

ROLE OF AGRICULTURE IN TRIBAL DEVELOPMENT: A COMPARATIVE STUDY IN KORAPUT DISTRICT OF ODISHA

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Abstract

Alzheimer's Disease (AD) mainly affect the cerebrum which mainly affects the memory and influences in reasoning, arranging, language, and also vision. Many Researchers accept that Alzheimer's disease occurs as a results of accumulation of a particular protein (beta-amyloid protein) in the cerebrum and causes the destruction of Neurons, Nowadays around 24 million individuals overall experiences some type of dementia and the worldwide commonness of dementia is relied upon to twofold at regular intervals, contacting 42 million individuals in 2020 and 81 million individuals in 2040. Lack of cholinergic neurons is the major cause for Alzheimer's sickness. The Choline esterase are important enzyme mainly involved in hydrolysis of choline esters. Hence this paper mainly focused the activity of Choline esterase and to find out the differences between the normal and with alzheimer disease and its importance.

Key words: Beta Amyloid, Choline esterase, dementia

Introduction

The agriculture sector is vital for the food and nutritional security of the nation. The growth of agricultural productivity is closely associated with a country's economic development. Agriculture continues to be the most important sector of the economy in most developing countries, accounting for the largest proportion of employment (Båge, 2005). This sector remains the principal source of livelihood for more than 41% of the population and contributes around 19% to India's national GDP (GoI, 2021). With increasing concern about the environmental, economic, and social impact of chemically dependent inorganic agriculture, many farmers and consumers seek alternative practices that will lead to green growth, agriculture profitability, and livelihood sustainability (Shrestha and Bajgain, 2005). Alternative organic farming is potentially a profitable enterprise, with a growing global market already supplied by more than 90 developing countries. Entrepreneurs see a market for the sale of food that has grown chemical-free (ADB, 2005). Organic agriculture can contribute to meaningful socio-economic and ecologically sustainable development, especially in developing countries. Local consumers in India have a fairly well-developed perception about organic produce, are interested in buying certified organic foods, and even willing to pay more for them (Alviar, 1980). Unless effective strategies for agriculture development are successfully implemented, ending rural poverty will remain a distant goal. Organic agriculture is a production system that sustains the health of soils, ecosystems and people. Organic agriculture is a production system based on an agro ecosystem management approach that utilizes both traditional and scientific knowledge (Adhikari, 2006). Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved. Organic agriculture is an ecological agriculture model with the specific definition and strict standards, which is an important aspect of sustainable agriculture (Fischer et al., 2002). Although organic farming is certainly growing in popularity, there are conflicting opinions about its potential and the benefits it can offer, in particular whether organic methods can actually improve the livelihoods of smaller farmers. Similarly, questions remain as to what impact organic methods have on labour, soil quality, local economies, and risk. Two areas of debate are most prominent: the local risk benefit ratio of organic adoption and the marketability of smallholder organic products.

Organic farming was the main method of farming before "modern agriculture" was introduced. After two World Wars, chemicals that were used as weapons were converted into fertilizers and pesticides for "peaceful"

use. Rural people came to adopt “modern” technology in order to lessen workload while the societal base shifted from agriculture to manufacturing and services. Consequently, organic farming became marginal and regarded as an old-fashioned and laborious technique with low productivity. The penetration of agricultural modernisation started in the 1960s in the “majority world”. According to Barr (1999) “Government was compelled to provide the necessary infrastructure in the form of irrigation, higher-yielding variety seeds and fertilisers, as well as information, subsidies and support price for agriculture. Without these incentives, the Green Revolution would have been a nonstarter.” But these impacts were not long term and sustainable. India's serious economic and political crisis in the mid-1960s triggered the big conversion of the government's agricultural policy that emphasised technological innovation and started to introduce new agricultural technologies from abroad (Fujita, 1999).

During this time, new technology and new production methods had emerged, including synthetic fertilizers, herbicides, pesticides, genetically modified crops, heavy irrigation, intensive tillage etc which is known as inorganic farming. Inorganic farming has become one of the most necessary farming systems to meet the growing demand of the people who want a high quantity of food without considering the environmental damage associated with intense production. This method usually alters the natural environment, affects human health, deteriorates the soil, degrades the air quality, misbalances biodiversity, contaminates groundwater used for drinking purposes, and makes plants less resistant to diseases. Inorganic fertilizers have a high acid content like hydrochloric and sulphuric acids. Continuous use of these leads to high soil acidity resulting in the death of nitrogen-fixing bacteria, earthworms and microorganisms. Since inorganic agriculture aims to maximize yields, environmental health and biodiversity are usually not preserved. Agriculture is the “driving force” disturbing the environment. Because agriculture makes use of the environment, it exercises a certain “pressure” on the environment. Owing to this pressure, the environment is characterised by a certain “state”, which, on its turn can influence “impact” the wellbeing of men, and the ecosystem or the economy” (Mondelaers et al., 2009). Organic farming has regained its recognition as a protest against environmental degradation and control by the global capitals and its promising premium products mainly for export. Today, organic farming is spreading worldwide.

According to a report of FiBL and IFOAM (2020), “a total of 71.5 million hectares of agricultural land were organically managed at the end of 2018, representing a growth of 2.9 per cent or 2 million hectares compared to 2017. Australia has the largest organic agricultural area (35.7 million hectares), followed by Argentina (3.6 million hectares), and China (3.1 million hectares). Due to the large organic farmland area in Australia, half of the global organic agricultural land is in Oceania (36.0 million hectares). Europe has the second largest area (15.6 million hectares), followed by Latin America (8 million hectares), covering 0.9% of the world's agricultural land. The coverage rate is high in Oceania (2.9%) and Europe (2.1%), and it is low in Asia (0.23%) and Africa (0.09%). In 2018, 2.8 million organic producers were reported. India continues to be the country with the highest number of producers (1'149'000), followed by Uganda (210'000), and Ethiopia (204'000)”.

India has the largest concentration of tribal people anywhere in the world except perhaps in Africa. The tribals are children of nature and the eco-system conditions their lifestyle. India with a variety of ecosystems, presents a varied tribal population throughout its length and breadth. The areas inhabited by the tribal constitute a significant part of the underdeveloped areas of the country. As reported by the Census of India (2011), Odisha has 22.1 % of tribal population and 9.7 % of the total tribal population of the country. Koraput is one of the most backward and tribal-dominated districts of Odisha, where most of the tribes depend on agriculture for their livelihood. The Food and Agriculture Organization (FAO) of United Nations in the year 2012 has accorded the status of Globally Important Agricultural Heritage Systems (GIAHS) to the traditional agricultural system being practiced in Koraput region of Odisha. The tribal people have an indigenous knowledge system for their various farming practices and over the decades, a good percentage of Koraput's tribal farmers follow the method of organic farming while others are doing inorganic farming. Basically, in this study, a comparative analysis has been made between organic and inorganic farming households by emphasising the impact of agricultural practices on tribal development in the district of Koraput.

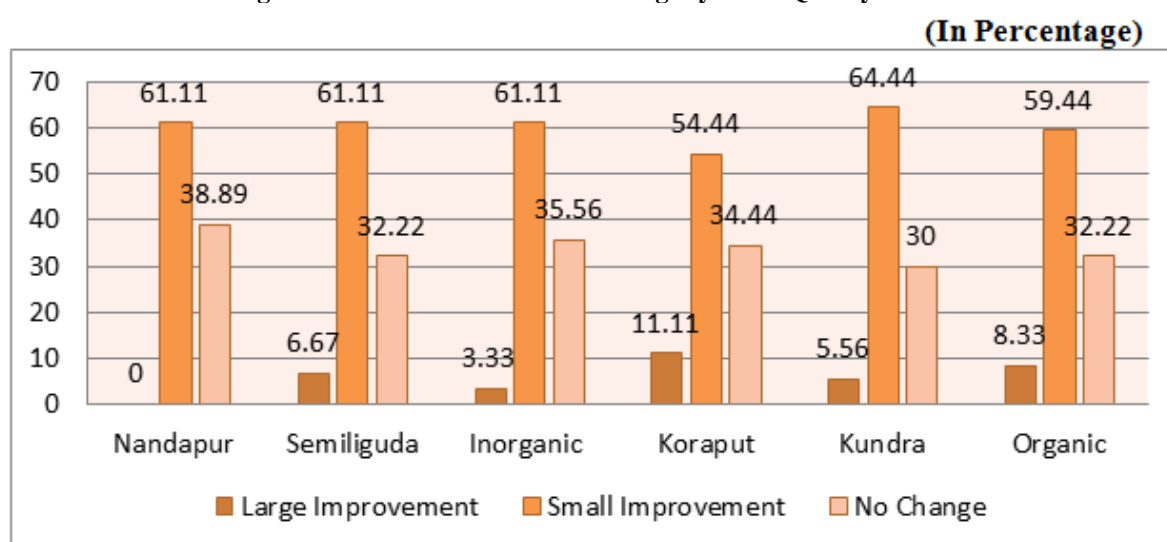
Objective and Methodology

The paper's main objective is to analyse the role of agriculture in tribal development in the Koraput district of Odisha by making a comparative study among the tribal farmers practicing organic and inorganic agriculture. This paper is based on primary data. Out of 14 blocks of Koraput district, two blocks dominated by organic farming namely Koraput and Kundra and the other two blocks dominated by inorganic farming i.e. Semiliguda and Nandapur have been selected through snowball sampling technique. In total, data from 180 organic and 180 inorganic farming units have been collected through structured household schedule. Simple descriptive statistical tools like average and percentage methods have been used for the analysis and results were depicted through various figures.

Results and Discussion

In general, development refers to social, economic, political and cultural changes in human life. This paper dwells upon the household views on the development of the farming communities depending upon their farm practices. As per the objective of the study, diverse opinions related to the status of development like the quality of life, agricultural income, farming condition, education of the children, amount of expenditure on food and calorie intake, health condition, quantity of clothes and footwear, housing type, access to drinking water, toilet system and sanitation, entertainment, travel and tourism, number of livestock, purchase of durable goods, participation in gram sabha, member of various SHG/farmers associations, amount of loans, amount of savings and investment, availability of assets and properties, social behaviour and respect in the society, access to government schemes and subsidy, number of bank accounts, use of ATM card, and use of the internet and mobile have been collected from the households. The farming households' views have been classified into three categories i.e. large improvement, small improvement, and no change. The analysis and results of the same have been discussed as follows.

Figure-1: Households Views on Living Style and Quality of Life

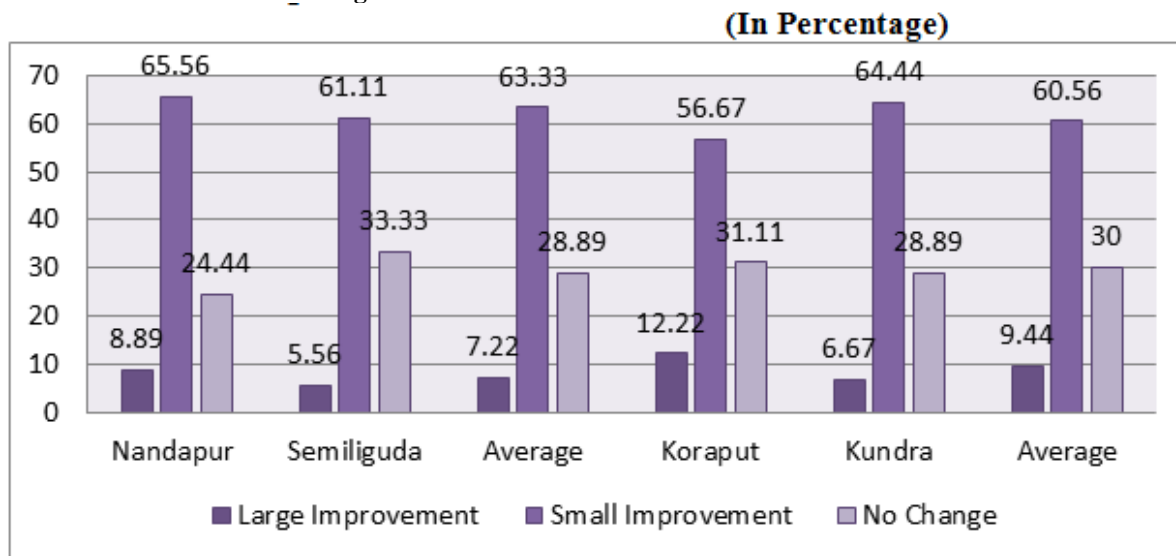


Source: Primary Data

Quality of life means the degree of fulfilment of basic needs like food, cloth, shelter, health, education as well as meeting physical, social, physiological, cultural and emotional needs. The above figure exhibits the change in living style and quality of life. According to the perception of the respondents, 35.56% and 32.22% of the average of inorganic farming and organic farming responded to no change whereas 61.11% and 59.44% of the average of inorganic farming and organic farming are of the view of small improvement in their standard of

living. 8.33% and 3.33% of the average of organic farming and inorganic farming responded to large improvement. Koraput has 11.11% of respondents having large improvement. The difference in inorganic farming in case of large improvement is approximately 3 times less than that of organic farming which may be due to higher income and good yield.

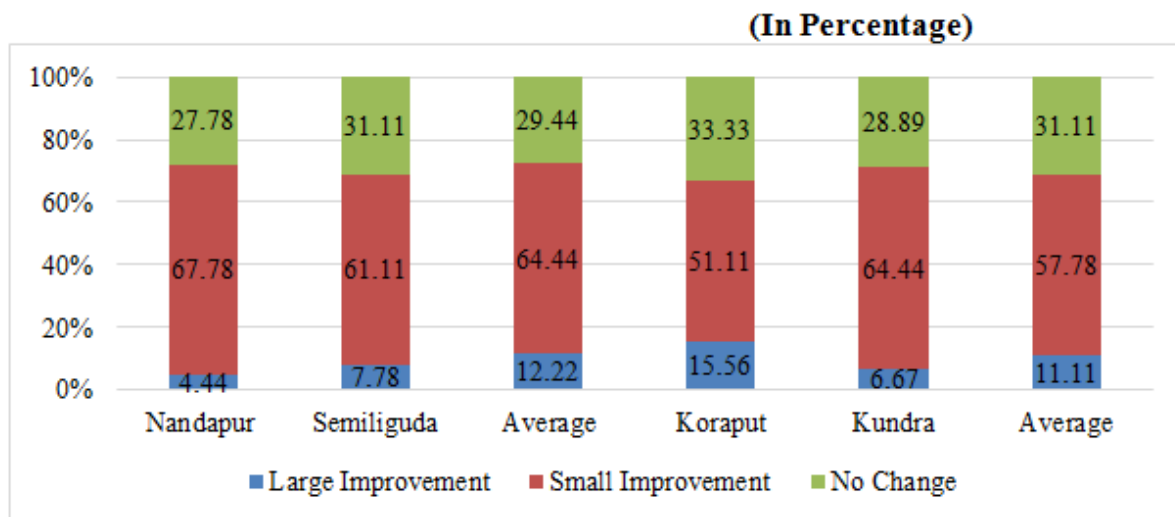
Figure-2: Households Views on Level of Income



Source: Primary Data

Level of income is an important determinant factor in the life of the people which refers to the monetary or non-monetary returns earned by an individual or business in exchange for providing labour, producing a good or service or through investing capital. From the data above, it can be stated that 28.89% and 30% of the average of inorganic farming and organic farming respectively responded to no change in the level of income. 65.56% of Nandapur followed by 64.44% of Kundra responded to small improvement. 63.33% and 60.56% of the average of inorganic farming and organic farming respectively have the opinion of small improvement in the income level. 12.22% of Koraput doing organic farming have large improvement. 9.44% and 7.22% of the average of organic farming and inorganic farming respectively had large improvement in the level of income. Thus, majority of the farmers responded to small improvement in the level of income and Koraput with 12.22% faced large improvement in the income level.

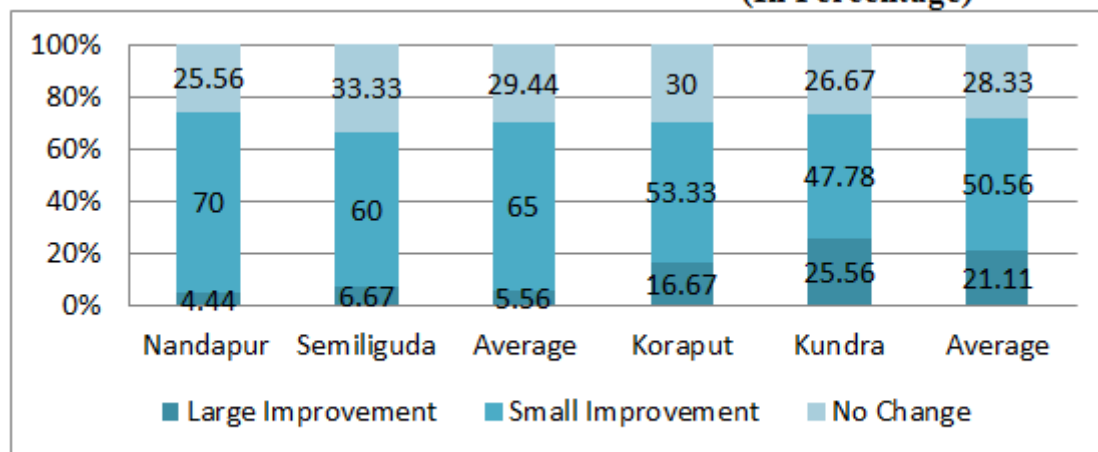
Figure-3: Households Views on Agricultural Income



Source: Primary Data

Agricultural income is an important factor which had influenced the human activities in a number of ways. So, the distribution of respondents under different categories according to their change in agricultural income has been analyzed and presented. According to the respondents view, 29.44% and 31.11% of the average of inorganic farming and organic farming respectively had no change in agricultural income. Nandapur at 67.78% records highest frequency of small improvement in agricultural income. 64.44% of the average of inorganic farming and 57.78% of the average of organic farming had small improvement in the agricultural income. 12.22% and 11.11% of the average of inorganic and organic farming had large improvement in agricultural income. This small and large improvement of the majority of farmers may be due to other business activities.

**Figure-4: Households Views on Farmer and Farming Condition
(In Percentage)**

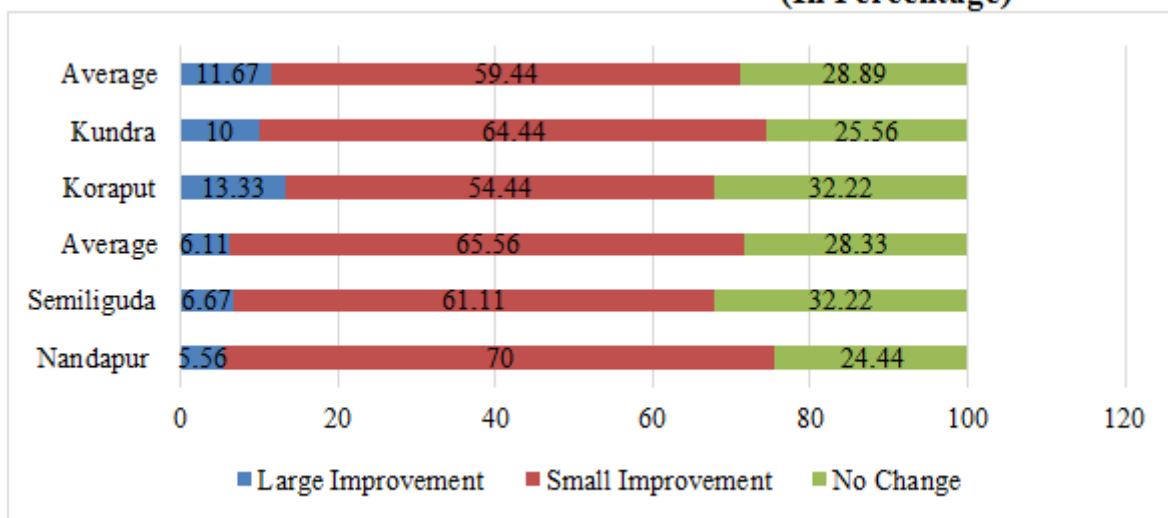


Source: Primary Data

Farming condition refers to the possession of agricultural implements in terms of tractors, bore well, cattle shed and power tillers being the major components and the natural resources like land, air, nutrients, water and sunlight. Irrespective of organic and inorganic farming, the possession of agricultural implements and prevailing natural condition leads to an increase in agricultural production. 29.44% of the average of inorganic farming and 28.33% of the average of organic farming had no change in their farming condition. 70% of Nandapur followed by 60% of Semiliguda had small improvement. In the same way 53.33% of Koraput and 47.78% of Kundra also had small improvement thus leading to 65% and 50.56% of the average of inorganic

farming and organic farming respectively. 5.56% and 21.11% of the average of inorganic and organic farming respectively had large improvement in their farming condition. Thus, it can be inferred that majority of the farmers practicing inorganic farming had small improvement than organic farming but the reverse can be noticed in case of large improvement. This may be due to high yield and long run process in case of organic farming.

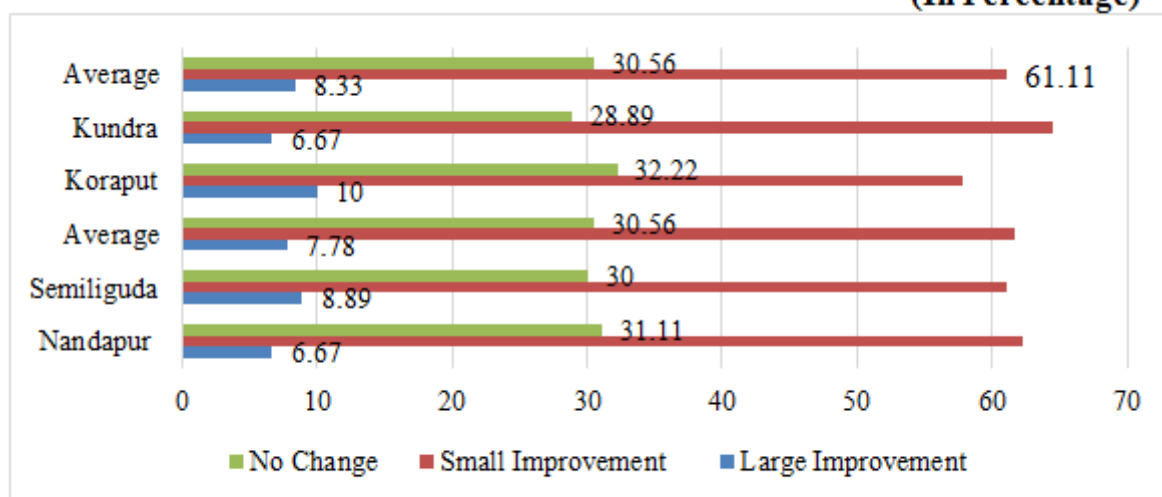
**Figure-5: Households Views on Education of the Children
 (In Percentage)**



Source: Primary Data

Education in present society has a great impact on individual's status in the society. It also affects the individual's chances for bringing in a given occupation including health and living status. 28.33% and 28.89% of the average of inorganic and organic farming had no change in children's education. 70% of Nandapur followed by 64.44% of Kundra had small improvement in the status of education of children. 65.56% and 59.44% of the average of inorganic and organic farming respectively experienced small improvement in the education of the children. 11.67% and 6.11% of the average of organic and inorganic farming had large improvement in the education of the children. Thus, it can be found that the frequency of large improvement has taken more in organic farming than inorganic farming whereas small improvement is more in inorganic farming than organic farming.

**Figure-6: Households Views on Amount of Expenditure on Food and Calorie Intake
 (In Percentage)**

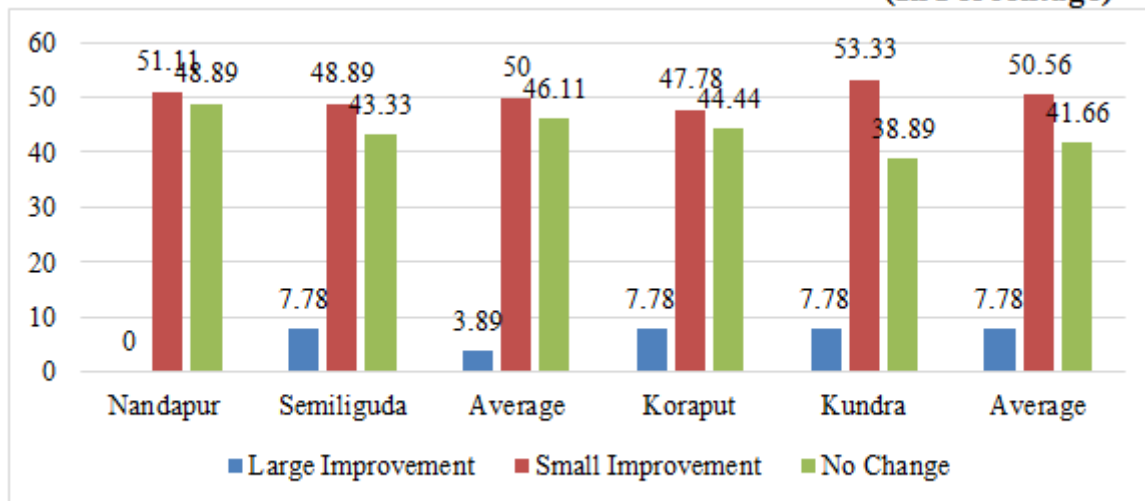


Source: Primary Data

Expenditure on food and calorie intake represents the dietary status and nutrient intake which also signifies the status of living. The figure above depicts that 30.56% of the average of both organic and inorganic farming responded to no change in the amount of expenditure on food. 61.67% and 61.11% of the average of inorganic and organic farming respectively had small improvement. 7.78% and 8.33% of the average of

inorganic and organic farming had large improvement. Koraput block has 10% of respondents with the opinion of large improvement. All the blocks irrespective of different types of farming have almost the same level of expenditure on food and calorie intake.

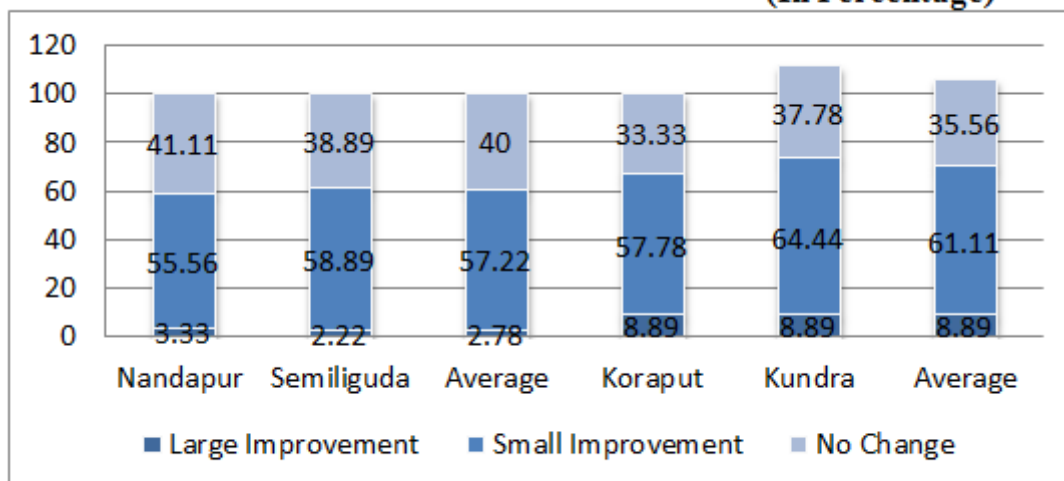
Figure-7: Households Views on Health Condition of the Family Members (In Percentage)



Source: Primary Data

Health is a state of complete physical, mental and social well-being. The figure above predicts that 46.11% and 41.66% of the average of inorganic and organic farming respectively have no change. 50% and 50.56% of the average of inorganic and organic farming respectively have small improvement in the health condition of the family members. Organic farming blocks, on an average, have witnessed 7.78% large improvement whereas 7.78% of the respondents of Semiliguda have witnessed large improvement. Thus, it can be inferred that majority of the farming communities had small improvement followed by no change in the health condition of the family members.

Figure-8: Households Views on Quantity of Clothes and Footwear (In Percentage)

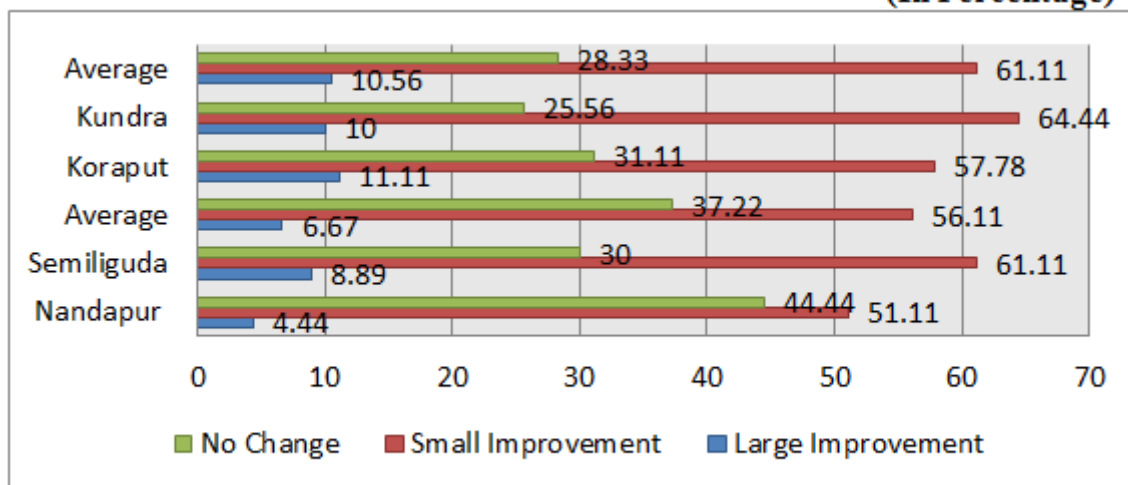


Source: Primary Data

The quantity of clothes and footwear represents the standard of living. 40% and 35.56% of the average of inorganic and organic farming households had no change in the quantity of clothes they use. 57.22% and

61.11% of the average of inorganic and organic farming had small improvement. 8.89% of the average of organic and 2.78% of the average of inorganic farming had large improvement. Thus, it can be said that majority of the households doing both organic and inorganic farming had small improvement followed by no change. Thus, it can be concluded from the above data that the standard of living of organic farming households are much better than inorganic farming households.

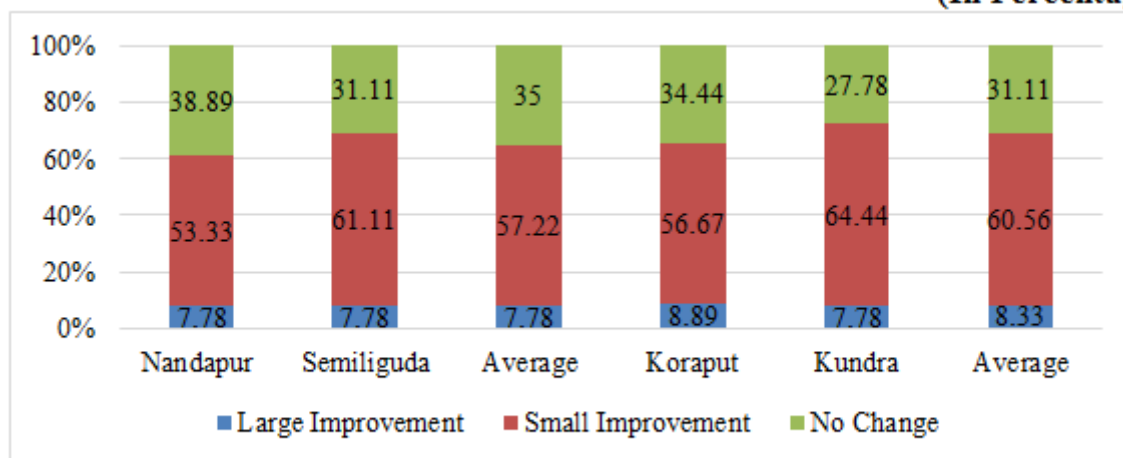
Figure-9: Households Views on Housing Type, Drinking Water, Cooking, Drainage and Toilet System (In Percentage)



Source: Primary Data

The type of house is considered to be a physical capital and asset for the household. Drinking water, cooking fuel, drainage, toilet system and sanitation also determines the standard of living of a household. The figure above predicts that 37.22% and 28.33% of the average of inorganic and organic farming households had no change in housing type, drinking water, cooking, drainage and toilet system. 56.11% and 61.11% of the average of inorganic and organic farming households had small improvement. 6.67% and 10.56% of inorganic and organic farming households had large improvement in all these factors. Thus, it is observed that the households doing organic farming had more frequency of both small and large improvement than households practicing inorganic farming.

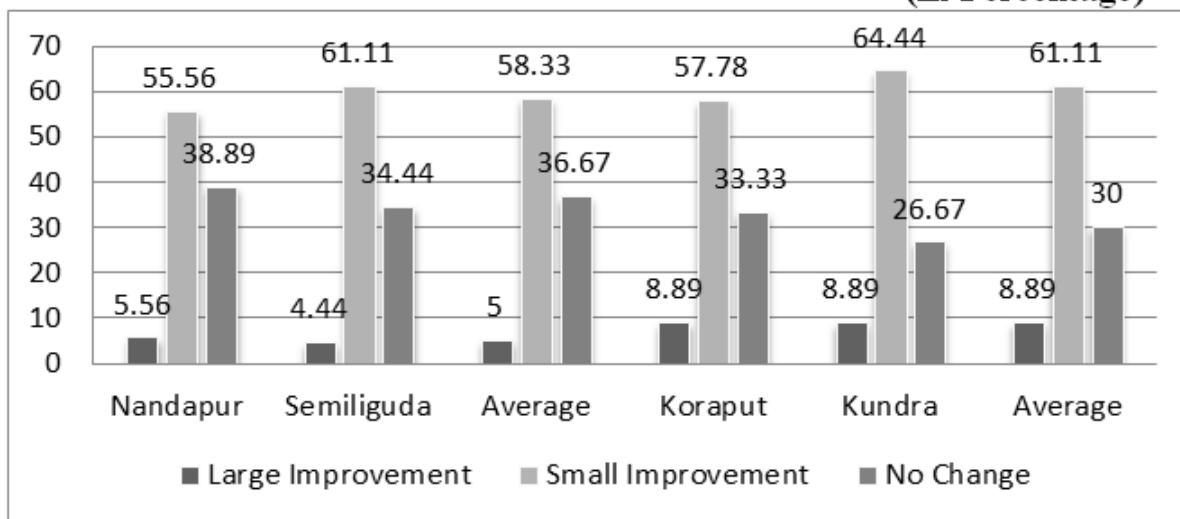
Figure-10: Households Views on Recreation, Entertainment and Travel and Tourism (In Percentage)



Source: Primary Data

This refers to individual's aspect of quality time with interpersonal activities which gives happiness and develops social network. 35% of the average of inorganic farming households and 31.11% of the average of organic farming households had no change. 57.22% and 60.56% of the average of inorganic and organic farming households had small improvement in these activities while 7.78% and 8.33% of average of inorganic and organic farming households had large improvement. This shows that households practicing organic farming had more improvement than households doing inorganic farming which predicts that organic farming households are better off in this aspect than households doing inorganic farming.

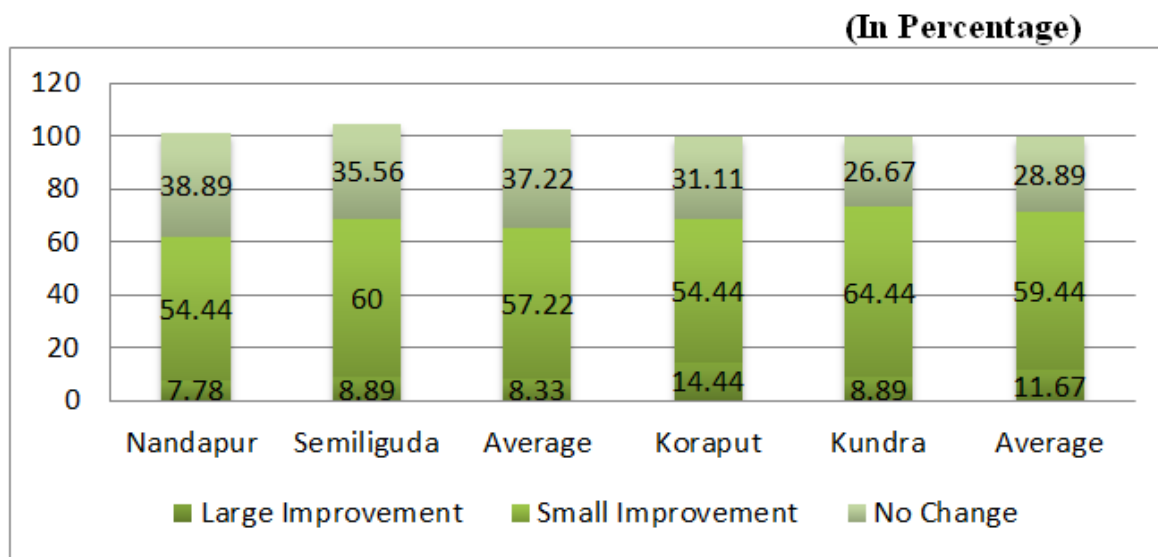
**Figure-11: Households Views on Number of Livestock and By Products
 (In Percentage)**



Source: Primary Data

Livestock and farming form an integrated livelihood system in rural areas, especially in the organic farming system. 36.67% and 30% of the average of inorganic farming and organic farming respectively had no change in the number of livestock. 64.44% of Kundra practicing organic farming opined to small improvement in the number of livestock. 61.11% and 58.33% of the average of organic farming and inorganic farming respectively responded to small improvement in the number of livestock. 8.89% of the average of organic farming and 5% of the average of inorganic farming had large improvement in the number of livestock. This shows that majority of the respondents of both organic and inorganic farming had improvement in economic status which can be predicted from the above figure.

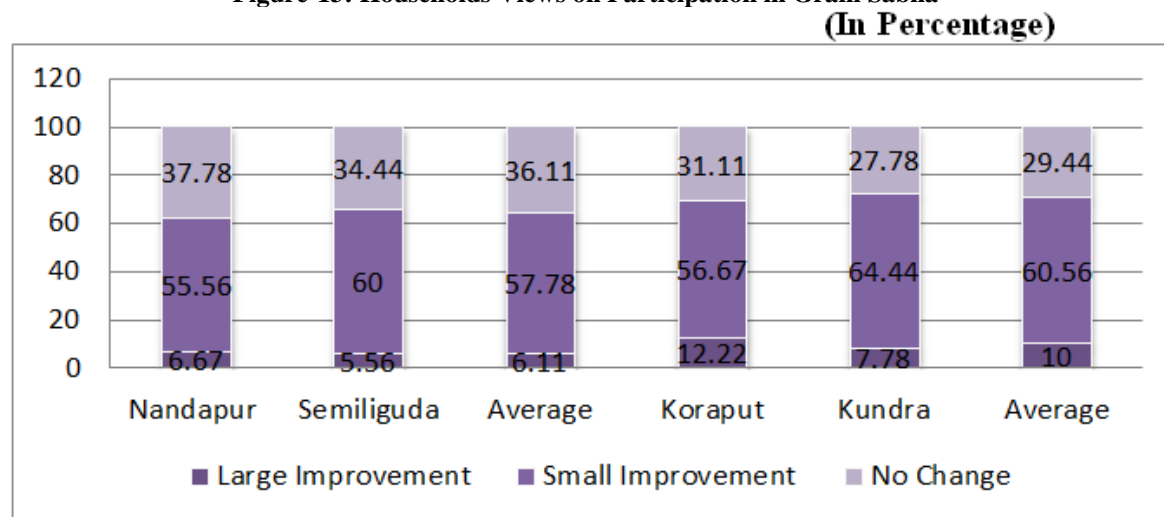
Figure-12: Households Views on Purchase of Durable Goods



Source: Primary Data

Purchase of durable goods represents physical capital of a household. The figure above predicts that in the purchase of durable goods, 37.22% and 28.89% of the average of inorganic and organic farming households had no change. 57.22% and 59.44% of the average of inorganic and organic farming households had small improvement whereas 8.33% of the average of inorganic farming and 11.67% of the average of organic farming had large improvement in the purchase of durable goods. Thus, it can be inferred that organic farming households are advanced than households doing inorganic farming in case of owning of durable goods.

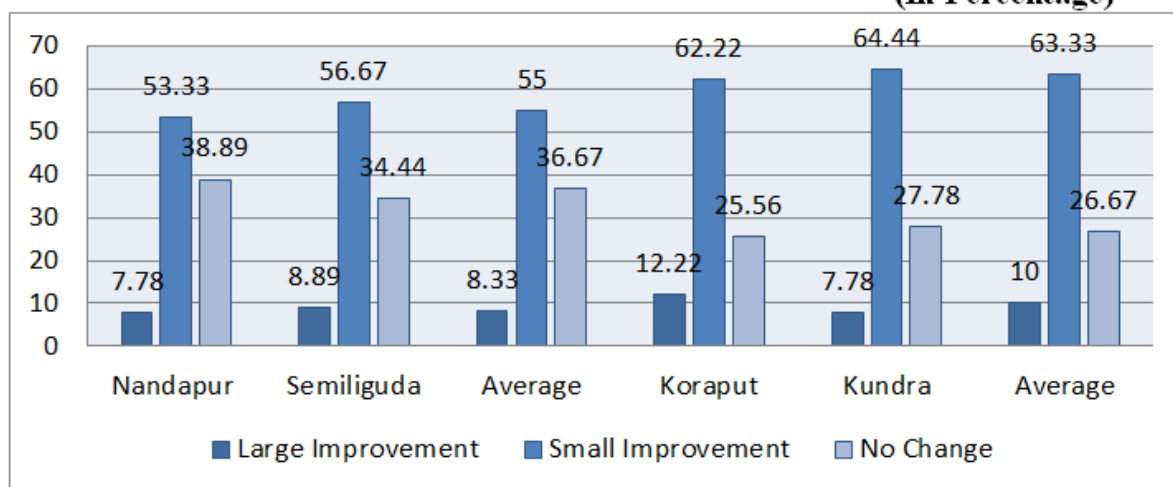
Figure-13: Households Views on Participation in Gram Sabha



Source: Primary Data

Participation in gram sabha develops the social network and enhances the community welfare development. The figure above shows that 36.11% and 29.44% of the average of inorganic farming and organic farming had no change i.e. they don't participate in Gram Sabha activities. 57.78% and 60.56% of the average of inorganic and organic farming households had small improvement in the participation of gram sabha activities. 6.11% and 10% of the average of households doing inorganic and organic farming respectively had large improvement. Thus, the participation in gram sabha is found more in case of organic farming households than households doing inorganic farming.

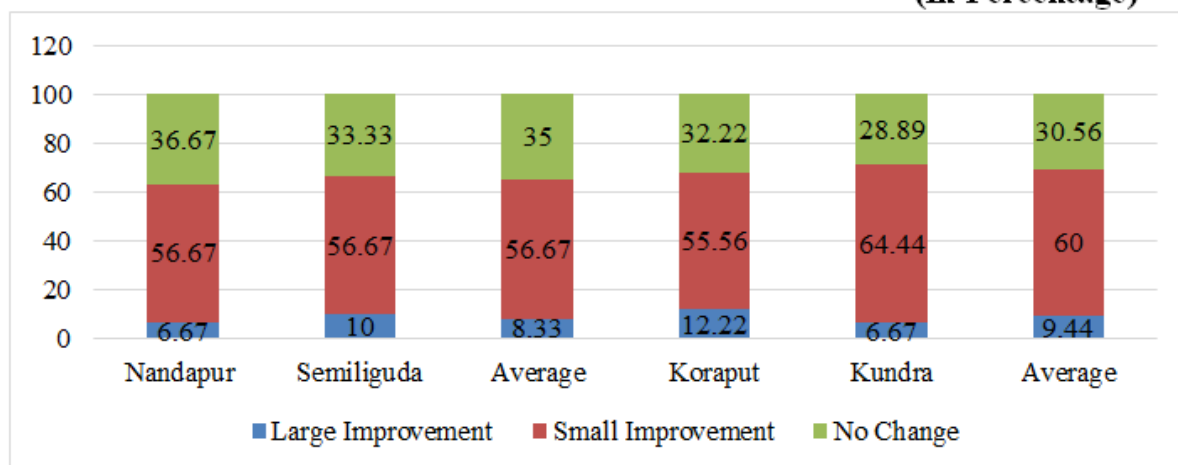
**Figure-14: Households Views on Members of Agricultural Organisations
 (In Percentage)**



Source: Primary Data

The figure above represents a sense of participation in the group activities and developing unity for solving any problem. According to the view of the respondents, 36.67% and 26.67% of the average of inorganic and organic farming had no change. 55% and 63.33% of the average of inorganic and organic farming had small improvement. 10% of average of the households doing organic farming and 8.33% of average of households doing inorganic farming had large improvement. Thus, it can be found that majority of the households are members to different agricultural organisations.

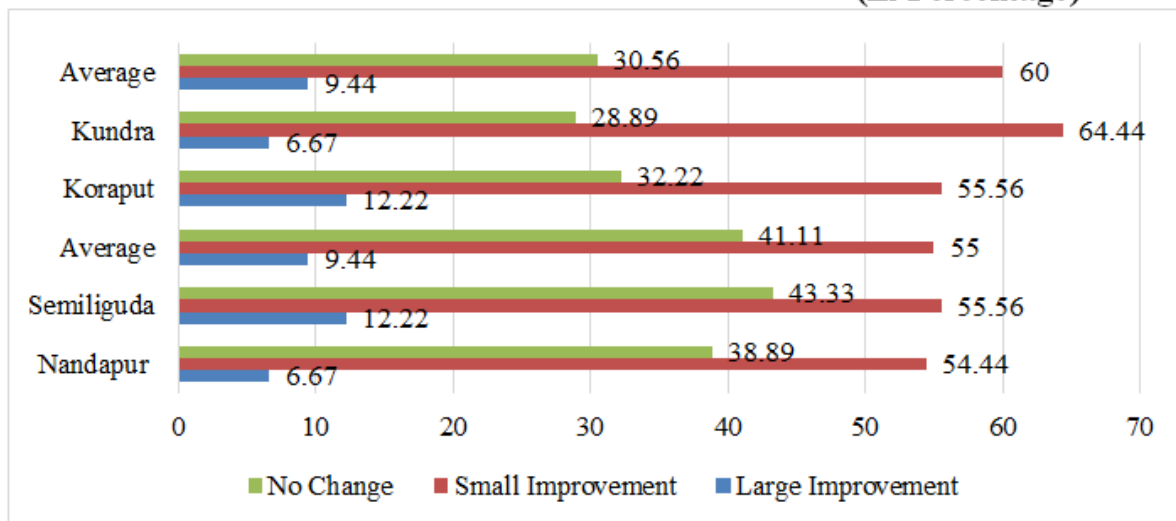
**Figure-15: Households Views on Amount of Saving and Investment
 (In Percentage)**



Source: Primary Data

Saving and investment are considered as an asset as it yields return in terms of interest and profit. The figure depicts that 35% and 30.56% of the average of inorganic and organic farming households had no change in the amount of saving and investment. 56.67% and 60% of the average of households doing inorganic and organic farming respectively had small improvement. 8.33% of the average of inorganic farming and 9.44% of the average of organic farming had large improvement in the amount of investment and saving. Thus, the large/small improvement in the amount of investment and savings is found somewhat more in case of organic farming households than the households doing inorganic farming which may be due to higher income in case of organic farming.

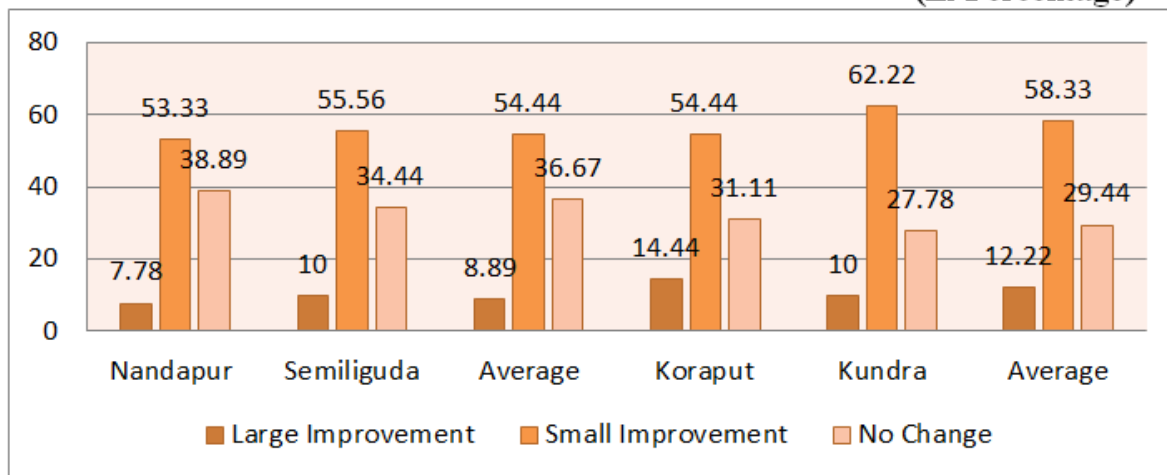
**Figure-16: Households Views on Assets and Properties
 (In Percentage)**



Source: Primary Data

Assets and properties represent a sense of financial security and possession of consumer durable goods having value. The figure above predicts that 41.11% and 30.56% of the average of inorganic and organic farming households had no change. 9.44% of the average of both the cases of farming had large improvement. 55% and 60% of the average of inorganic and organic farming households had small improvement in the possession of assets and properties including land and jewellery. This shows that households doing organic farming are somewhat better off than inorganic farming households as the frequency of small improvement is more in case of organic farming.

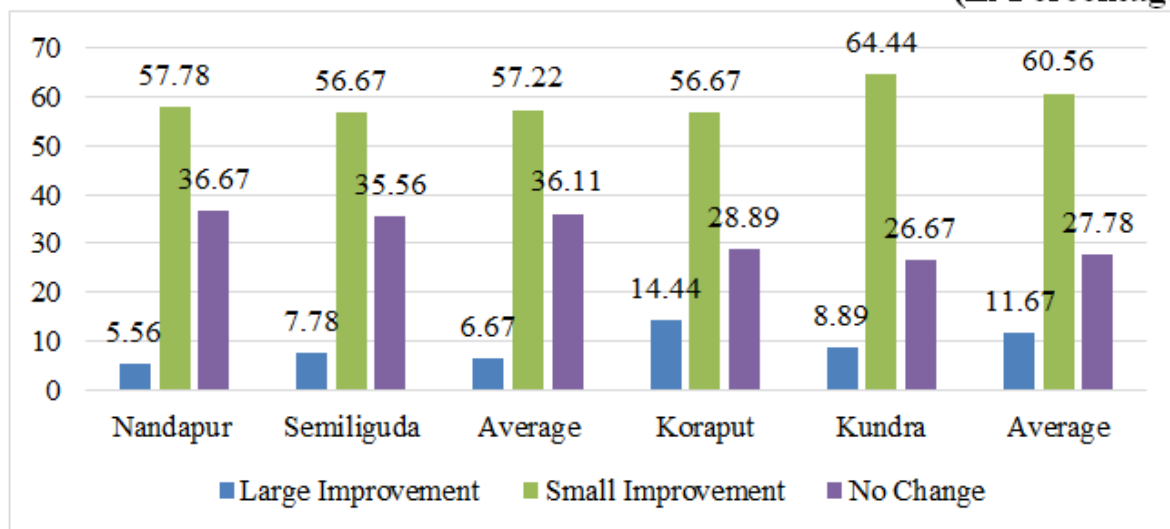
**Figure-17: Households Views on Social Recognition
 (In Percentage)**



Source: Primary Data

This factor has been taken into account to represent the farming communities' social recognition. According to the respondents view, 36.67% and 29.44% of the average of inorganic farming and organic farming respectively experienced no change. 54.44% and 58.33% of the average of inorganic farming and organic farming had small improvement whereas 8.89% and 12.22% of the average of inorganic and organic farming respectively had large improvement. Thus, it can be concluded that the organic farming households are better off from their counterpart in this aspect.

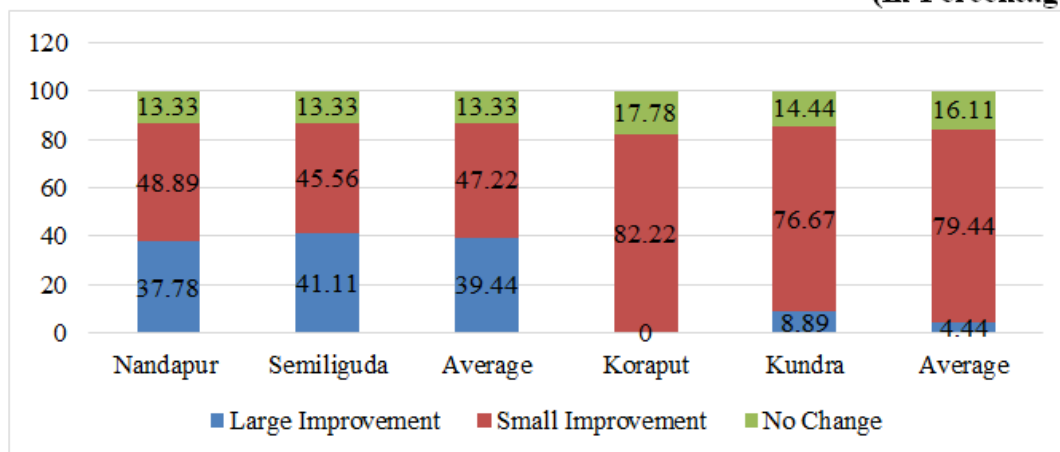
Figure-18: Households Views on Access to Govt. Training, Schemes and Subsidy (In Percentage)



Source: Primary Data

This factor has been taken into account to resemble that the farming community have farm related skills to secure a better livelihood and they have access to several government schemes and subsidy. According to the data above, 36.11% and 27.78% of the average of inorganic farming and organic farming respectively had no change. 57.22% and 60.56% of the average of inorganic and organic farming respectively had small improvement and 6.67% and 11.67% of the average of inorganic and organic farming had large improvement. Thus, it can be said that the organic farming households have more access to government programs and schemes.

Figure-19: Households Views on Bank Accounts and Modern Banking (In Percentage)

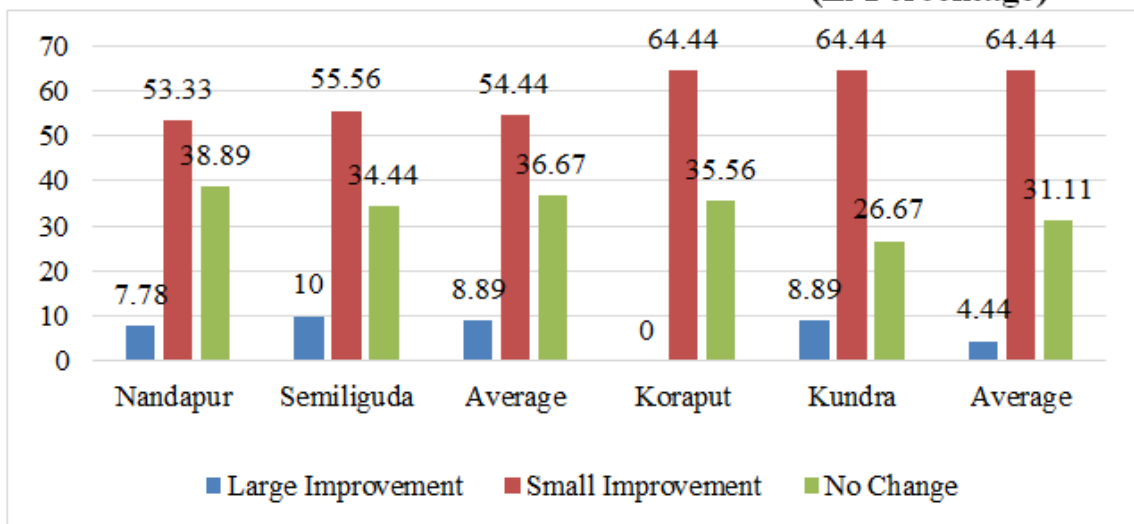


Source: Primary Data

The above figure resembles the concept of financial inclusion of the people. According to the data above, 13.33% of average of inorganic farming and 16.11% of average of organic farming had no change i.e. they have no access to such facilities whereas majority of the respondents had small improvement. 79.44% of the average of organic farming and 47.22% of average of inorganic farming had small improvement. Koraput at 82.22% doing organic farming has highest financial literacy. 39.44% and 4.44% of the average of inorganic farming and

organic farming had large improvement in the use of ATM, bank accounts and digital payment. Thus, the inorganic farming blocks had large improvement as compared to organic blocks.

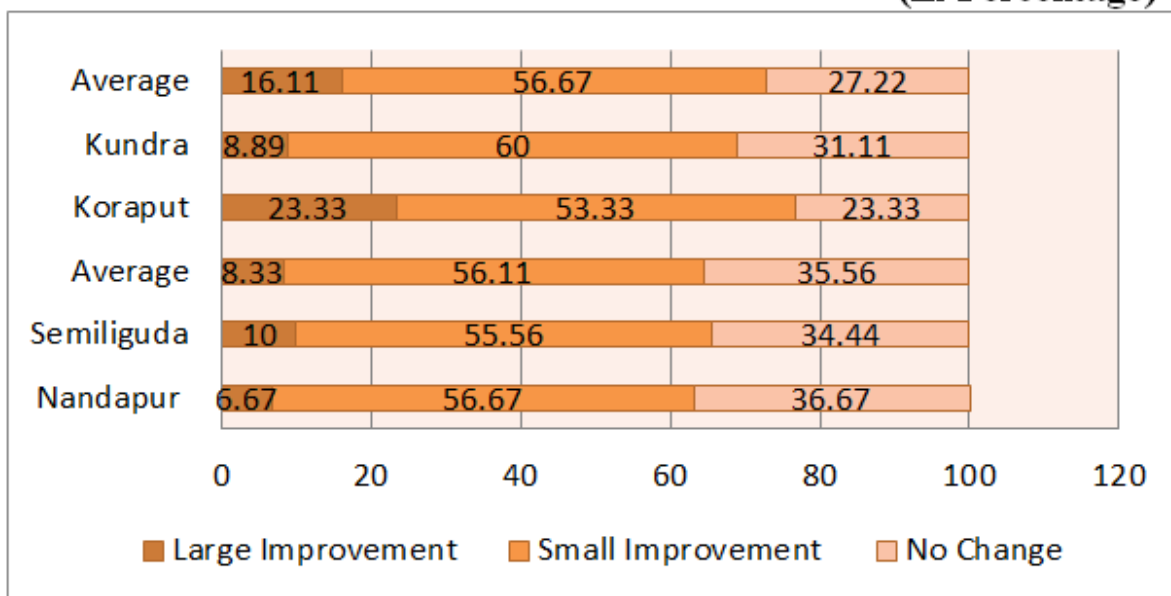
**Figure-20: Households Views on Use of Electricity
(In Percentage)**



Source: Primary Data

Use of electricity gives a sense of economic security. The figure above reveals that 36.67% and 31.11% of the average of inorganic farming and organic farming respectively had no change. 64.44% and 54.44% of the average of organic and inorganic farming had small improvement in the use of electricity. 8.89% and 4.44% of the average of inorganic farming and organic farming had large improvement in the use of electricity. 64.44% of Koraput and Kundra doing organic farming followed by 55.56% of Semiliguda doing inorganic farming had small improvement. 10% of Semiliguda respondents have also witnessed large improvement. Thus, it can be said that the organic farming households are better off from their counterpart in the above case.

**Figure-21: Households Views on Use of Internet and Smart Phone
(In Percentage)**



Source: Primary Data

With the growing adoption of the Internet of Things (IoT), farming communities have acquainted themselves with smart phone/mobile and internet use for getting information about marketing and weather forecast for agricultural input application like fertiliser and pesticides which might get affected by unforeseen disasters. According to the respondents view, 35.56% and 27.22% of the average of inorganic and organic farming respectively had no change in use of mobile phones. 56.11% and 56.67% of the average of inorganic and organic farming had small improvement in the usage of internet. 8.33% of inorganic farming and 16.11% of organic farming faced large improvement in the use of internet and smart phones. 60% of Kundra doing organic farming followed by 56.67% of Nandapur practicing inorganic farming had small improvement in the use of internet. Thus, the analysis showed that mobile phones and internet have increased an opportunity to the farmers to communicate directly with market brokers and customers to sell their products in good price and has ultimately improved their income.

Conclusion

Since the study has been undertaken in one of the under-developed tribal districts in the state, the findings may throw light on the effectiveness of the different farming types in bringing about overall rural and tribal development. The study found that in the cases of quality of life, agricultural income, farming condition, education of children, health condition, sanitation and drinking water, members of different organisations and participation in village meetings, the households doing organic farming are better off than the households doing inorganic farming. However, there is no such significant difference in the case of expenditure in food and calorie intake. Hence, the study clearly indicates that organic farming practice is generating economic, social and individual benefits. By considering the beneficial effects of organic farming, the study suggests that the government should formulate appropriate policies and strategies to promote organic farming to realise its full potential. The government should decide special outlay in the budget to enhance organic farming in the district of Koraput. Though the state is giving support by providing subsidies, implementing schemes and giving awards to organic farmers. But these schemes and subsidies are not adequate and also not free from corruption. The entire benefits of any scheme or subsidy on inputs do not reach directly to the farmers. The government should implement these schemes without any leakage, which can result in appreciation among organic farmers and lead to expansion of organic farming.

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