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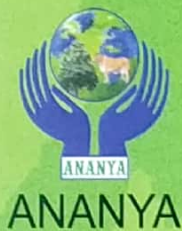


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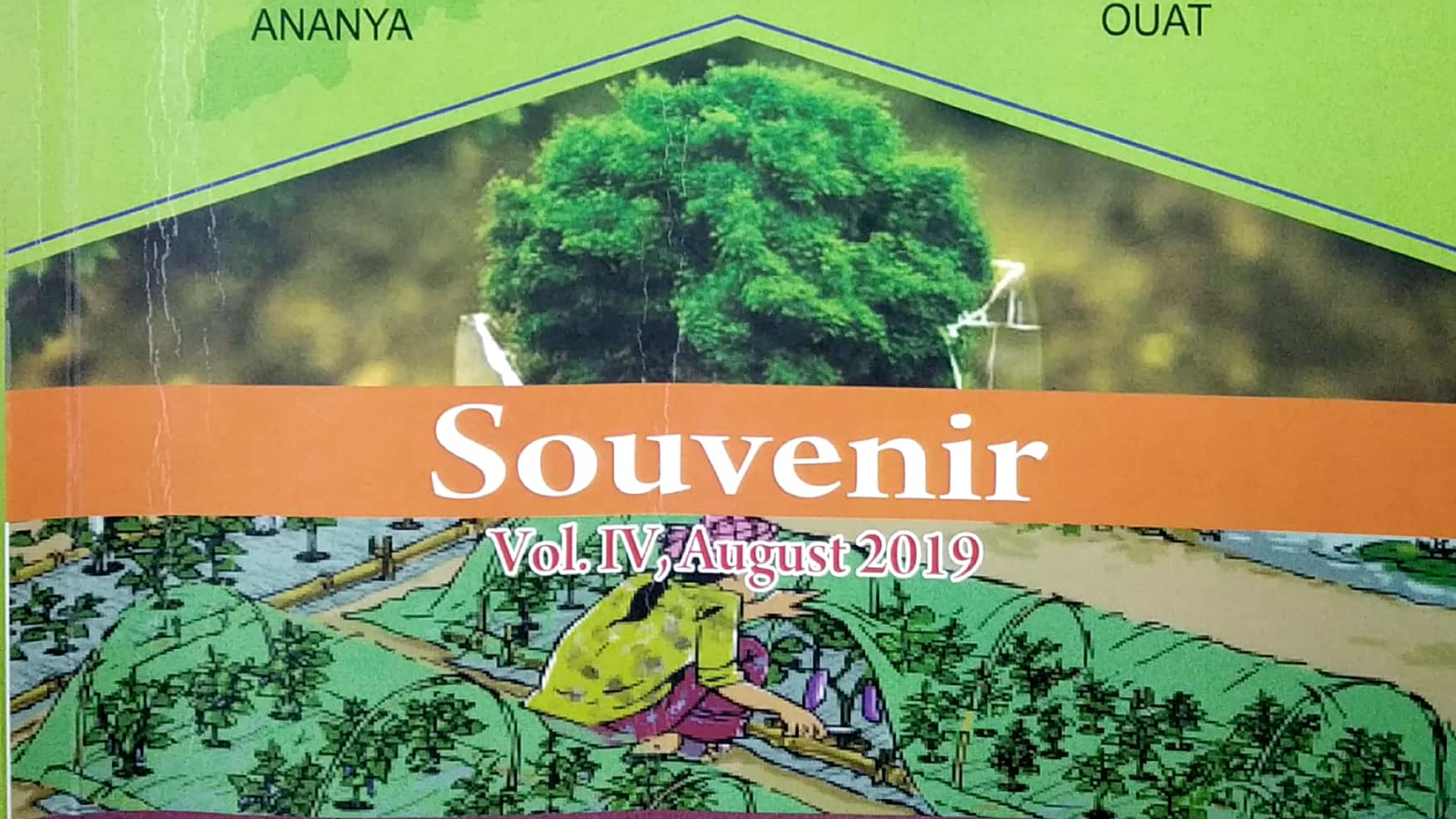
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Doubling Farmers Income in Odisha by 2022 through agricultural diversification

A.K. Nayak, Vijayakumar, S and Rubina Khanam

Past strategy for development of the agriculture sector in India has focused primarily on raising agriculture output and improving food security. It made country self-sufficient in food grain production and changed the fate of country from net importer of food grains to exporter. Though the strategies increased the food grain production and availability, but it does not increased the farmer's income up to the expected level. In many cases farmer's income remained same due to increased production cost and stable market price. As a result, country has witnessed disparities in the economic development of farmers.

Over the 65 years (1951-52 to 2016-17), industry has grown at the annual average rate of 6.1%, service 6.2% and agriculture sector 2.9%. The result of this slower growth rate in agriculture pull down the GDP from 53.1%(1950-51) to 15.2% in recent years. But the employment share by agriculture is still high at around 45%. The most important reason for the emergence of agrarian distress in the country during 1990s is the low level of absolute income as well as large and deteriorating disparity between income of a farmer and non-agricultural worker, which turned even more serious in latest years. Presently, the average income of an Indian farmer is about Rs. 6,430 per month. But there is a huge variation of farmers per month income in different regions of India. For example, in Punjab it is Rs. 18,060 while in Bihar 3,560. Similarly, the benefit of green revolution was not extended to Easter India. The average monthly income of Odisha farmers is low (Rs. 4953/month) compared to the national average. In this background, the goal set to double farmer's income by 2022-23 can play crucial role to promote farmer's welfare, reduce agrarian distress and bring parity between income of farmers and those working in non-agricultural professions and also

discourage the level of disparity among different regions of India. According to the reports published from Niti Aayog, doubling real income of farmers till 2022-23 over the base year of 2015-16, requires annual growth of 10.41%. To achieve the growth rate, a range of approaches and strategies need to be developed starting from modern agricultural technologies as well as appropriate market price realization and value addition, which support farmers in all their endeavors.

Odisha has a geographical area of 1,55,707 km² with a population of 4.2 crores. It's 9th largest state by area and 11th largest by population. About 60% population of the state draws its sustenance fully or partially from the agriculture sector. It is the mainstay of state's economy providing livelihood support to large section (60%) of population. The total cultivated land of the state is 61.80 lakh ha out of which 33.37 lakh ha (54%) of land is irrigated. Low land, medium land and high land account 25% (15.11 lakh ha) 28% (17.55 lakh ha) and 47% (29.14 lakh ha) of the total cultivated land area respectively (Odisha Agricultural Statistics, 2013-14). The cropping intensity of the state is 167%. As per Agricultural Census-2010-11 the number of operational holdings of the state is 46.67 lakh with operational area 48.52 lakh ha. Only 4% of the farmers are coming under large category whereas remaining 96% farmers are in marginal to medium category (marginal-23; small-30; semi-medium-27; medium-16). Accordingly, the average size of land holding is 1.04 ha. Rice is the major crop in *Kharif* season, whereas, pulses & oilseeds in *Rabi* season. The total irrigated area in the state is increasing over the year. The gross irrigated area is 35.21 lakh ha (22.54 lakh ha during *Kharif* and 12.67 lakh ha during *Rabi*) which is 70.38% (30.05 lakh ha) of the irrigation potential created from all sources till 2013-14 (Odisha Agricultural Statistics,

2013-14). The share of the agriculture sector in the States Gross Domestic Product (GDP) has been declining over the years, still this sector continues to be vital for the State's economy as about 60% population of the state draws its sustenance fully or partially from this sector. This sector often suffers by natural calamities like cyclones, drought and flash floods.

Uncertainty in monsoon and regular incidence of insect pest and disease and stable market price reduced the agricultural productivity and income. In addition, traditional agricultural practices and traditional cultivars, lack of proper irrigation infrastructure, skewed land distribution, small size of land-holding, and inadequate capital investment are the threat of low productivity. Thus, for shifting the current production-driven to income-driven agriculture system a range of strategies (economic, technological, infrastructure, policy and social) based on the present agro-ecological-economical-social condition of Odisha should be adopted.

Productivity Gaps of major Crops:

Productivity of the major cereal crops in Odisha is lower than the average yield the country.

Table 1. Productivity and yield comparison of major crops grown in Odisha in 2015-16

Crop	Productivity (q/ha)		Yield comparison
	Odisha	India	
Rice	14.91	24.00	Low
Gram	7.75	8.77	Low
Sugarcane	644.00	707.20	Low
Mustard	2.05	11.84	Low
Jute	21.74	25.60	Low
Potato	101.73	260.00	Low
Wheat	13.47	30.34	Low
Peanut	10.97	14.76	Low
Total pulses	5.26	8.87	Low

Source: Annual Report 2015-16, GOI,

Thus, scope is existing to raise farmer's income through improving the productivity of these crops. The yield gap of major crops of Odisha in comparison to national productivity is presented in table 1.

Providing quality seeds, proper agronomic practice, enhancing seed replacement ratio, promoting high yielding varieties, increasing cropping intensity in rice-fallow areas could be some possible way out for reducing the yield gaps of major crops in Odisha.

High value crops as an option for diversification

In Odisha, farmers are mainly practicing rice cultivation and they are not much remunerative as compared to high value crops like vegetables, fruits and flower crops. The market price of rice has become stagnant over the years and in near future there is very less probability for rise in price of rice. The interstate yield comparison of vegetable yield shows most of vegetables are falling under medium productivity category. However, the area under vegetable is very less. Thus, there is lot of scope to

Table 2. Area, production, productivity and yield comparison of vegetables crops

Crop	Area	Production ('000MT)	Productivity ('000MT/ha)	Productivity
Beans	11.23	52.11	4.64	Low
Brinjal	125.2	2158.25	17.24	Medium
Cabbage	40.98	1150.88	28.08	High
Cauliflower	44.07	667.73	15.15	Medium
Okra	65.24	578.53	8.87	Medium
Onion	57.46	704.96	12.27	Medium
Peas	5.89	52.79	8.97	Medium
Potato	14.99	249.76	16.66	Medium
Tapioca	0.06	1.01	16.83	Medium
Tomato	97.02	1385.96	14.29	Medium

(Source: NHB)

Table 3. Area, production, productivity and yield comparison of Fruits and other plantation crops (Source: NHB)

Crop	Area ('000ha)	Production ('000MT)	Productivity ('000MT/ha)	Yield comparison
Aonla	2.02	0.71	0.35	Low productivity
Banana	25.06	476.60	19.02	Medium productivity
Guava	14.20	103.60	7.30	Low productivity
Mango	197.52	751.02	3.80	Low productivity
Papaya	3.28	72.18	22.01	Medium productivity
Pineapple	0.84	10.38	12.36	Low productivity
Pomegranate	0.23	0.87	3.38	Low productivity
Sapota	3.35	15.64	4.67	Low productivity
Total spices	123.32	181.50	1.47	Low productivity
Total Plantations	217.69	309.34	1.42	Low productivity
Total Loose Flowers	7.44	37.40	5.03	Low productivity

Yield comparison between different states revealed that the productivity of all the fruit crops are very low except mango and papaya. As all other fruit crops are falling under low productivity category, there is immense scope to improve the productivity of these crops in Odisha by growing improved varieties and adopting best agronomic management practices. Similarly, there is lot of scope for increasing the area and productivity of spices, loose flowers, and plantation crops in Odisha.

Diversification

Most of the farming community of Odisha is coming under marginal to medium category (96%) and the average per capita land holding size is very small (1.04 ha). Thus, decreasing per capita land availability and increasing demand for food grains, fruits, vegetables, and meat forces agrarian community to adopt diversified farming. Agricultural diversification could be a remuneration option for all classes of farmers. The synergistic blending of agricultural crops, horticulture crops, dairy, fisheries, and poultry will ensure better input use efficient, regular income

flow and reduce the risk of total crop failure. Crop diversification with high value crop(s) and high yielding varieties by shifting from traditionally grown less remunerative crop(s) and varieties will definitely increase the income and empower the socio economic status of the farmers. The potential and demand for vegetables, high value fruit crops and flowers are very high and increasing over the years. The major portion of the requirement of these commodities is mainly meet through importing form the neighboring states. Odisha has immense potential for horticulture crops, particularly in vegetable and fruits cultivation. The recent establishment of flower market in Ganjam district boosted the commercial flower cultivation. These kind of diversification in farming provides better conditions for food security and enables farmers to grow diversified products for sale at market and will helps in obtaining higher income to meet household well-being. However, a effective commodity supply chain is needed because of the perishable nature of these commodities. Strong marketing link is essential to remove the middle level agents. These middle level agents exist in various forms restricting a larger margin from the producers.

Which is further aggravated by the lack of proper storage facilities. Scientific storage system should be enhanced to improve the shelf life of the produce and reduce the cost of post-harvest handling. Thus, Warehousing financing as well as cold-chain storage have to be given prime importance for

enhancing farmers' income. Adaption of simple agricultural machineries that improve the efficiency of farm operations and productivity should be promoted through custom hiring center. List of farm implements suitable for different categories of farmers are presented in table 3.

Table 4: List of farm implements suitable for various categories of farmers

Category of farmer	Implements suitable
Marginal & Small	Drum seeder, Bullock drawn drum seeder, Cono weeder, Multi crop seed drill, pre -germinated hill seeder, Finger weeder, wheel finger weeder, star cono weeder, Blade and rake weeder
Medium	Power tiller, rice transplanter
Large	Tractor, Laser land leveler, rice transplanter , Happy seeder, Plough and harrow
For all category through custom hiring	Combine harvester, Thresher, Rotavator, Laser land leveler, seed cum fertilizer drill, Chisel plough, Hole digger, Plough and harrow

Livestock as an option for diversification:

Similarly, to commercial flower cultivation, establishment of commercial dairy farming in potentially area could also be another possible option for agriculture diversification in Odisha. The milk production of Odisha is increased from 5.8 lakh metric tonnes (LMT) in 1994-95 to 19.0 LMT in 2014-15 exhibiting a compound annual growth rate of 6.4% (Table 5). However, with the share of 4 per cent of the country bovine population, it accounts only 1.3 % of the country milk production (Dairying in Odisha, A statistical profile 2016). According to the 19th Livestock Census, Odisha has witnessed decline in bovine population. However, the milk production is increasing over the year due to increase in milk production from exotic and cross-bred cattle and indigenous cows. Regarding utilization, the dairy farmers retain 25% of the milk for household purpose and convert 18 % of the milk into value added dairy products and sell about 60% as fluid milk.

Although Odisha has 4% of the country bovine population, it shares in milk production is very low due to its low productivity. This is due to non-availability of sufficient quantity of quality green fodder, and feed (concentrates). Another reason is 83.7% bovine population is Indigenous cattle and crossbred cattle account only 10.5% of the total bovine population (Table 4). The demand for green fodder in the State is about 312 lakh MT and that of dry fodder is 139 lakh MT against the availability of about 161 lakh MT green fodder and 106 lakh MT dry fodder (Dairying in Odisha. A statistical profile 2016). Thus production of green fodders (Napier grass, fodder sorghum, fodder maize) ensure the availability of fodders throughout the years. These crops are also suitable for boarder crops. Thus, each part of the land can be utilized efficiently. In addition, Government support also required to establish more number of veterinary hospitals, polyclinics, mobile veterinary units; timely supply and storage of semen for artificial insemination; introduction of high

yielding breeds, establishment of efficient training Centre for genetic improvement of livestock, supply of quality fodders etc.

Poultry and fishery

The consumption of poultry meat and egg has been increasing over the year whereas the production is remaining constant. The deficit was met through importing from neighbor states. As a result, the price of egg and red meat is increasing over the year. Thus, integration of poultry production could be the viable option to double the farmer's income. With the increasing demand of livestock producers, integration of this sector with the existing farming set up can be a remunerative business for the farming community of Odisha.

Table 5. Livestock population in Odisha:2014-15

Bovine	12.3 million
Indigenous cattle	10.3 million
Crossbreed cattle	1.3 million
Buffaloes	0.7 million
Small Ruminants	8.1 million
Poultry	19.9
Total milk production	1903,000 MT
Total egg production	1924 million
Total meat production	162.5,000 MT
Marine and Inland fish production	413.8,000MT

Table 6: Milk production in Odisha 2014-15

Livestock	Production '000 MT
Cross breeds	844
Indigenous	860
Buffalo	194
Goat	4
Total	1903

Conclusion

The average income of Odisha farmers is low compared to national average. The low income is attributed to various factors, viz. environmental, technological, market, and socio-economic status. Diversifications with high value crops like vegetables, flowers, fruits and livestock enterprises

will be a strong strategy to double the income of all the categories of farmers. This will also be a step towards climate resilient agriculture. Farmers should be encouraged to cultivate higher value crops through various government programmers. Moreover, farmers should also get easy and timely access to the quality seeds of different high yielding variety. Inclusion of livestock farming will reduce the dependence on agriculture and will buffer farmer's income. The average agriculture productivity is also low in Odisha compared to others state in the country. To enhance the productivity supply of quality seeds, judicious use of inputs, efficient use of modern technologies, encouragement for value addition, market linkage for getting better price for the farm produce is essential. Due care should be taken, so that all the strategies will be more realistic, locally acceptable and cost effective.

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