IMPACT OF TREADLE PUMP
ON CHILDREN IN ORISSA

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Study by

Nabakrushna Choudhury Centre for Development Studies, Bhubaneswar
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ABBREVIATIONS

ADITI	-Affordable Drip Irrigation Technology Intervention
CD	-Community Development
DRDA	-District Rural Development Agency
GoO	-Government of Orissa
IDEI	-International Development Enterprises India
ICDS	- Integrated Child Development Services
ILO	-International Labour Organization
KB	-Krishak Bandhu
LIC	-Life Insurance Corporation of India
NGO	-Non Government Organization
NTFP	-Non Timber Forest Products
OBC	-Other Backward Castes
PTG	-Primitive Tribal Groups
SEBC	-Socially Economically Backward Communities
SHG	-Self Help Groups
ST	-Scheduled Tribes
TP	- Treadle Pump

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- Consultancy on "Tribal Movements and Livelihood: Recent Developments in Orissa", sponsored by Sponsored by Indian institute of Public Administration (IIPA), New Delhi, Under Chronic Poverty Research Center, India, August-September, 2005.
- Consultancy on "Role of Indigenous Institutions in Tribal Livelihood: An Empirical Study in a Tribal district of Orissa", awarded as a part of the Sir Ratan Tata Trust (SRTT) and ISEC, Bangalore Visiting Fellowship.
- Consultancy on "Poverty and Hunger in Orissa", A Position paper in the context of Millennium Development Goal, for the campaign, Katha Rakhibata Sarkar, submitted to CYSD, Bhubaneswar.
- "Ethnic and Communal Harmony in Kandhamal District", Report Submitted to SFDC, Behrampur, Funded by TROCCAIRE, Ireland, Jan-Feb, 2008.

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- "Micro Credit" at Dhaka during Nov. 1997.
- "Environmental Impact Assessment" (EIA) at Dhaka during July 2006.
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EXECUTIVE SUMMARY

The objective of the study was to asses if

- Treadle Pump as a technology, brings a change in agriculture, by way of providing irrigation input
- Increased income due to sale of agri-produces has multifarious use for the well being of the children, particularly with respect to health, education, clothing and other facilities.

Treadle Pump (TP) is a low cost foot operated water lifting device that uses bamboo or PVC or flexible pipe for suction. It helps pump water out of shallow water bodies to a maximum depth of 20 feet. Average discharge of water is in the range of one to two litres per second.

Present study covered 45 and 44 TP users across five villages, and two blocks in each of the two districts of Kandhamal and Keonjhar districts respectively. Thus the study covered 89 TP user households representing 10 villages spread over four blocks of the two districts. The study also involved 36 non-users (as control group) spread across eight villages in the two districts to understand how the TP users have benefitted.

The TP users were primarily small and marginal farmers. The average size of land holding for TP users was 3.62acres (4.09 acres in Kandhamal and 3.14 acres in Keonjhar district).The water source tapped by TP users to lift water was dug well in 88% cases, and nearby streams in 12% cases. Use of TP helped irrigate vegetables (99%), spices (38%) and other horticultural crops (57%), which would not have been possible for the small holders except for kharif season. Farmers used TP to irrigate Kharif crops as well sometimes, e.g. cereals and pulses. Among the TP non-users both production and sale of vegetables was insignificant.

Agriculture was the major source of livelihood (67%) for the TP users, other sources being private services, labour wages, livestock and NTFP. Average annual household income for a TP user was ₹1, 01,334 in Keonjhar district and ₹91,851 in Kandhamal.

As regards the impact on food and nutrition of the children of TP users, in pre TP period, 42.29% children were deprived of breakfast. Post TP usage all children had three meals a day which included rice and two vegetable curries in most of the cases (instead of just rice and a leafy vegetable curry). Production of different crops helped children have a balanced diet, i.e. carbohydrate, protein, vitamins and minerals. Sale of vegetables brought in cash and increased the purchasing power of the TP users. The farmers could buy protein foods like meat, pulses, etc. for their children. 99% of the TP households reported an improvement in their dietary pattern. They were no cases of hunger and malnutrition.

Expenses on health care of children, primarily for treatment of diseases, was much higher during the TP usage period than before. Expenditure on health care increased by more than 20 times in Keonjhar district and more than 100 times in Kandhamal district for TP users, which was 3.5 times higher than non users. There was a shift in attitude of the TP users towards treatment. TP contributed towards healthy childhoods which have direct and indirect bearing on the family and society.

All the children in TP using households attended school/college. There was no single case of discontinuity in education. Children didn't limit their education to schools, but joined colleges, which includes professional courses. Education of the children was taken care of irrespective of the gender of the child. During TP usage period parents were willing to provide quality education and considered overall development of the children. There was increased spending on school fees, (16 times), private tuition fees (13 times), and on story books and games/sports items. TP made formal education possible for the poor tribal households of Kandhamal and Keonjhar districts.

Higher cash returns from surplus agricultural production encouraged the farmers to go for savings. Out of 89 TP users, only 14.60% had savings account in formal banking institutions prior to usage of TP, which increased to 91.01% during post usage period. 83.14% of the TP users had opened savings accounts in the name of their children (primarily to meet their educational needs) while among non-users only 11.11% had done so.

In pre-TP usage period, farmers could buy only two pairs of dresses per child per year on an average. Post TP usage farmers bought four pairs of dresses per child on an average. The average expenditure on dress materials in TP usage period was 3.75 times that of in pre TP period. Cost per dress was also higher as compared to pre TP usage period. Between the TP users and the non-users, the TP users spent 60% more on dress materials of their children.

Apart from health, education and clothing of children, the TP users also took care to provide other possible assets to their children such as wrist watch, bicycle (commutation to school/ college), radio, mobile sets, etc.

Adoption of TP helped the small holders develop their socio-economic conditions. This was reflected in their improved food habits, secured livelihood, market linkages, education, health, and dressing.

INTRODUCTION

1.1. Statement of the Problem

Childhood is an important phase in the growth of human society. Children form a sizeable section of human population and labour force in several fields. In less developed countries the incidence of child labour force is quite high. Child labour represents a serious threat to real and meaningful social development.

Empirical accounting shows that in 2004 there were nearly 191 million children across the globe, in the age group five to fourteen, with a work participation rate of 15.8 % (ILO, 2006). The largest number of children workers (122 million) was concentrated in Asia-Pacific region, and India accounted for a substantial number (ILO, Ibid). According to NSS estimates, there were 10.6 million working children in India during 2004/05 as compared to 10.1 million in 1999-2000, indicating a growth rate of one percent. Indian Policy makers and planners have been concerned with the issue of child labour, and have formulated proactive legislative policies; but the problem continues to threat the nation.

Food insecurity at household level is one of the most serious problems encountered by the rural households in India, which are largely influenced by food production at household level. Poor families spend around 70% of their income on food, yet do not get a balanced diet. In such a situation it is natural for the parents to ignore the health and education of their children. In this process children lead a life which is both physically and mentally hazardous.

In rural India children are the natural supporting hands in household activities. A strong link is observed between food security, school enrolment, school dropout and education of the children. Education helps reduce child labour and poverty of the rural households in the long run.

1.2. Research Design

1.2.1. Objectives

- To make a profile of TP users with respect to their social life, livelihood, occupation, crop calendar, and income
- To understand the impact of TP on the well-being of the children with respect to their health, nutritional status and education
- To find out the changes in the attitude of the TP users towards the well being of the children

1.2.2. Study Universe

The study has adopted a multistage stratified sampling method to select two tribal dominated districts. Thus, Kandhamal district from southern region of Orissa and Keonjhar district from northern region were selected.

At second stage four Community Development Blocks; two from each of the two districts were selected considering various development factors like tribal concentration, backward situations and the extent of IDEI's operational activities.

At third stage, five revenue villages in each of the two blocks were selected based on large scale adoption of TP technology and duration of intervention by IDEI. Thus, ten villages were selected for the study.

At fourth stage 45 TP users and 17 non users in Kandhamal district, and 44 TP users and 19 non users in Keonjhar district were selected and interviewed for data collection. In total the study covered 89 TP users and 36 TP Non-user households. In addition, children from both TP user and non user households were interviewed.

1.2.3. Data Collection

Both primary and secondary sources have been tapped to collect data during the study. The study treated TP users as the core source of primary data. Non TP-users across eight villages were interviewed as part of the study to collect different socio-economic information. Secondary data on various aspects of TP and TP using households were also collected from different Field Offices and Regional Office of IDEI at Bhubaneswar. The reports published by IDEI and other states relating to TP were also referred to during the study.

1.2.4. Evaluation Framework and Tool for Data Collection

The study adopted household survey method. Interview schedules were filled up from both TP user and non-user households. In addition, the study also adopted Focus Group Discussions (FGDs) and in-depth-interviews. Functionaries of IDEI, both at Field Offices and Regional Office were interviewed so as to enrich the data pool.

In addition to the quantitative data, the study also emphasized on documenting the qualitative responses like choice, attitude, and behaviour. Through different scaling techniques the qualitative data were substantiated for assessment of qualitative impact of TP on the children. The study adopted a wider and holistic perspective to understand the impact of TP on children.

Two different structured interview schedules were used to collect primary data. The interview schedules were pre-coded and covered both close and open ended questions. The first interview schedule for the TP using households documented data in different sections like demographic structure, land holding position, cropping pattern, adoption of irrigation sources, household assets, employment opportunities, agriculture production, pricing, value addition, consumption and expenditure pattern. The data collection included both pre TP usage and usage period.

The data collected through the schedules were tabulated and analyzed. The quantitative impact of TP on children was analyzed for the two districts. The qualitative data supplements the quantitative responses.

1.2.5. Duration of the Study

The study was carried out during February and March, 2010. Data collection was done by both the research team members personally in two phases in each district.

1.2.6. Ethical Issues

The study involved the consent of the TP users and non users. The respondents were apprised of the objectives of the study. During the study all attempts were made to create confidence amongst the respondents to safe guard their rights and interests.

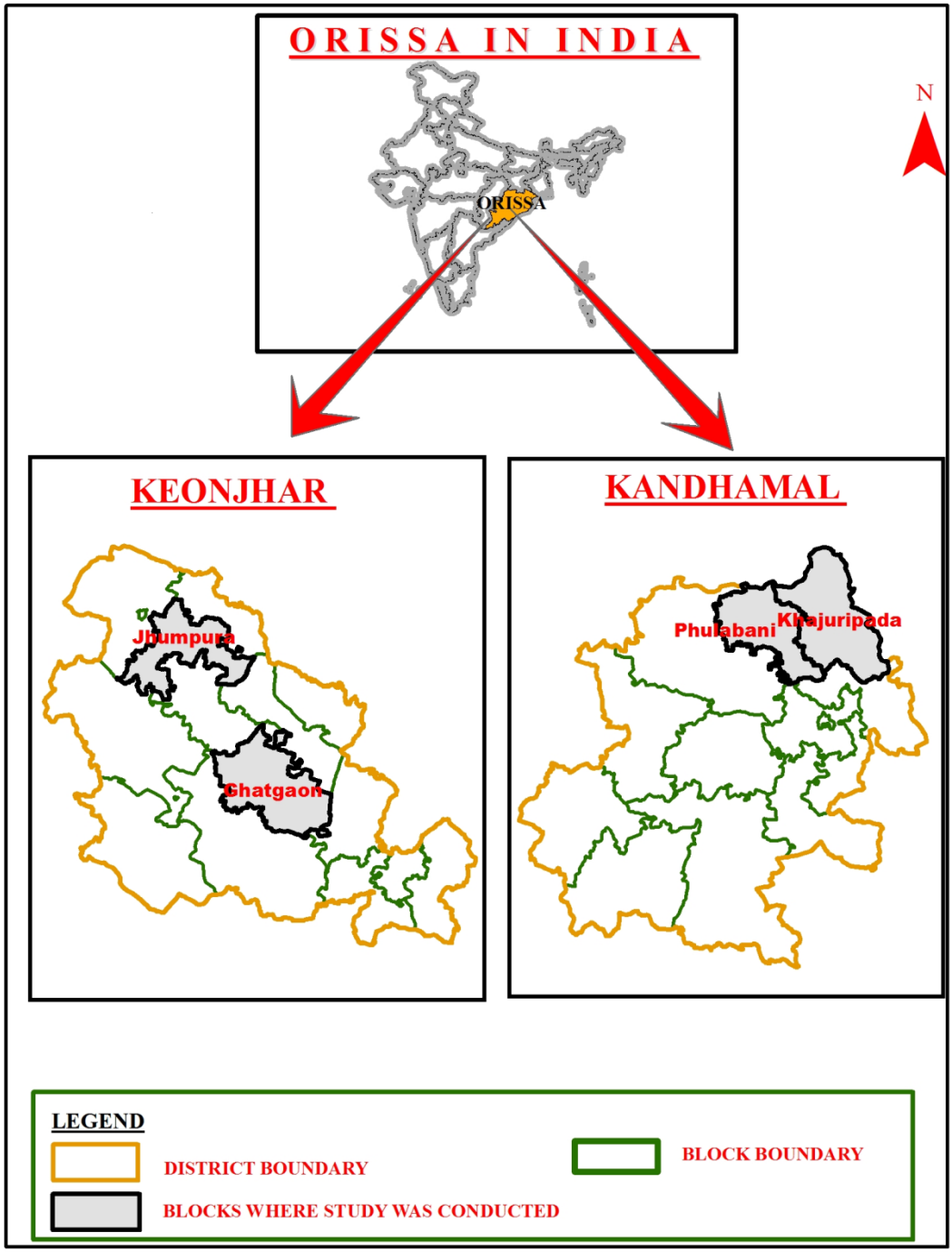
1.2.7. Study Limitation

The study largely relied on memory recall of the respondents. The recall method has limitation in terms of accuracy of data. There is every possibility that the data collected through the process were over or understated by the respondents.

PROFILE OF THE STUDY UNIVERSE

This chapter is divided into two sections. The first section describes about the distinct social and economic characteristics of Orissa and both the study districts. The second section explains briefly about the social, demographic and economic characteristics of the TP user and Non-TP user households covered under the study.

About Orissa



The State of Orissa is situated on the Coast of Bay of Bengal, surrounded by Andhra Pradesh in South, Bay of Bengal in east, Chhattisgarh in the west, and West Bengal and Bihar in the

north. Depending upon the agro-climatic features, the State is divided into four distinct zones viz. i) The Northern Plateau ii) The Central Table Land iii) The Eastern Ghats iv)The Coastal Plain. The State presently covers 1, 55,707 sq. Km which accounts for 4.74 % of total land area of the country, and ranks 9th among the Indian States. The administrative divisions of the state include 30 districts, which are sub-divided into 59 sub-divisions, consisting of 314 Community Development Blocks. As regards the population, the state ranks 11th, shares 3.74 % of India's population with a growth rate of 2% per annum. Since 1921 the State has experienced a progressive decline in the sex ratio of females. The sex ratio was 1,086 females per 1,000 males in 1921, but has reduced to 927 females during 1991.

Kandhamal District: Socio-Economic Profile

Kandhamal is one of the southern districts in Orissa, surrounded with hills and forests. The ethnic composition of the district comprises Kandha, a tribal community and its sub groups like Kutia Kandha, Desia Kandha, Malua Kandha and Pengu Kandha. Geographically the district is divided into 2,379 inhabited villages. The district has a normal rainfall of 1597.1 mm per annum. It has a total population of 6.48 lakhs of which 6.04 lakhs live in rural areas, which signifies that the urban population is only 6.80%. The density of population is only 81 against the state average of 236 persons living per sq. km. The district has an average literacy rate of 52.68%. The average consumption of fertilizer is only 4 kg per hectare (2003-04), the lowest in the state, against the state average of 39 kg per ha. This indicates less intensive farming practices in the region.

Blocks covered in Kandhamal District:

Block- Khajuripada

Khajuripada is one of the Panchayat Samitis (Block) of Kandhamal district. Geographically the block is the fourth largest which accommodates 11,274 households. The block has 239 inhabited villages. Of the total population STs account for 50.37% and SCs account for 31.07%. The block receives an annual rainfall of is 1,921.7 mm (2005).

Block- Phulbani

Phulbani is the district head quarter block, with geographical area of 307.32 Sq. Km, which accommodates 7,804 households. The block has 210 inhabited villages. Out of the total population SC population accounts for 19.6%, while those from ST account for 56.64%. The block receives a total rainfall of 1,714.0 mm per annum (2005).

Keonjhar District: A Socio Economic Profile

The district of Keonjhar consists of three sub-divisions and 13 CD blocks. There are 286 Gram Panchayat consisting of 2,069 inhabited villages. Normal rainfall of the district is 1,534.5 mm per annum. The district has a total population of 15, 62,000 (2001 Census of India), of which rural population constitutes 86.34%. SCs constitute 11.61% of the population, and STs 44.5%. The density of population of the district stands at 188 persons per sq. km. The literacy rate of the district is 59.24 %, while that of STs is 40.30%. The consumption of fertilizer is 24 kg per hectare.

Blocks covered in Keonjhar District:

Block- Ghatagaon

The geographical area of Ghatagaon block is 461.65 Sq. Km. The block consists of 140 inhabited villages with 20,948 households. Out of the total population SCs constitute 5.71% and STs 62.29%. The block receives an annual rainfall of 1,063.0 mm (2004) against the district average of 1,086.0 mm.

Block- Jhumpura

Jhumpura has total geographical area of 484.33 sq. km. The block consists of 149 inhabited villages. Of the total population SCs account for 6.57% and STs constitute 49.23% (Census of India, 2001). The block receives an annual rainfall of 1,119.9 mm (2004).

The next section explains the socio-demographic characteristics of both the TP users and Non-TP users taken as a control group.

2.1 The Sample

A control group of non TP households was taken in order to compare the status of certain socio-economic indicators with that of TP users. The study covered 45 TP user households distributed over five revenue villages of two Community Development Blocks of Kandhamal district, and 44 TP user households across five villages distributed over two CD Blocks of Keonjhar district. Thus, the study covered 89 TP user households across ten villages, spread over four CD blocks of two districts. The study also covered 17 and 19 Non-TP user households, as a control group, from Kandhamal and Keonjhar districts respectively,

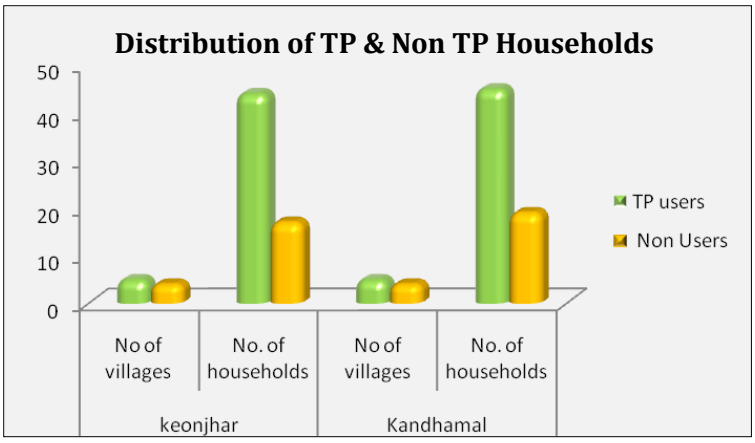


Figure 2.1a (Source- Primary Survey, 2010)

spread across eight villages. Distribution of both TP user and Non-TP user households in both the districts and villages are is shown in the Figures 2.1a. & 2.1b.

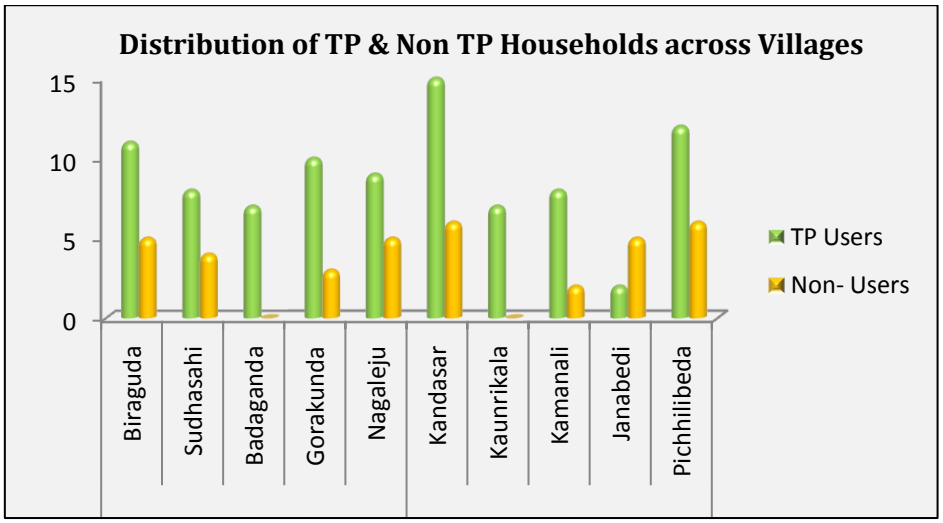


Figure 2.1b (Source-Primary Survey, 2010)

2.2 Period of TP Purchase

The study has classified the period of TP purchase into 3 categories - 2000-2002, 2003-2005 and 2006 to 2008. The respondents had used TP for minimum two years period to maximum ten years. Majority of the respondents had used TP for two to four years (figure 2.2).

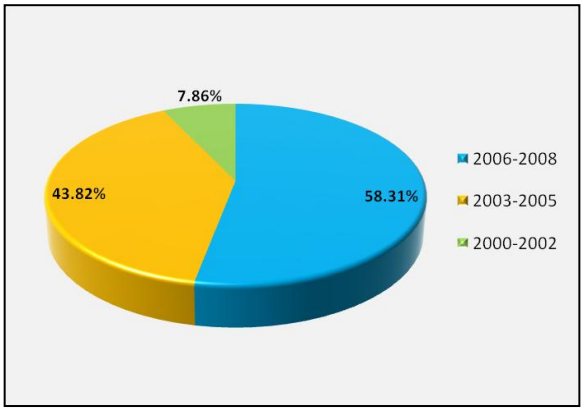


Figure2.2 (Source-Primary Survey, 2010)

2.3. Ethnic Distribution

Majority of the TP users were from the marginalized sections of the society, which includes ST and SC (56.17%). The respondents from other castes include those from general and other backward castes. Figure 2.3 shows the ethnic distribution of the TP users.

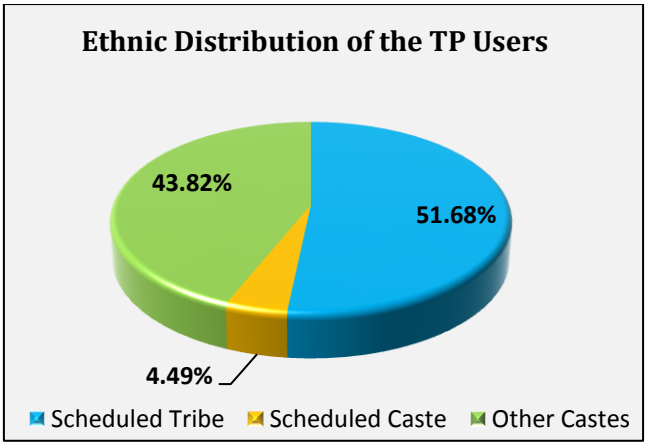


Figure 2.3 (Source-Primary Survey, 2010)

2.4. Demographic Composition

The Study covered a total population of 482 in the TP households, of which male and female shared an almost equal ratio. Similar was the case in Non TP households. The details of population structure are given in Table-2.4.

Distribution of Population of TP users

Sl. No	District	Population		
		Male	Female	Total
TP Users				
1.	Kandhamal	51.90%	48.10%	100%
2.	Keonjhar	48.98%	51.02%	100%
	Total	49.39%	50.61%	100%
TP Non-Users				
1.	Kandhamal	48.08%	51.92%	100%
2.	Keonjhar	50.54%	49.46%	100%
	Total	49.24%	50.76%	100%

Table No- 2.4. (Source-Primary Survey, 2010)

2.5. Education

Data on educational status of the population was collected for TP users as well as non users. Educational status in terms of percentage of illiterates and those who attended school was more or less same for both the populations. But the TP households recorded a higher percentage of persons who attended college. Details of educational status of the population are shown in figure 2.5.

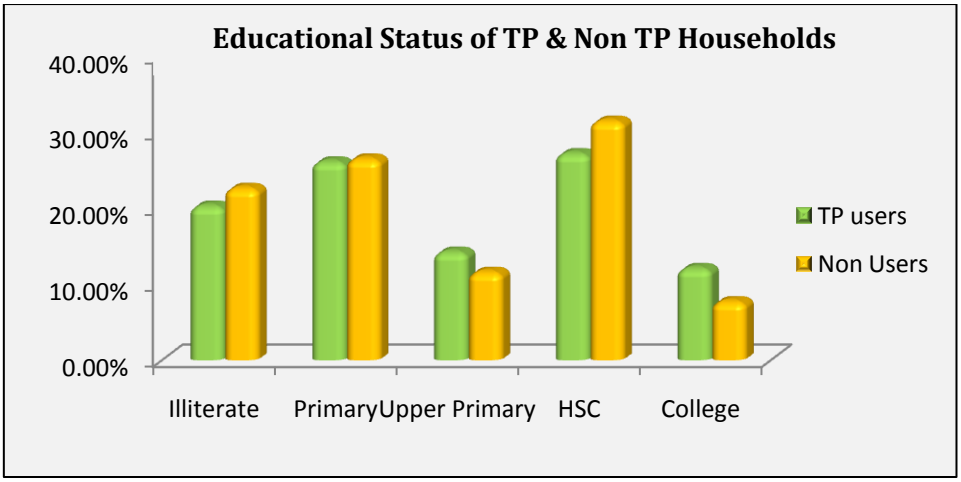


Table No- 2.5. (Source-Primary Survey, 2010)

2.6. House Type

The data on house type shows that between the two populations only the TP users had concrete (pucca) houses, but a very small percentage. However, majority in both the cases resided in houses made from unburnt bricks, mud, etc. (kaccha) (figure 2.6).

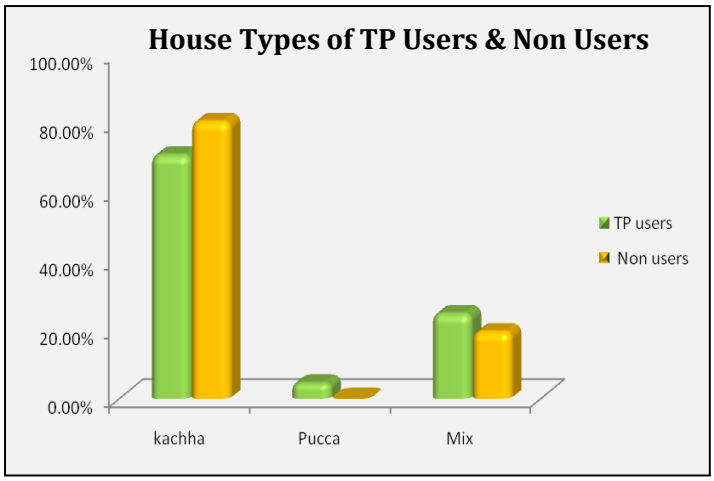


Table No- 2.6. (Source-Primary Survey, 2010)

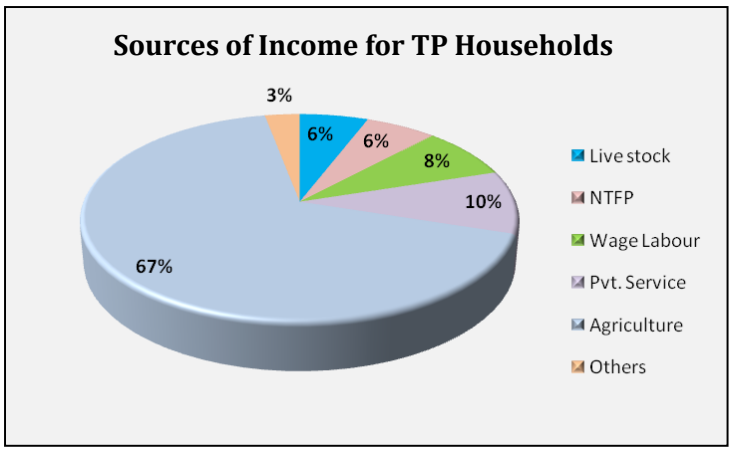
2.7. Income Status

2.7.1. Land holding

Data on landholding (both owned and hired) of the TP users shows that the average size of land holding was 4.02 acres in Kandhamal, and 3.08 acres in Keonjhar district. Cases of land hiring were rare.

2.7.2. Household Income

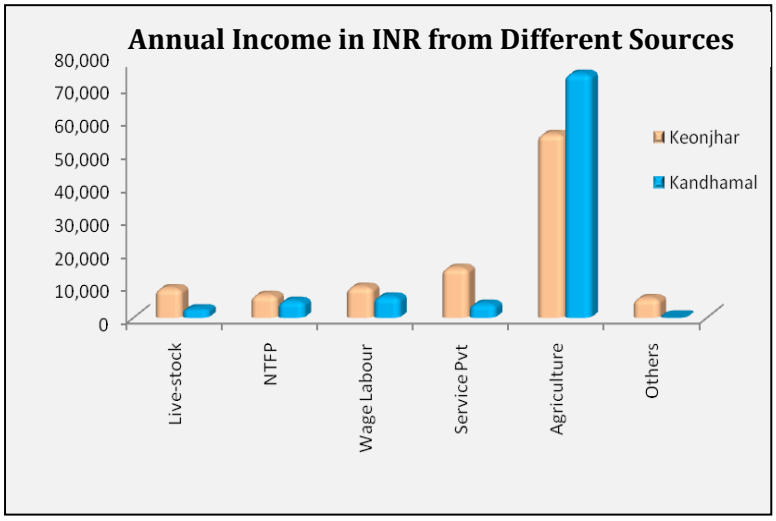
Data on income and different sources of income for TP households were collected. The sources were primarily agriculture, livestock, Non-Timber Forest Products, labour wages, private services (drivers, peons, etc.), and others (tea stalls, vegetable vending, dry leaves



collection, brick selling, etc.). Agriculture was the major source of livelihood (67%) followed by private services and labour wages (Figure 2.7.2a).

Figure 2.7.2a (Source-Primary Survey, 2010)

The average annual income for TP households in Keonjhar district was ₹1, 01,334, with 55% of it from agriculture. In Kandhamal the average annual income was ₹ 91, 851 with a substantial contribution from agriculture (80%).



Analysis of income from agriculture shows that 24% of the customers earned more than ₹ 80,000 per annum from agriculture alone. 20.5% customers earned in the range of ₹ 60,000 to ₹ 80,000, 32% in the range ₹ 40,000 to ₹ 60,000, and 20.5% in the range of ₹20,000 to ₹40,000. Only three percent earned between ₹16,000 to ₹ 20,000.

Figure 2.7.2b (Source-Primary Survey, 2010)

Further it was observed that the smallholders who had used the TP for three to five years made annual profits as good as those who have been using for eight to ten years.

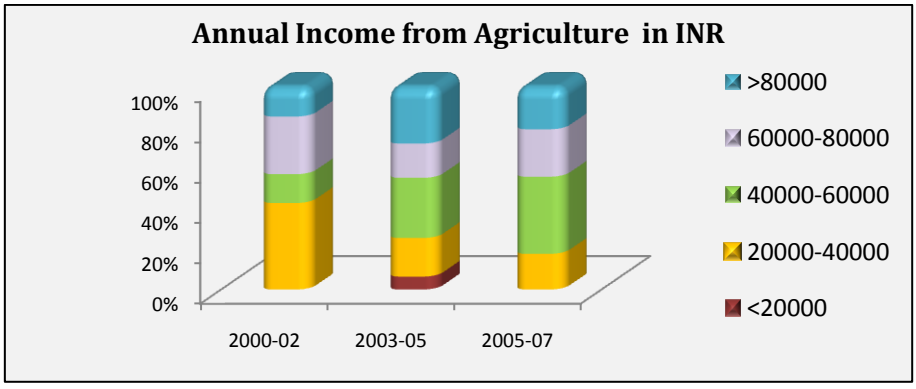
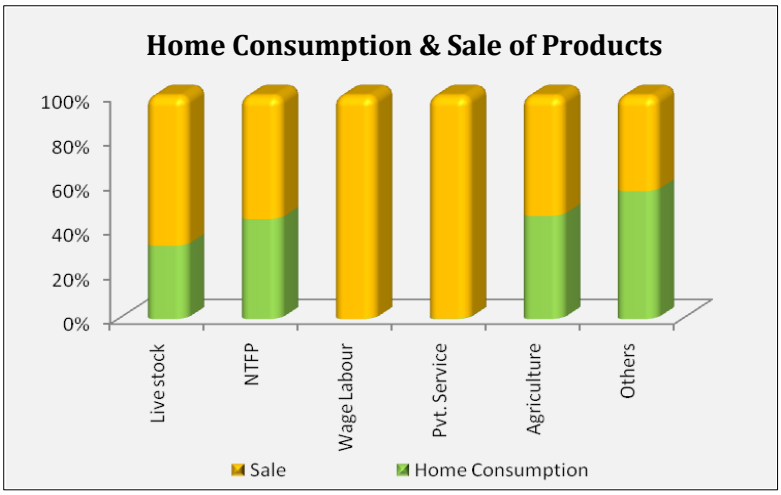


Figure 2.7.2c (Source-Primary Survey, 2010)



While in case of service based incomes, the entire amount was in cash; in case of products certain proportion was always used for home consumption and surplus was sold for cash (Figure 2.7.2d).

Figure 2.7.2d (Source-Primary Survey, 2010)

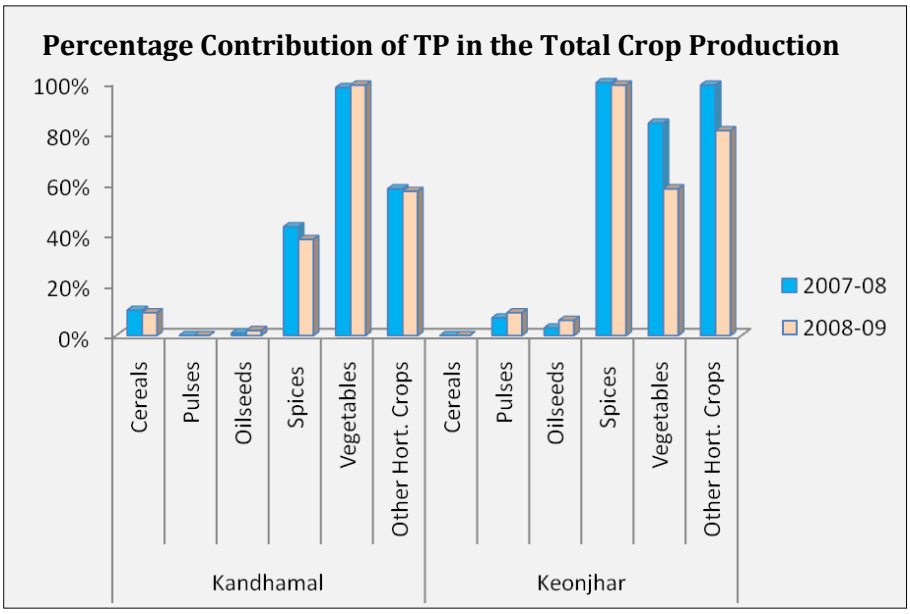
TREADLE PUMP INTERVENTION BY IDEI

Findings on TP Intervention in the Area

3.1.1. Place of Purchase of TPs

TPs in Orissa are promoted through specific channels under private ownership, facilitated by IDEI. NGOs are also involved in the promotion of TP. However, private manufacturers and dealers in the open market play major role in the sale of TPs.

3.1.2. Production of Crops and the role of TP



The TP users mostly tapped dug wells as source of water for irrigation, and few tapped the river or canal water. Data on production of various crops by the TP users was collected for the year 2007-08 and 2008-09.

Figure 3.1.2 (Source- Primary survey, 2010)

Contribution of TP in irrigating the crops was also recorded. The data collected indicates that use of TP helped irrigate vegetables (79%), spices (69%) and other horticultural crops (69%). The villagers by and large opined that without TP they would not have been able take up those crops except for kharif season. TP was also used during Kharif season to irrigate cereal, legume and oilseeds crop (4-5%).

IMPACT OF T.P. ON CHILDREN

4.1. Food Security and Nutritional Impact

Land and water are the two most important inputs for production combined with other inputs like seeds, fertilizers, human labour, tools and technologies. The present chapter explains about the impact of TP on food security and nutrition of children. More specifically the empirical data is collected in relation to the dietary pattern of the children and changes over time, source of diets, average consumption expenditure on food items, etc. In order to substantiate the finding responses of non-TP users were also collected with respect to food security, standard of living and family livelihood. The responses of the children of the TP user families on various related issues were also collected.

4.1.1. Consumption expenditure on Food items:

Average Annual Consumption expenditures of TP HH on food items (in Rs)

Food Items	Kandhamal			Keonjhar		
	Pre TP	Post TP	% increase or decrease	Pre TP	Post TP	% increase or decrease
Cereals	8,631.89	5,690.16	-34%	14,295.1	15,043.6	5%
Spices	889.67	2,635.34	196%	1,179.55	3,118.52	164%
Oil	1,182.22	968.44	-18%	958.87	1,791.14	87%
Vegetables	2,456.67	13,243.3	439%	3,981.82	11,733.3	195%
Pulses	875.56	1,505.56	72%	2,092.05	1,195.46	-43%
Meat/Fish	737.78	2,222.22	201%	1,825	3,098.86	70%

Table-4.1.1 (Source-Primary Survey, 2010)

The data with respect to the average income from various sources indicated that for all TP users agriculture was the major source of livelihood. More specifically when one looks into the contribution of various types of crops to the food basket, one finds that vegetable cultivation with the use of TP contributes more compared to other crops. The data on the consumption expenditure **(both purchased and in kind)** of the TP users when compared

between Pre usage and usage period shows that in there was increased expenditure on all food items except for cereals, and prominently in case of spices, vegetables and non vegetarian food like meat and fish (Table-4.1.1).

Though agricultural produce were primarily meant for sale to earn cash, almost half of the produce was consumed by the families. As regards the expenditure on food for children, 97.75% of the respondents reported an increase in expenditure for the same, and stated that increase in income post TP usage encouraged them to them spend more. An equal percentage stated they were able to overcome food insecurity.

4.1.2. Nutritional Impact on children:

Children enjoying a healthy meal

Data on the frequency of meals shows that more than 40% of the children (in TP households) were deprived of breakfast in pre TP period. During the usage period, not only all the children had breakfast, but an increased percentage (84%) had rice with vegetable curry instead of just rice and a leafy vegetable curry. Similarly for lunch and dinner more number of children (>60%) had rice with two curries instead of just one curry as in pre TP period (>90%). The children considered this a luxury. It is understood that use of TP helped the users meet the nutritional requirements of their family, children in particular.

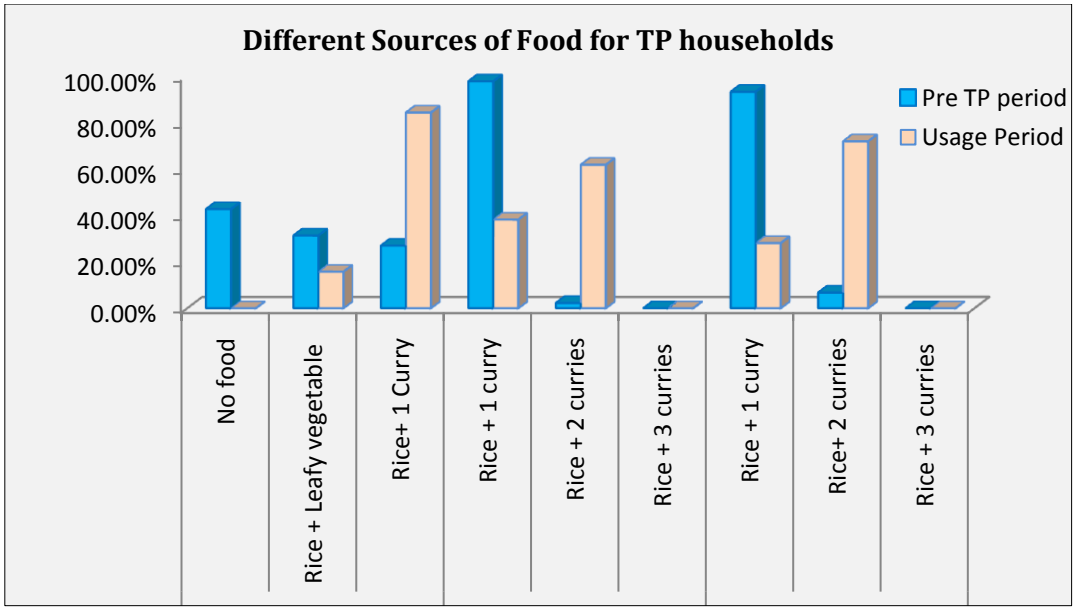


Figure 4.1.2 (Source-Primary Survey, 2010)

4.1.3. Sources of diet for the children

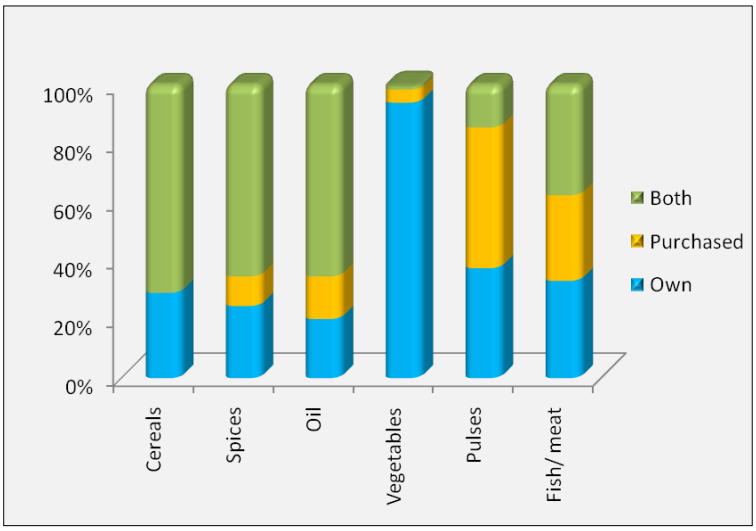


Figure 4.1.3a (Source-Primary Survey, 2010)

Various sources of diet for children in TP using households were analyzed. The sources are broadly divided into three categories- home grown/produced, purchased, and both. Food types are broadly categorized as cereals, pulses, vegetables, oil, spices, and fish/meat. The study shows that for vegetables most of the TP users (94.38%) depended exclusively on own produce. This establishes the fact that TP has helped the farmers in production of more vegetables, thereby increasing household consumption of vegetables. For cereals none of the farmers depended exclusively on purchase. Pulses and non vegetarian foods were mostly purchased (Figure 4.1.3a)

99% TP users ascertained that there was improvement both in terms of quantity and quality of food consumed by the children (Figure- 4.1.3 b). The study found out that the availability of adequate vegetables and food grains due to TP interventions have solved the nutritional deficiencies of the children. Certain common diseases due to the deficiencies of balanced diet which were observed in pre-TP period were no more visible after TP interventions

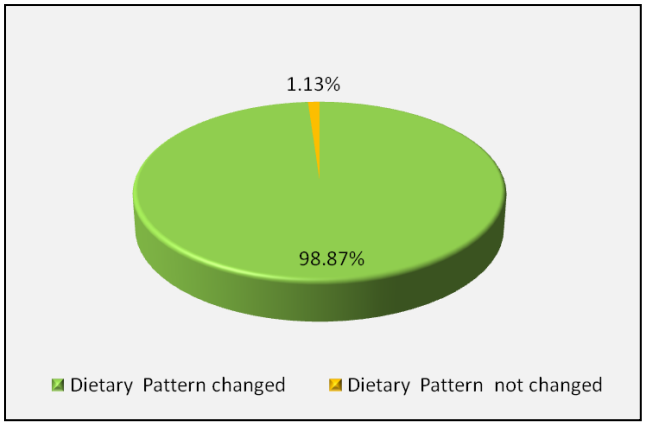


Figure 4.1.3b (Source-Primary Survey, 2010)

Qualitative responses on specific reasons for change in the dietary pattern were noted (Table-4.1.3c). All TP using households agreed that increased production as well as production of different types of vegetables contributed to the change. Around 91% agreed that fresh vegetables were available for home consumption throughout the year.

Nearly 60% were of the opinion that availability of cash from sale of vegetables helped them purchase more pulses, oil and other food items from the market.

Reasons for change in the dietary pattern of the children in TP Households

Sl. No	Reasons	Responses		
		Kandhamal (N=45)	Keonjhar (N=44)	Total (N=89)
1.	Vegetable production has increased	100%	100%	100%
2.	Consumption of different vegetables that are grown	100%	100%	100%
3.	Fresh vegetables are available for home consumption in all the seasons	88.88%	93.18%	91.01%
4.	Surplus vegetables are sold, which helps family to purchase other food items.	77.77%	86.36%	82.02%
5.	Consumption of poultry products has increased, because sale of the same has decreased due to increased vegetables sale	68.88%	68.18%	68.53%
7.	Family is able to purchase more pulses and oil from the market for home consumption	62.22%	56.81%	59.55%

Table 4.1.3c (Source –Primary Survey, 2010)

4.1.4. Impact on Family Livelihood Security

Qualitative responses on impact of TP on livelihood security of the families were analyzed (Table-4.1.4).

Above 90% of the respondents were of the opinion that assured livelihood was a result of

- Increase in net income because of vegetables production and sale
- Savings which resulted from less spending on purchased food

- Assured food availability because of round the year cultivation

All the TP users (100%) agreed that

- TP created employment opportunities for the family (family labour) due to increased farming activities
- Increased the net agricultural production by the family
- In pre-TP period cropping pattern was basically mono-cropping and cereal based, which changed to multi cropping with different vegetable crops.

Impact of TP on the family livelihood security of TP users

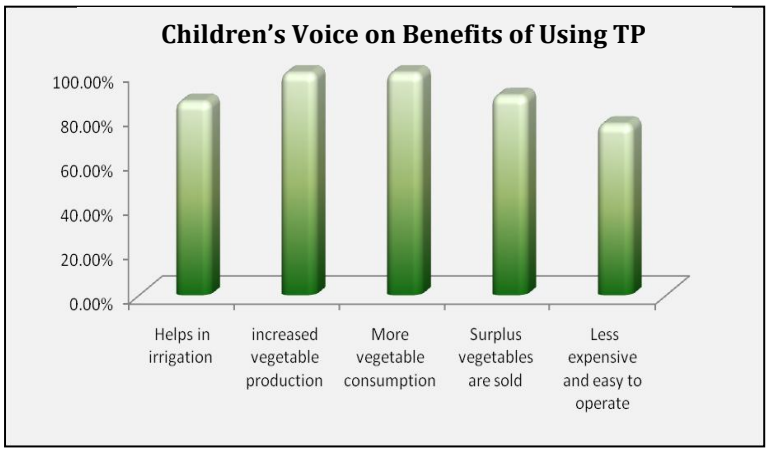
Sl. No	Impact	Responses		
		Kandhamal (N=45)	Keonjhar (N=44)	Total (N=89)
1.	Employment opportunities in agriculture created for all members in the family	100%	100%	100%
2.	Net food production by the family has increased	100%	100%	100%
3.	Food production in different seasons, and assured food availability to family	97.77%	93.18%	95.50%
4.	Net income of the family due to vegetable production has increased	88.88%	97.72%	93.25%
5.	Multi cropping has replaced mono crop practice, thus different crops were grown and consumed	100%	100%	100%
6.	Savings of TP user families has increased	88.88%	93.18%	91.01%
7.	Storage of surplus food produced helps meet the food demand during lean seasons	77.77%	88.63%	83.14%

Table No-4.1.4 (Source –Primary Survey, 2010)

4.1.5. Views of Children on benefits of TP

The study also attempted to find out the responses of the children of the TP users on various aspects of TP, with reference to agriculture in particular. The qualitative responses are documented in figure 4.1.5.

As regards the views of children in TP using households, they were quite aware of the advantages of using TP. 77% children understood how it operates, and were aware that TP is cost effective. All the children were of the opinion that there was increased production and



hence consumption of vegetables. 90% reported that sale of surplus vegetables increased their family incomes.

Table No-4.1.5 (Source –Primary Survey, 2010)

4.1.6. Responses of the TP Non-Users

The study also attempted to understand the views of TP non-users on various aspects viz. food security, standard of living, family livelihood security, etc.

Responses of Non Users on the standard of living

Sl. No.	Standard of living	Responses		
		Kandhamal (N=17)	Keonjhar (N=19)	Total (N=36)
1.	Agriculture production and income are not increasing	70.58%	89.47%	80.55%
2.	There is no change in the cropping pattern or diversification	82.35%	94.73%	88.88%
3.	There is scarcity of food in all seasons	70.58%	47.36%	58.33%
4.	Balanced diet is not available primarily due to lack of vegetables	82.35%	57.86%	69.44%
5.	Family depends mainly on the market for food grains and vegetables	100%	100%	100%
6.	Family unable to spend more on health, education, and household needs of the family	100%	84.21%	91.66%
7.	There is no security of livelihood	88.23%	94.73%	91.66%
8.	There is no scope for savings	100%	100%	100%

Table 4.1.6 (Source –Primary Survey, 2010)

The responses of the non users hint at the fact that lack of assured irrigation was a major problem, and most of the outcomes were interlinked. Limited cultivation throughout the

year resulted in limited production, hence less income. The outcome was scarcity of food, lack of balanced diet and less purchasing power. All the TP non-users reported that their livelihood was not secured and less income didn't allow them to go for savings.

4.2. Health Care and Treatment:

The concept of health and disease is inextricably intertwined with social, cultural, and economic factors which are product of and influenced by the well being of family members and on their access to resources. Conceptually disease and sickness are important variables that influence the health of a human society. Socio-cultural factors more or less determine beliefs and practices related to health, disease and treatment.

In Orissa around 98 percent children have one or the other form of anaemia. Children in six to eleven years age group, underweight children, those from rural areas with illiterate family (98%), and from SC and ST ethnic background (100%) are more prone to anaemia. Besides several vector borne diseases like malaria, diarrhoea, dysentery, etc. take their toll every year.

With this premise the study tried to find out various issues relating to health of both TP users and Non-users, viz: diseases suffered by children during last two years, expenditure made towards treatment of the children, attitudinal changes towards disease treatment and qualitative responses of both TP and Non-users.

4.2.1. Expenditure on Treatment

The study found out that the most prevalent diseases in the region were malaria, fever, dysentery and diarrhoea.

Expenditure on treatment of children were documented such as cost borne towards treatment, consultation with the doctors, cost towards medicines, cost of commutation, cost of food and other treatments. The expenses were documented separately for both pre TP and TP usage period in the two districts. The data on pre-TP period was preceding year of the TP purchase, which varies from users to users.

In Keonjhar and Kandhamal districts the average overall expenditure on health care of children increased by more than 20 and 100 times respectively during TP usage period. When compared to non users, the expenditure was about five and two times higher in Keonjhar and Kandhamal districts respectively (Table 4.2.1). There was a positive change in the attitudinal shift from traditional to modern treatment. Thus, there was increased expenditure towards consultation, medicines and better nutrition. The non TP users did also attend to their children needs, but lack of affordability was a hindrance to better health care of children in such households.

Average Annual Expenditure (in INR) on Health Care of Children by TP Users

Expenditure Head	Keonjhar			Kandhamal		
	Pre TP	Post TP	Non Users	Pre TP	Post TP	Non Users
Consultation with doctors	11.36	245.45	26.3	0	150.07	44.1
Cost of medicine	119.3	3,152.04	444.72	32.22	2,611.55	1,034.11
Cost of commutation	0	151.14	80.51	0	136.22	29.41
Cost of food & other treatments	34.09	443.64	163.15	0	477.33	297.05

Table 4.2.1. (Source –Primary Survey, 2010)

Introduction of TP has helped the rural farmers to come out of such vicious traps of poverty. In Indian context where human labour force is important to make agriculture and family life more productive and healthier, children as future work force are crucial to maximize production and minimize rural poverty. The good health and wealth concept is well linked when one analyses the impact of TP on children. TP has contributed to create healthy childhoods, which have direct and indirect bearing on the family and society.

4.3. Impact on Education

Children of TP User Farmers Playing in School

The inequalities in child well being in India is based on caste, class and gender. Even after sixty years of independence one has to admit the fact that the marginal and disadvantaged groups in particular and rural people in general, find very little representation in the race of mainstream achievements or progress. Despite various efforts made by the Government and civil societies, poverty still pays a major role in the life and livelihood of sections of the population. The cycle of disadvantage starts at birth and continues through childhood to the next generation, which is reflected in the poor educational enrolment, retention, and dropouts. The acuteness of these problems is manifested in the magnitude of child labour force. With this background the present section has attempted to assess the impact of TP on children, with special reference to school enrolment, annual expenditure on children's education, change in attitude of parents towards children's education, etc.

4.3.1. Enrolment of Children in School

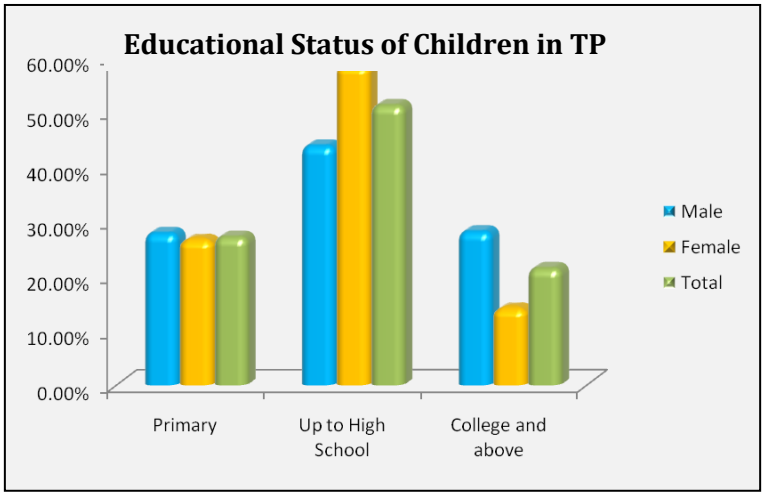


Figure 4.3.1. (Source –Primary Survey, 2010)

Data on educational status of children in both the districts surveyed was collected (children in the age group of one to six have not been considered while calculating the school enrolment status). All the children in TP using households attended school/colleges. There was no single case of discontinuity in education. Children didn't limit their education to schools, but joined colleges, which includes professional courses. Education of children was taken care of irrespective of the gender of the child.

4.3.2 Expenditure on Education

Willingness to spend on various educational purposes determines one's attitude towards education. The study tried to collect data on average expenditure on education by both TP users and non-users viz. payment of tuition fee, cost of books and notebooks, school stationery, etc. The expenditure was assessed separately for pre TP period, usage period and for non users in both the districts (Figure-4.3.2). The data indicates that there was increased expenditure on education of children in TP usage period. In pre TP period, with limited income, expenditures were limited to essentials such as school fees, uniforms and books and notebooks and indispensable school stationeries. But during TP usage period parents were willing to provide quality education and considered overall development of the

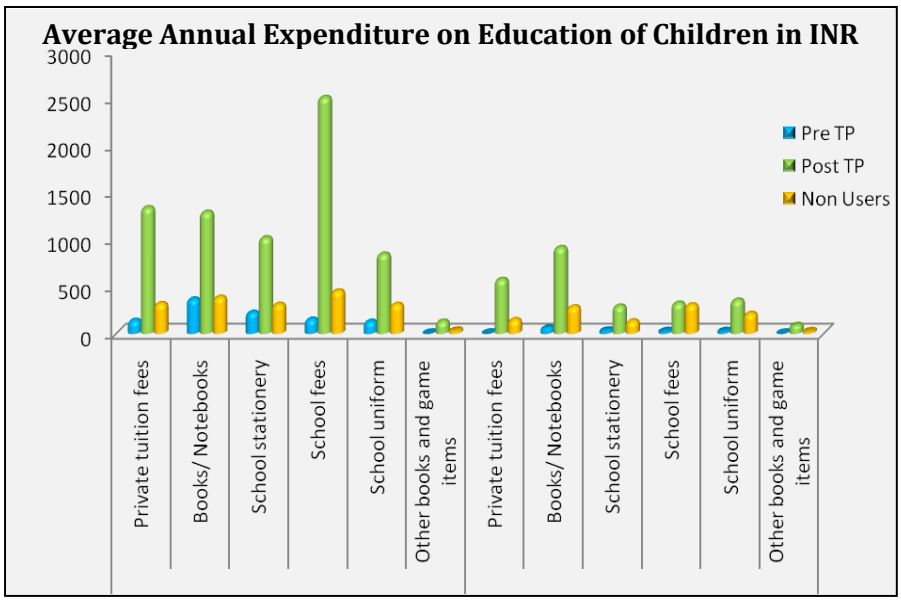


Figure 4.3.2. (Source –Primary Survey, 2010)

children. This is manifested in increase in school fees (16 times), private tuition fees (13 times) and expenditure on story books and games/sports items.

Expenditures on educational activities of children were much less in case of non users. While 68.5% of the TP farmers indicated that formal education was necessary, only 25% of the non TP users agreed to that. Most of the parents in TP using households agreed that they were able to sit with their children during their study (even though they did not contribute much in their study) for a longer period as compared to pre-TP period. All the non users reported that owing to irregular income they never had the confidence to prioritize their children education.TP has made formal education possible for the poor tribal households of Kandhamal and Keonjhar districts. TP has also contributed in strengthening the village social capital.

4.4. Household Savings

One of the objectives of the study was also to find out the impact of TP in terms of encouraging the TP users to have savings. The study tried to find out the status of savings by the families (primarily for children) in both pre and post-TP period.

4.4.1 Access to Saving Institutions

It was observed that in pre-TP period only 14% of the TP using households had savings account with banks which increased to 91% during TP usage period. While majority had accounts with banks, small fractions saved with Post Offices and LIC.

Savings by TP users in Pre-and post TP period

Sl. No.	District	Total HHs	Responses				
			TP Users		Sources of saving in Post –TP Period		
			Saving in Post-TP Period	Saving in Pre-TP period	Bank	Post Office	LIC of India
1	Keonjhar	44	93.18%	9.09%	87.80%	4.87%	7.31%
2	Kandhamal	45	88.88%	20%	42.50%	52.50%	5%
Total		89	91.01%	14%	61.72%	28.39%	6.17%

Table 4.4.1 (Source-Primary Survey, 2010)

It is understood that surplus agricultural production helped generate high cash returns. The small farmers were then encouraged to go for savings. Hence financial institutions were more accessible for the farmers than it was in pre TP period.

4.4.2 Saving Accounts for Children

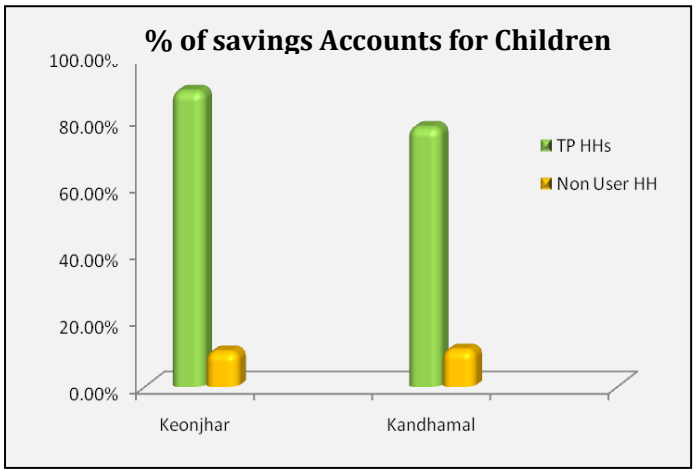


Figure 4.4.2a (Source-Primary Survey, 2010)

The study tried to know if the savings account by the TP users were primarily meant for their children, hence, data for the same was collected. Figure 4.4.2a explains that 83.14% of the TP using households with savings account had opened the accounts for their children. In case of non TP households with savings account only 11.11% had done so in the names of their children.

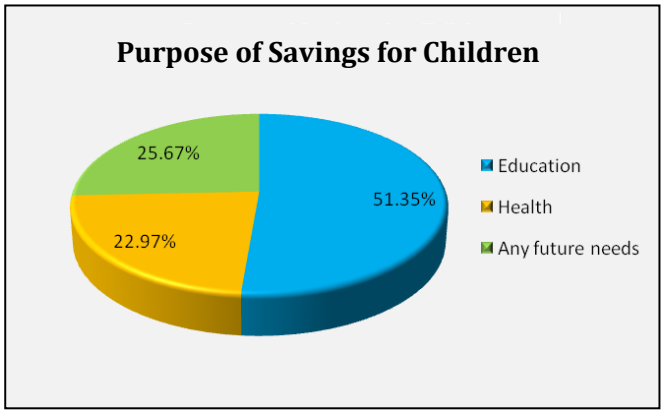


Figure 4.4.2b (Source-Primary Survey, 2010)

Because of regular cash flow TP users were motivated towards savings. They aspired to provide better and higher education for children, and thus saved to meet their future expenses. Figure 4.4.2b explains various intentions behind the savings for children by TP users.

4.5. Clothing and Material Assets for Children

This section tries to assess the impact of TP on clothing of children and their access to minimum material assets. In this context data on quality and number of pairs of dresses purchased for children, both in pre and post-TP period, was collected and presented in 4.5.1a.

Children wearing new dresses

& (on left) matching slippers too!

4.5.1 Number of Dresses & Expenditure

Possession of number of pairs of dresses by a child signifies the financial ability of the parents to spend on them. It was observed that average pair of dresses for children increased to four from two per year during the TP usage period. While all the TP users reported that the quality of cloth or spending per cloth had increased, only 58% of non TP agreed to that.

Response on expenses on clothing of children

Sl. No	Indicators	TP Users	Non Users
		Total (N=89)	Total (N=36)
1	Expenses for clothing increased	100%	100%
2	TP enables higher spending on clothing	100%	-
3	Quality of cloth has improved	100%	58.33%

Table 4.5.1a (Source- Primary survey, 2010)

Data on expenditure shows that in TP households, the expenditure on clothing of children was 3.75 times that of in pre TP Period (4.5 times in case of boys and three times in case of girls). When compared to non TP households, the spending by TP users was higher by 60% (85% in case of boys and 34% in case of girls)(Table 4.5.1b).

Average Annual Expenditure on Clothing of Children by TP and Non-TP users

Sl. No	District	Total HH	Average expenses in INR						
			Pre-TP		Post-TP (2008-09)		Non TP users		
			Boys	Girls	Boys	Girls	Total HH	Boys	Girls
1	Kandhamal	45	247.56	355.56	1,141.1	698.89	17	782.35	582.35
2	Keonjhar	44	320.57	309.55	1,423.8	1,239.1	19	600	863.16
3.	Total	89	568.13	665.11	2,564.9	1,937.9	36	1,382.3	1,445.5

Table-4.5.1b (Source- Primary survey, 2010)

4.5.2 Material Assets

Children in TP households were interviewed to collect data on additional expenses made in buying small assets for them (during TP usage period). The study shows all the children

purchased wrist watches for themselves and nearly 75% purchased bicycle which would help them commute to schools and tuition classes. Table 4.5.2 lists the assets purchased by TP users for their children, which was possible because of increased income.

Purchase of motorbike to drop children to school

Various items purchased by the TP users' children in post- TP period

	Items	Kandhamal (N=25)	Keonjhar (N=14)	Total (N=39)
1.	Wrist Watch	100%	100%	100%
2.	Wall Clock	92%	85.71%	89.74%
3.	Bicycle	84%	71.42%	74.48%
7.	Mobile set	44%	50%	46.15%
8.	Radio	76%	57%	69.23%
9.	Tape-Recorder	52%	57.14%	53.84%

Table No-4.5.2 Source –Primary Survey, 2010

The preceding chapters establish the fact that adoption of TP by the farmers has helped them develop their socio-economic conditions. This is reflected in their improved food habits, secured livelihood, market linkages, education, health, and dressing. Majority of the TP users agreed that their children are getting adequate financial support towards health, education and clothing, and other miscellaneous needs.

In addition they have developed a sense of savings to take care of future needs. This has created opportunities to link them with the formal banking sector and other financial services. TP not only saved the poor smallholder farmers from clutches of poverty but also made them visionaries.

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