy	500	500	500
Kalahandi				
Place of selling	Product	Minimum	Maximum	Mean
Farm gate	Kulthi	1200	1200	1200
	Onion	300	300	300
	Paddy	490	490	490
Mandi	Cotton	1800	2200	2003.33
Market	Banana	200	200	200
	Paddy	450	570	492.5
	Ragi	1200	1200	1200
Malkangiri				
Place of selling	Product	Minimum	Maximum	Mean
Farm gate	Groundnut	700	800	750
	Paddy	400	520	456.67
	Ragi	100	100	100
	Til	1200	1500	1300
Mandi	Paddy	520	520	520
Market	Cauliflower	600	600	600
	Groundnut	1200	1200	1200
	Maize	500	700	633.33
	Paddy	400	550	490
	Ragi	1200	1400	1266.67
	Til	1200	1500	1383.33

Nawarangpur				
Place of selling	Product	Minimum	Maximum	Mean
Farm gate	Maize	500	500	500
	Molasses	1000	1000	1000
	Paddy	400	520	467.14
	Ragi	1000	1000	1000
	Sugarcane	1000	1000	1000
Mandi	Paddy	500	500	500
Market	Chana	800	800	800
	Paddy	500	540	508.57
	Vegetable	500	800	666.67
Nuapada				
Place of selling	Product	Minimum	Maximum	Mean
Farm gate	Moong	2200	2200	2200
	Paddy	450	480	473.33
Market	Chana	1000	1000	1000
	Chilly	550	550	550
	Moong	2300	2400	2350
	Onion	250	500	350
	Paddy	450	500	475
Sonepur				
Place of selling	Product	Minimum	Maximum	Mean
Farm gate	Paddy	400	500	450
	Total	400	500	450
Market	Moong	2500	2500	2500
	Onion	400	400	400
	Paddy	533	533	533

Annexure 5.3: Establishment of Market Yards (RLTAP 2002-03)

Sl. No.	Name of the District	Name of the RMC	Place for establishment of Market yards	No. of market yards	Estimate cost of a Market yard (Rs in lakhs)	Total Project cost	Government share under the scheme (90%)	Government share now sanctioned	RMC share (10%)
1	Malkangiri	Malkangiri	MV-72, MV-17, MV-79, Vijaguda, Korukunda, Podia, Potieru, Vejangiwada	8	20	160	160	160	0
2	Nawarangpur	Nawarangpur	Raighar, Umerkote	2	20	40	36	36	4
3	Sonepur	Dunguripalli	Mahadevpalli	1	20	20	18	18	2
4	Bolangir	Bolangir	Tusara	1	20	20	18	18	2
5	Bolangir	Kantabanjhi	Mandal, Moribahal	2	20	40	36	36	4
6	Kalahandi	Mukhiguda	Ladugaon, Bandankana	2	20	40	36	36	4
7	Kalahandi	Junagarh	Chaharbanahal	1	20	20	18	18	2
8	Kalahandi	Bhawanipatna	Biswanathpur	1	20	20	18	18	2
9	Nuapada	Khariar Road	Boden	1	20	20	18	18	2
10	Koraput	Jeypore	Kotpad	1	20	20	18	18	2
11	Support services	Orissa State Agri-Marketing Board				20	20	20	
Total				20	200	420	396	396	24

*Grand Total * for Malkangiri area, the RMC shall not bear any cost towards the project*

Source: Directorate of Agricultural Marketing

Annexure 5.4: Activities taken up in KBK Districts in terms of Improving and Establishing Market Yards (RLTAP 2003-04)					
Sl. No.	Name of the Scheme/Project	Name of the RMC/Market Yard		Project cost (Rs in lakhs)	Govt. Share now sanctioned (Rs. In lakhs)
1	Development of market yards/Mini market yards	Kesinga - M. Rampur		10	9
		Koraput - Kunduli		13.33	12
		Rayagada - Kashipur		12.22	11
		Mukhiguda- Mukhiguda		12.22	11
		Total		47.77	43
2	Installation of Mechanized Paddy Cleaners with Automatic weighing and bagging facility	Nawarangpur		11	11
		Bolangir		11	11
		Junagarh		11	11
		Khariar Road		11	11
		Jeypore		11	11
		Gunupur		11	11
		Total		66	66
3	Electrification of Market Yards		numbers		
		Dunguripalli	1	1.5	1.5
		Bolangir	2	3	3
		Kantabanjhi	2	3	3
		Kesinga	3	3	3
		Khariar Road	1	1.5	1.5
		Total		12	12
4	Installation of Mini grading units		units		
		Nawarangpur	2	1	1
		Malkangiri	2	1	1
		Dunguripalli	2	1	1
		Biramaharajpur	1	0.5	0.5
		Bolangir	2	1	1
		Kantabanjhi	2	1	1
		Mukhiguda	2	1	1
		Junagarh	3	1.5	1.5
		Kesinga	2	1	1
		Bhawanipatna	2	1	1
		Khariar Road	2	1	1
		Jeypore	2	1	1
		Dumuriput	2	1	1
		Gunupur	2	1	1
Rayagada	2	1	1		
Total		15	15		
5	Installation of cooling Chambers/Cold rooms in the Market yards		numbers		
		Koraput at Kunduli	3	15	15
		Koraput at Similiguda	2	10	10
		Jeypore at Borigumma	1	5	5
		Jeypore Aat Nuagaon	1	5	5
		Nawarangpur at Umerkote	1	5	5
Total		40	40		
Grand Total				180.77	176

SOME SUCCESS EXPERIMENTS TO AGRICULTURAL DIVERSIFICATION

1. Success in Inter-Cropping

The¹ resource poor farmers of Nagupalla village of Kalahandi were growing cotton under rainfed condition in uplands with poor crop management practices. Cotton was being grown along with random sowing of pigeonpea without adopting proper intercropping practices. As a result productivity of both crops was low. Under the field level demonstration programme on Cotton Production Technology of TMC MM-II, scientists of KVK, Kalahandi visited Nagupalla village during June-2005 and persuaded the farmers to follow the integrated crop management practice. Sri Kamalakanta Goud, a progressive farmer cultivated 0.4 ha under hybrid cotton (Tulasi) intercropped with pigeonpea (Cv-ICPL 87-119) (8 row cotton: 2 row pigeon pea). Following this method he has used 20% less fertilizer in cotton crop and applied only phosphoculture in pigeonpea. Another important aspect was that the bollworm *Helicoverpa armigera* was found infesting pigeon pea without affecting the cotton crop. The pest was easily managed by spraying pesticide in pigeonpea. Under the supervision of the scientists of KVK, Kalahandi, Sri Goud incurred expenditure of Rs. 4500/- and obtained seed cotton and pigeon grain yield of 6 quintals and 1.5 quintals respectively, earning a net profit of Rs 10000/- per acre. Being inspired other cotton farmers of surrounding villages have become interested to follow the method of intercropping pigeonpea with cotton to get a higher return.

2. Kharif onion Cultivation – A Boon to Kalahandi Farmers:

Growing of onion is an age-old traditional practice of Kalahandi farmers. But in the absence of adoption of proper technology, farmers used to get very poor yield. Participatory survey and on farm trials on farmers' field have shown that intervention of new variety could yield much more. Sri Bhubaneswar Bhoi a progressive farmer of village Kinerkela of Kesinga Block actively participated in the programme and harvested a yield of 80 quintals per hectare. High production brought him

¹ Source: "Krushi Vigyan Kendra", Bhawanipatana

substantially higher income. Dr. Hossain, T.O. KVK, Kalahandi feels that impact of such on farm trials have long lasting impact among the onion growers of the district.

3. Hybrid Sunflower Cultivation Pays High Dividends

After harvesting of Kharif paddy farmers of village Kasurpada of Kesinga block were growing sunflower CV. Morden under poor management condition as a result of which the productivity was poor (10.5 quintals per hectare) under the FLD (Oilseeds and pulses) programme. Scientists of KVK, Kalahandi visited Kasurpada village impressed upon the villagers to go in for hybrid sunflower cultivation with scientific agro-techniques for high returns. Sri Kesaba Chandra Bhoi, a progressive farmer, cultivated 0.4 ha hybrid sunflower (Jwalamukhi) with recommended package of practices under the supervision of scientists of KVK Kalahandi. Sri Bhoi, incurred an expenditure of Rs. 2600, and obtained seed yield of 19.5 quintals per hectare, getting a net profit of Rs. 7,400 in a period of 3½ months. Being inspired, other sunflower growers of Kasurpada village have taken up hybrid sunflower cultivation with high returns.

4. In Malkangiri District, during 2002-03 a set of different agriculture implements were provided to 20 SHGs for Rs. 2575 after 95% subsidy on total cost of Rs. 51500 per set. The agricultural implement kit includes one power thresher, 3 low-lift hand pumps, four hand winnowers, one power spray, three hand compression sprayers, one puddler (99 model), one pulse thresher and one puddle thresher. To avail this agricultural implement kit the SHG group deposited Rs 2575 (5% of the total cost). An SHG 'Shyama' operating in MV-7 village of Malkangiri district, since 2001 has 17 female members. Each member has contributed to the SHG fund Rs 50/month. After two years of starting operations the SHG received a set from the Agriculture Department after paying Rs 2575 and began to custom hire these implements to needy farmers in their own and nearby villages at a competitive price in relations to charges of similar implements being floated in other major markets. The farmers were very receptive to the rates of the Self Help Group. Further the SHG also provided valuable instructions regarding the operation of the implements. During the year 2003-04 the SHG had already earned Rs 70000 by hiring the implements to the farmers. This has inspired many women SHG groups to come forward with greater interest for the

implementation of this programme. It would be helpful if the scheme continues for an extended period. With additional resources generated by custom hiring of services, the group has also undertaken kerosene dealership, MDM programme and selling of fertilizers.

Migration Check: A remote village shows the way

In a region where migration has become a way of life, Sargiguda in Muribahal block of Balangir district has set an example by being the only village to have checked the trend without the help of the administration or the government. The 130-odd families, including 84 BPL families, in the village have managed to keep themselves busy throughout the year, thanks to their innovative initiatives.

The villagers have dug up about 500 'chuans' (small open wells) on their own in between their agricultural fields to take care of their irrigation needs throughout the year. As a result, while about 50 acres are cultivated in rabi season, the figure goes up to 100 acres in kharif and winter season. The villagers grow paddy, 'kolath' (kulthi), dal, 'mandia' (ragi), sugarcane and a variety of vegetables.

Sargiguda also has an advantage as far as its location is concerned. Rainwater from the hills collects at this village. Besides, since it is one of the seven villages that have been protecting the Khujen forest, the dense vegetation helps in recharging groundwater and ensures enough water in the wells throughout the year. "No youth in the village sits idle. Either they sell the agricultural produce in the market or help in crushing sugarcane. Others sell sugarcane juice. "Some youths also collect iron, tin, bottles and plastic materials from different houses and exchange them for eatables! No wonder, the village has carved a niche for itself not only in Muribahal but also in neighboring Bangomunda and Tureikela blocks.

"These villagers have scripted a success story as they have understood their priorities better than the government officials," claims of 'Vikalpa', an NGO operating in the area. Most of the government programmes are broad based rather than being local specific. So they do not serve the purpose. "Instead of pushing a plethora of government schemes down their throats, the villagers should be allowed to manage their own resources and development will follow".

Source: The Times of India, Bhubaneswar Edition, Dated 14 April 2006, Friday

CONSTRAINTS AND RECOMMENDATIONS

Introduction

Although called a programme, components of agricultural diversification have been implemented independently without proper planning of personnel, resources, and convergence with other programmes. Beneficiary participation in planning has been completely neglected at planning stage. Government has tried to achieve good results through supply side management without any regard to the needs of farmers. This is the main lacuna of the programme. Several constraints faced by both the implementing agencies and the farmers are detailed below:

Constraints Faced by the Implementing Agency

Non-acceptance of HYV Seeds by the Farmers

The tribal people have a prejudice in terms of using high yielding variety of seeds. They believe that the cost that would incur by using these seeds for cultivation purposes would be very high and would not lead to proportional returns. They also believe that the taste of crops cultivated through such seeds would not be palatable.

Irregular Supply and Failure in Germination of Seeds

There is irregularity in the supply of the seeds to the farmers from the Agriculture Department. In about 30-40% of cases the field level officers are not able to supply the seeds before the sowing period. It is estimated that in relation to demand, supply of quality seed falls short by 50-60% less. For various reasons germination of seeds supplied by the Agriculture Department is not fully satisfactory. The follow-up to examine the causes of low germination is simply missing.

Constraints in Opening of Agro-service Centers

As per the guidelines, there is a provision for opening an agro-service centre where beneficiaries have atleast 10 acres of land. It is difficult to find farmers who fulfill the above criterion. This has resulted in inadequate numbers of service centres opening in

many districts. In Malkangiri only one service centre has been opened during 2000-01 to 2005-06 whereas in Nuapada no service centre has opened during the same period.

Saving seeds from HYV crops for subsequent year

The farmers who are provided with HYV seeds by the Agriculture Department do not save seeds from their own production for the next year unlike in the case of traditional varieties. Many feel that HYV seeds from their produce are not as good as fresh HYV seeds purchased from government stores (shops). Sometimes this induces them to revert to traditional seeds in the next cropping season if adequate HYV seeds are not available from government sources. As a result, the return from cultivation of crops drops in subsequent years. As an example hybrid varieties of ragi are provided under two components of the Agriculture Diversification Programme, namely Ragi Seed Exchange Programme and Ragi Crop Demonstration. In spite of the inclusion of 200 beneficiaries in each district (Nawarangpur, Malkangiri and Kalahandi) under Ragi Crop Demonstration Programme, the practice of using HYV seeds has not taken root in the minds of the farmers. Farmers revert back to the use of traditional varieties after a year or two. Consequently, the yield of ragi in Malkangiri and Kalahandi districts has declined by 16% and 20% respectively.

Constraints Faced by the Beneficiaries

Inadequate Land and Irrigation Facilities

Most of the lands in the KBK region are high lands and small in size. This makes the application of new agricultural techniques such as the use of tractors uneconomical. It is also difficult to provide irrigation facilities for highlands. As HYV seeds require more water than traditional varieties it makes cultivation on high lands using HYV seeds difficult.

Irregular Supply of Seeds

Supply of the seeds to the farmers is sometimes highly irregular and as a consequence they are not able to use the HYV seeds during the sowing period. Sometimes the supply of seeds is not in accordance with demand. This forces many farmers to purchase seeds from the market, which provide no guarantee of high output. Further,

the supply of fertilizers and pesticides is not adequate and is not in accordance with the time of application.

High Wear and Tear of Agricultural Implements

Though agricultural implements are supplied to the farmers to facilitate cultivation, within a year or two the implements wear down. Since there is no facility for the repair of these implements (along with lack of financial resources to get them repaired) they become redundant after two to three years.

Low Returns from Agriculture

Although income has increased after introduction of the programme, the level of income is still below the poverty line. As most of the farmers belong to the BPL category they do not have enough resources to invest in diversified cash crops. Market development to cater to the needs of small producers having small surplus to sell is highly inadequate. These small producers do not get reasonable price for their products.

Poor Supervision by the Agricultural Officers

Supervision by agricultural officers leaves much to be desired. They themselves are not adequately trained. This is accentuated by frequent transfers from the region. This causes de-motivation among farmers, as the confidence generated through dealing with a particular official is difficult to sustain after the official's transfer. Further, replaced officials do not always carry with them proper insight regarding the intricacies of the functioning of various schemes in that particular area. By the time they get acquainted to the area, they are transferred on their own initiative to get out of KBK

Need of Training and Demonstration Programme

Though demonstration programmes on different crops like paddy, ragi, moong and niger have been imparted in all the six districts yet large number of farmers do not get proper training for improving quality and quantity of production. Hardly any record about the achievements or failures of crop demonstration is maintained as learning

which can guide future course of action. In the training programmes provided to the farmers, training is limited to a day or two thereby limiting the coverage area content. There is hardly any follow up. Beneficiaries have complained that there is no follow-up after a demonstration programmes due to which acceptance of HYV seeds, changing agricultural practices to increase production and diversion towards cash crops are not fully effective

Ignorance Regarding Credit Facilities

Farmers interested in undertaking cash crop cultivation are not able do so due to financial constraints for purchasing high cost but critical inputs They have poor knowledge regarding credit facilities (amount, interest, repayment process) offered by various financial institutions including banks.

Advance Price Negotiation

Most of the farmers avail credit from Mahajans or moneylenders. Urgent financial requirements force the people to negotiate with the creditors in terms of price fixation for their crops. In cases where the farmers are not able to repay the debt, they are forced to sell their produce at the price negotiated upon irrespective of the price prevalent in the market. In almost all cases the negotiated price for future output is 30 to 50% lower than the market prices

Lease in Farming

In cases where farmers are operating on lands leased by landlords, they are expected to provide a certain proportion of the produce to the landowners in accordance with the contract made at the time of lease. During seasons when production is low, farmers are not able to fulfill the conditions of the contract. In such cases they are forced to repay from other sources such as taking loans from money lenders. This indebtedness leads to a cycle of extreme poverty.

Low Returns due to Inadequate Market Facility

In many places there is no government mandi or market functioning where farmers can sell their commodities at reasonable prices, which would give reasonable value to

the farmers for their products. Lack of proper marketing facilities forces farmers to sell their produce to local businessmen who exploit them by setting much lower prices as compared to prices in the wholesale or retail markets.

Lack of Storage Facility

Lack of storage facilities at market place forces farmers to sell their produce on the same day when they bring their produce to the market. Knowing this vulnerability of the farmers the middleman and businessmen exploit them by setting low prices. Farmers fearing loss in quality of their produce are forced to agree to the terms of the buyers. Due to poverty farmers are not able to make storage facilities of their own. It has been seen that in some areas of Nuapada district onion is produced widely but there is no storage facility for the produce forcing farmers to sell at the existing price.

Exploitation by Middlemen

Most of the farmers being tribal and living below the poverty line need immediate cash to meet daily requirements. The middlemen advance money and later lift the produce assuring that the balance will be paid within a short span. However, it is seen that the farmers have not received their balance in certain places even 4 years after some agricultural produce was sold to middlemen.

RECOMMENDATIONS

There is serious capacity constraint at district level to review all agricultural programmes and schemes and forge a linkage among them. Each programme or scheme is independently implemented and monitored regarding achievements in relation to targets instead of finding out its development effectiveness. Overall the programme has shown some mixed results. While diversification of crops has taken place in certain areas leading to increase in farmers' income, this increase has not sufficiently pushed them up to achieve 'Above Poverty Level' status. The programme needs a thorough revision and re-orientation. In fact it does not seem to be a programme. The components look like sub-components of a scheme. What is required is building up of management capacity initially at district levels and subsequently at lower levels (Blocks, Panchayats) etc. Agricultural diversification is a function of several supply side and demand side factors varying across districts and within Blocks of a district. Programme components are to be tailor-made to suit specific requirements of regions and specific group of farmers. Some of the steps recommended are detailed below:

Timely Supply of Good Quality HYV Seeds

It is very important that the seeds supplied to the farmers must be of good quality. These seeds must be checked in the laboratories to improve seed germination. Farmers grain from HYV seeds should be tested by government for their quality. It is necessary that seeds must be supplied in time in accordance with the needs of the farmers through opening of additional seed sales centres to minimize transaction costs involved in purchasing seeds from the market and also to ensure seed quality.

Improvement in Training Quality and Increase in Number of Demonstration Programme

Although some farmers have begun using HYV seeds lack of quality training sometimes leads to modest results, which are not up to the expectation of the farmers. Thus demonstration programmes should also complement distribution of HYV seeds in order to equip farmers with production improvement techniques (How many days the demonstration programme has been done)

Supply of Agricultural Implements

As a substantial number of farmers of the KBK region are under the BPL category they are not in a position to purchase the agricultural implements at the existing subsidy rates given by the agricultural department. In conjunction to the provision of higher subsidy on agricultural implements there should also be also a provision for the payment of the balance amount on easy installment basis.

Motivation among Officials

Due to the lack of interest among the agricultural officers at the field level the implementation of various programmes is not running efficiently. If officers were given incentives in accordance with their achievement of targets and quality of programme output, it would prompt officers to operate with more zeal. Further, flexibility in implementation in accordance with the type of problems would give officers more options to bring about desired results

Motivation among Farmers

Department should try to communicate with the farmers through methods which have more impact on their minds such as organization of 'palla' and drama skits. Innovative ideas should be communicated through projectors and other modern technology.

Market Facility

It is necessary that government should provide market facility for existing and newly introduced crops. Before introduction of any crop it is necessary to provide market facility to the farmers through which they will be motivated to cultivate newly introduced crops.

Value Addition

Since farmers get immediate cash at local markets or at the farm gate they are induced into disposing of their crops as soon as harvests are over. To increase the value of the farmers' produce, government should encourage the sale of produce in mandies. The

mode of operation in the mandies is highly cumbersome. Further there are only 3 to 4 mandies per districts. The constraints faced by farmers in selling at mandies should be smoothed out. Value addition can also take place by opening of more agro-processing units. In comparison to selling paddy, processed rice would fetch a higher price.

Crop Insurance

There is no assurance with respect to satisfactory returns from agriculture due to various reasons such as natural calamities. Sometimes farmers have to face severe losses when there is failure of crops. To mitigate the effect it is vital to introduce insurance on crops like cotton and sugarcane.

Crop insurance is covering only 14 per cent of the farmers. The need is to expand the cover to all farmers and all crops in a time bound manner. The scheme needs to be made more farmer friendly and the premium should be reduced.

Special Importance to the Landless Agricultural Labourers

For the landless agricultural labourers (both men and women), the aim should be to convert them into skilled workers, thereby adding economic value to their time and labour. The training should be in skills which can help in organizing market driven enterprises and the training methodology should be based on the principle of learning by doing.

Development of Agri-risk Fund

The government of India may step in to create an Agri-risk fund to provide relief (waiver in full/ part of loan and interest) to the farmers in the case of successive drought, etc, and also waiver of interest on loaning in areas hit by drought, floods, heavy pest infestation etc. This fund should have contributions from the Central Government, State Government and banks in pre-determined fashion. 1

¹ Agricultural Renewal and prosperity/ Yojana/ jan 2007/ page-90

Development of Soil Testing Laboratories

Re-tooling and re-equipment of all soil testing laboratories should be taken up in order to provide each household with a Soil Health Card. The soil health card should stimulate balanced fertilization, including the amelioration of micronutrient deficiencies.²

Introduction of Low Water-Intensive Crops

As the rainfall in the region is very erratic, the yield of traditional crops cultivated within the KBK region varies from year to year. Therefore, to mitigate the negative impact in years when rainfall is less, there should be a diversification towards crops, which require less water such as pulses and oilseeds. However, since the management of these crops requires more care training should also be imparted.

Creating Awareness Regarding Kisan Call Centres

Government of Orissa has established Kisan Call Centres for providing instant solution to problems faced by farmers at the field level. The calls to these centres are toll free. But as farmers are not aware about this facility they are not in a position to avail the benefits. Therefore, it is essential to generate awareness among the farmers for better utilization of this service.

CONCLUSION

The programme on the whole had a positive impact in terms of motivating farmers from a static paddy oriented cropping system to a more diversified income generating cropping system. There would be more lasting changes if the intensity of follow-ups on crop demonstration to be undertaken in future is increased. Increase in subsidies and financial support is bound by funds available, however, quality of grass-root level implementation is much more important for realizing development programme targets. Instead of having agricultural diversification as a programme, it should form a component of agricultural planning for the district.

² Ibid

REFERENCES

Arabinda Ghosh	Diversifying Agriculture: The New Mantra, Yojana, January 2001
Ashok Gulati and Tim Kelley (1999)	'Trade Liberalization & Indian Agriculture-Cropping Pattern Changes and Efficiency Gains in Semi-arid Tropics', Oxford University Press
B. Bhuyan	Marketing of Agricultural Produce in Orissa
Christofer L. Delago (1995)	'Agricultural diversification and export promotion in sub-Saharan Africa', Food Policy, Vol 20 No.3 June 1995
Dr. Damodar Tripathy, Julie Tripathy	Agricultural Diversification, Migration and Poverty Reduction in Orissa: in Interpretative Analysis
Government of Orissa	Orissa Agricultural Statistics, 1995-96 to 2005-06.
Government of Orissa	Agronica, Directorate of Agriculture and Food production.
Government of Orissa, Panchayati Raj Department	1997 BPL Survey
Government of Orissa, Planning and Coordination Department	Revised Annual Action Plan under RLTAAP for KBK Districts, 2002-03
Pingali Prabhu L and Mark W. Rosegrant	"Agricultural commercialization and diversification: processes and policies", Food Policy, Vol 20 No.3 June 1995
R S Sidhu, A S Bhullar	Patterns and Determinants of Agricultural Growth in the Two Punjabs, EPW December 31, 2005-January 6, 2006
Surinder Sud	Crop Insurance and National Agricultural Policy, Yojana, January 2001
Vishal Rawat	Agricultural Spectrum, December 2004
Website	www.ori.nic/diorissa/market.htm



A good crop of High yield ragi but food prepared out of it is not palatable leading to farmers reverting to traditional ragi seeds.



Mixed cropping Arhar with Maize: the latter already harvested.



Ploughing still continues to be the dominant cultivation method



Power Tillers increasing the efficiency of land cultivation



Harvest of Tomatoes after a season of Diversification



Ph1 Farmers growing off season vegetables to fetch high market prices



Ph2 Farmers selling off season vegetables and getting just rewards for their foresight through crop diversification.