

**IMPACT OF TREADLE PUMP  
ON CHILDREN IN WEST BENGAL**

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## **ABBREVIATIONS**

ADITI	-	Affordable Drip Irrigation Technology Intervention
CD	-	Community Development
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
WFP	-	World Food Programme

## **EXECUTIVE SUMMARY**

The objective of the study was to assess 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 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 liters per second.

The study has covered 99 TP user farm families distributed over nine villages of five Panchayat Samitis of East Medinipur, West Medinipur and Uttar Dinajpur districts of West Bengal. In 2002 Medinipur was divided into two different districts of East and West Medinipur. For various reasons of similarities in the geo-physical and socio-cultural characteristics the study has clubbed TP using households of East Medinipur and west-Medinipur, which are considered undivided in the current study

### **Key Findings**

- Around 14.44 percent TP using households belonged to Muslim community, and 77 percent to scheduled caste and schedule tribe communities. The total TP using population studied included 245 males and 243 females. Average size of TP using family was five
- Around 48 percent TP users lived in Kutcha or mud houses. BPL households constituted 54.8 percent of the TP users, while rest 45.2 percent belonged to APL category
- Average land holding of a TP using household in Medinipur was 1.55 acres, and 1.57 acres in Uttar Dinajpur district.

- IDEI staffs were the major motivators (55.7%) for the farmers to purchase TP. Around 95 percent TPs were purchased from dealers. The common water sources tapped by TP users included their private bore well (91%)
- All the 99 TP were in good functional conditions. Bamboo Pedal Pump, a variety of TP, was commonly used by the farmers in West Bengal. When not in use the pumps are taken out from bore well and kept at home
- Agriculture was the primary occupation for all TP using households, and wage labour the major secondary occupation. Around 72.30 percent of the total income of TP users was raised from agriculture followed by wage labour (9.38%). The average agricultural income of a TP using household was around Rs. 68,591/- and that of from wage labour is Rs.8,902/-
- Major agricultural and allied assets of TP using households included bullock, cow, sheep and goat, while non agriculture assets included bicycle. Around 70 percent households had purchased mobile sets, which was basically due to the increasing income from agriculture
- Agriculture contributed in a major way (72.30%) to the food basket of TP using farm families
- TP was used almost for 100 percent of the vegetable cultivation in both the districts. The study shows that TPs contribution in production of different agricultural produces was significant both in terms of production and income
- Increased agricultural production due to irrigation support with help of TP not only increased net production but also brought in surplus cash to the families. This significantly contributed towards food security of the families
- Purchasing power of TP users for food items had also increased. For all food items, expenditure by TP users increased in post TP period. Around 57.5 per cent of agro-produces were consumed and 42.50 per cent produces were sold in market
- In pre-TP period around 38.39 per cent TP users couldn't afford to provide breakfast to their children, while in the post – TP period not only all children had breakfast but also additional food items

- As regards health care and treatment, the data reflects that consultation with doctors by TP users increased by 78.78 per cent in post – TP period. Higher income helped 83.83 per cent users access health services. For all TP users investment on family health had increased over the time
- Educational status of the TP using family members was quite encouraging. Around 12 percent children of TP users attend classes in colleges and 26 percent were at high school level. TP provided confidence through way of regular income which was an insurance for children’s education
- As regards expenditure on education, percentage increase in spending for various educational needs by TP users in post-TP period was quite high for tuition fees and school fees, and books
- Savings in formal institutions in post-TP period increased by 15.73 per cent households. TP users had access to institutions like banks, post office and Life Insurance Corporation of India
- TP users had opened personal accounts in name of their children and number of such accounts increased from 11.3 percent to 61.8 per cent in post TP period. The increase was phenomenal, to the extent of 464 per cent
- Average expenditure on clothing of boys and girls increased by 31.3% and 60.8% respectively
- TP using families had developed a sense of responsibility in utilization of the savings to meet the future needs of their children.

# 1. INTRODUCTION

## 1.1.Statement of the Problem

In less developed countries children and their childhood is deprived of adequate attention of the family as well as of the state. Such deprivations are manifested in the form of malnutrition, under-nutrition, stunted growth, illiteracy etc which again results in various socio cultural problems in subsequent period. Childhood is the most important phase of biological development of human beings. This phase is also equally important for a healthy society to continue on sustainable basis.

Empirical accountings on various life and living of the children and their child hood shows that 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) are reported 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 children and their child hood and have formulated various proactive legislative policies and programs; but the problems seems to continue.

Food insecurity at household level is one of the most serious problems encountered by the rural households in India, which is largely influenced by food production and access to food basket at household level in-terms of affordability and physical access. Many studies have shown that poor families spend around 70% of their income on food, and yet do not get a balanced diet. In a situation where state has largely failed and individual families have suffered in providing adequate support system to the children, it is natural for the parents to ignore the health and education of their childhood. In this process children lead a life which is both physically and mentally hazardous.

Children in rural regions are the natural supporting hands in household economies. One finds a strong link between food security, school enrolment, school dropout and education of the children. Empirical studies have established the fact that education helps to 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 children with respect to their health and nutritional status and education
- To find out the changes in the attitude of TP users towards the well being of their children

### **1.2.2. Study Universe**

The study adopted a multistage stratified sampling method to select districts. Thus, Uttar Dinajpur district from northern region of West Bengal and Medinipur district from southern region were selected.

At second stage five Community Development Blocks were selected considering various development factors like backward situations and extent of IDEI's operational activities.

At third stage, five revenue villages from Uttar Dinajpur and four villages from Medinipur were selected based on large scale adoption of TP technology and duration of intervention by IDEI. Thus, nine villages were selected for the study.

At fourth stage 64 TP users from Uttar Dinajpur district, and 35 TP users Medinipur district were selected and interviewed for data collection. The study covered a total of 99 TP user households.

### **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 representing 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 during the study.



#### **1.2.4. Evaluation Framework and Tool for Data Collection**

The study adopted household survey method. Interview schedule was filled up from TP 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.

A structured interview schedule was used to collect primary data. The interview schedule was pre-coded and covered both close and open ended questions. The interview schedule for 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 post-TP usage period.

The data collected through the schedule was tabulated and analyzed. Quantitative impact of TP on children was analyzed for both the districts. The qualitative data supplements the quantitative responses.

#### **1.2.5. Duration of the Study**

The study was carried out during October, 2010. Data collection was done by both the research team members personally in each district.

#### **1.2.6. Ethical Issues & Study Limitation**

The study involved the consent of TP 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.

The study largely relied on memory recall of the respondents. The memory 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. The answers were therefore double checked while contextualizing with past situation.

## 2. PROFILE OF STUDY UNIVERSE

### (Socio-economic Profile of the Study Districts)

This section briefly describes the socio-economic profile of the study districts. It tries to give an over view of various indicators pertaining to life and living of local people.

#### 2.1 West Bengal:

West Bengal covers the bottleneck of India in the east, stretching from the Himalayas in the north to the Bay of Bengal in the south. The state is surrounded by Sikkim and Bhutan on the north, Assam and Bangladesh on the east, the Bay of Bengal on the south and Orissa, Bihar and Nepal on the west. The state lies between  $27^{\circ} 13' 15''$  and  $21^{\circ} 25' 24''$  north latitudes and  $85^{\circ} 48' 20''$  and  $89^{\circ} 53' 04''$  east longitudes.



The state has an area of 88,752 sq. km and a population of 80.18 million. There are 19 districts, 341 Blocks and 40782 villages. The state has a population density of 903 per sq.km. (as against the national average of 312). The decadal growth rate of the State is 17.77% against 21.54% for the country. The demography of the State includes SC and ST

population of 18.45% and 4.41% respectively. Female literacy rate for the state stands at 59.6% and the sex ratio is reported as 934 females per 1000 males (2001 Census of India)

### **2.1.a Medinipur (Undivided) District:**

Medinipur was the biggest among the districts of West Bengal, with its geographical location in  $21^{\circ} 36'$  to  $22^{\circ} 57'$  north latitude to  $86^{\circ} 33'$  to  $88^{\circ} 11'$  east longitude. The district covers around 15.86% of West Bengal in size. Four major rivers named Hoogly, Cossy, Rupnarayan and Subarnarekha flow through this district which influence the water level. The geographical features of this district may be defined in four divisions like planes of Shilai, lower Cossy planes, upland of Medinipur and planes of Contai region. The present study was confined to the Contai region which forms the middle and southern portion of this district. In 2002 the district was divided into two different districts of East Medinipur and West Medinipur.

#### **West Medinipur:**

The District of West Medinipur came into existence in January, 2002. The district has four sub-divisions, 29 Blocks, 290 Gram Panchayat and 7580 inhabited villages. Geographical area of the district is 9,295 sq km. West Medinipur has a total population of 5,193,411 (2001) and a population density of 558 per sq.km. Rural population constitutes 88 percent of the district's total population. The district has a literacy rate of 60.7%. The district has a suitable agro-climatic condition for cultivation of mulberry and horticulture crops such as mango, banana, guava, lemon, papaya, cashew and jackfruit.

#### **East Medinipur:**

This district of East Medinipur was formed in January, 2002. The district has 4 sub-divisions, 25 Blocks and 223 Gram Panchayat. Geographical area of the district is 4,785 sq. km. East Medinipur has a total population of 4,417,377 (2001) and population density is 923 per sq.km. Literacy rate of the district is 80.2%. Crops raised in the area include rice, banana, coconut, potato, cotton and fresh vegetables.

### **2.1.b Uttar Dinajpur:**

The District of Uttar Dinajpur came into existence on 1st April, 1992 after the bifurcation of erstwhile West Dinajpur District. The District lies between latitude  $25^{\circ}11' N$  to  $26^{\circ}49' N$

and longitude 87°49' E to 90°00' E occupying an area of 3142 Sq. Km enclosed by Bangladesh on the East, Bihar on the West, Darjeeling & Jalpaiguri district on the North and Malda district on the South. The regional topography is generally flat with a gentle southerly slope towards which the main rivers like Kulik, Nagar, and Mahananda etc flow. Uttar Dinajpur is bestowed with a very fertile soil. The soil is very rich in nature due to the alluvial deposition which helps to grow paddy, jute, mesta, Sugarcane etc.

In Uttar Dinajpur District there are 2 Sub-Divisions Raigunj & Islampur, 110Km apart from each other. There are 4 Municipalities, 9 Blocks and 98 Panchayat covering 3192 villages. The district has a total population of 2,441,794 (2001) and population density of 778 per sq. km. 33% of the population in the district belong to SC & ST category. Uttar Dinajpur has a relatively low literacy rate of the district is 47.89%.

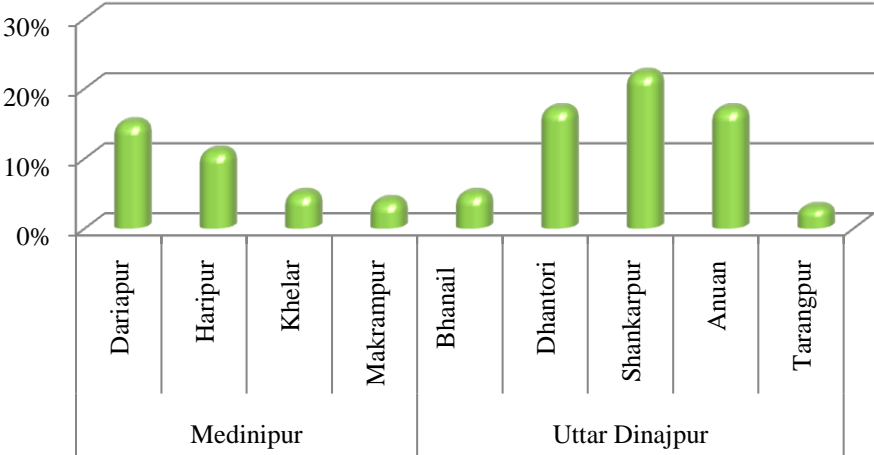
**2.2 Socio-Economic Profile of TP Using Households**

This section covers the profile of the TP using households and some of their socio-economic characteristics like demography, occupations and their livelihood basket.

**2.2.a Study Universe:**

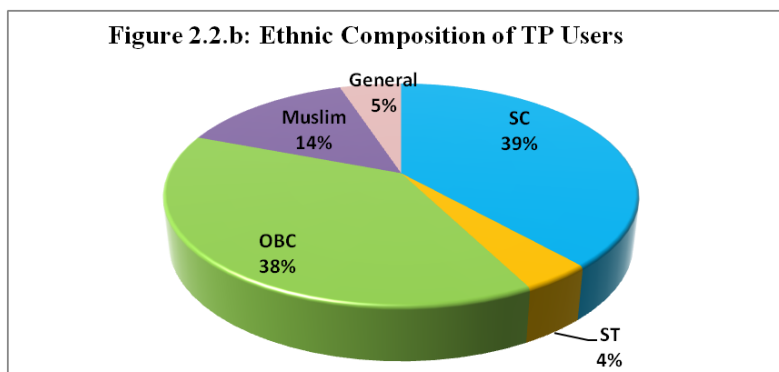
The study covered three districts. They are viz; East and West Medinipur and Uttar Dinajpur, of which East and West Medinipur are represented as a single district. 35% of the respondents were from Medinipur district, spread across four villages in three blocks, and 65% from Uttar Dinajpur, spread across five villages in two blocks. Figure 2.2.a shows distribution of respondents across villages.

**Fig. 2.2.a: Distribution of TP Users Across Villages**



### 2.2.b Ethnic Composition of TP Users:

Ethnic composition of TP users shows that of the total 99 households, around 14.14 percent belonged to Muslim community; scheduled castes and OBC communities, each



constituted 38 to 39 percent. Only 4.04 percent were from ST households and 5.05 percent belonged to General Caste groups.

### 2.2.c Gender Group Distribution:

The study covered a total population of 488 of which 245 (50.50%) were males and 243 (49.50%) females. In Medinipur district the study covered 35 TP using households which consisted of 87 males and 82 females, while in Utter Dinajpur district the study covered 64 TP using households consisting of 158 males and 161 females.

**Fig. 2.2.c: Distribution of Population as per Gender Groups**

District	Population		
	Total	Male	Female
Medinipur	100%	51.47%	48.52%
Uttar Dinajpur	100%	49.52%	50.48%
Total	100%	50.50%	49.50%

### 2.2.d Family Size :

Average family size per TP household has been calculated. Data collected indicate that TP using households had five members on an average. Average size of family in Medinipur as well as Utter Dinajpur was five.

### 2.2.e House Structure:

House structure of the TP users was categorized as Kutcha, Pucca and Mix type. Of the total 99 households, 48 percent TP users had Kutcha houses; only 6 percent had Pucca houses, and 45.7 percent households had houses of mix type. Details of house structures in each project village are given in figure 2.2.e. More Kutcha houses were found in Medinipur (77.5%) and more mix type of houses were found in Uttar Dinajpur (76.2%)

**Fig. 2.2.e: Distribution of House Status of TP Users**

District / Villages	Status of HH			
	Kutcha	Pucca	Mix	Total
<b>Medinipur</b>				
Dariapur	46.7%	20%	33.3%	100%
Haripur	63.6%	9.1%	27.3%	100%
Khelar	100%	-	-	100%
Makrampur	100%	-	-	100%
<b>Sub-Total</b>	<b>77.5%</b>	<b>7.3%</b>	<b>15.2%</b>	<b>100%</b>
<b>Uttar Dinajpur</b>				
Anauan	17.6%	-	82.4%	100%
Bhanail	20%	20%	60%	100%
Dhantori	29.4%	5.9%	64.7%	100%
Shankarpur	26.1%	-	73.9%	100%
Tarangapur	-	-	100%	100%
<b>Sub-Total</b>	<b>18.6%</b>	<b>5.2%</b>	<b>76.2%</b>	<b>100%</b>
<b>Grand Total</b>	<b>48.1%</b>	<b>6.2%</b>	<b>45.7%</b>	<b>100%</b>

### 2.2.f BPL/APL Status of TP Using Households :

In Medinipur district 58 percent were Below Poverty Line and 42 percent were Above Poverty Line. In Uttar Dinajpur district BPL households were comparatively fewer in number (51.6 percent households). Overall, BPL households (54.8%) outnumbered the APL ones (45.2%)

**Fig. 2.2.f: BPL / APL Status of TP Users**

District / Villages	Status of HH		
	Total	BPL	APL
<b>Medinipur</b>			
Dariapur	100%	66%	34%
Khelar	100%	80%	20%
Haripur	100%	36.4%	63.6%

Makrampur	100%	50%	50%
<b>Sub-Total</b>	<b>100%</b>	<b>58.1%</b>	<b>41.9%</b>
<b>Uttar Dinajpur</b>			
Anauan	100%	52.9%	47.1%
Bhanail	100%	60%	40%
Dhantori	100%	47.1%	52.9%
Shankarpur	100%	47.8%	52.2%
Tarangapur	100%	50%	50%
<b>Sub-Total</b>	<b>100%</b>	<b>51.6%</b>	<b>48.4%</b>
<b>Grand Total</b>	<b>100%</b>	<b>54.8%</b>	<b>45.2%</b>

### 2.2.g Land Holding:

Land holdings of TP users were documented for both owned land and hired land to understand average land holding per household. In Medinipur district average size of land holding was 1.49 acre in case of owned land, and 0.058 acre in case of hired in land. In Uttar Dinajpur district average size of owned land holding was 1.49 acre, and that of hired in land was .08 acre.

### 2.2.h Occupation:

Agriculture was the dominant and primary occupation for almost all TP users in Medinipur (97.14%) as well as Uttar Dinajpur (100%). Analysis of secondary occupation of the TP users showed that majority (60%) were engaged as wage labour, either in others' fields or houses on daily payment basis. 18% TP users had started small businesses viz. small kirana stores, kiosks etc. A small percentage (3%) was engaged in government or private jobs like peons, watchmen, etc.

**Fig. 2.2.h: Distribution of Primary Occupation of TP Users**

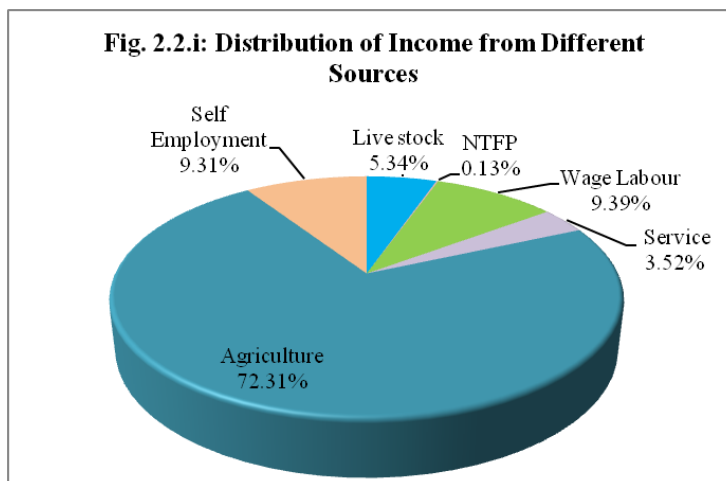
Districts	No. of HHs	Primary Occupation	
		Agriculture	Govt. Job
Medinipur	100%	97.14%	2.86%
Uttar Dinajpur	100%	100%	-
<b>Total</b>	<b>100%</b>	<b>98.98%</b>	<b>1.01%</b>

**Fig. 2.2.h: Distribution of Secondary Occupation of TP Users**

District	No. of HHs	Secondary Occupation				
		Wage Labour	Self Employed	Govt. / Pvt Job	Agri. Allied	No Occupation
Medinipur	100%	60%	8.56%	8.57%	2.85%	20.00%
U. Dinajpur	100%	59.37%	23.43%	-	-	17.18%
<b>Total</b>	<b>100%</b>	<b>59.59%</b>	<b>18.18%</b>	<b>3.03%</b>	<b>1.01%</b>	<b>18.18%</b>

**2.2.i Income:**

**Fig. 2.2.i: Distribution of Income from Different Sources**



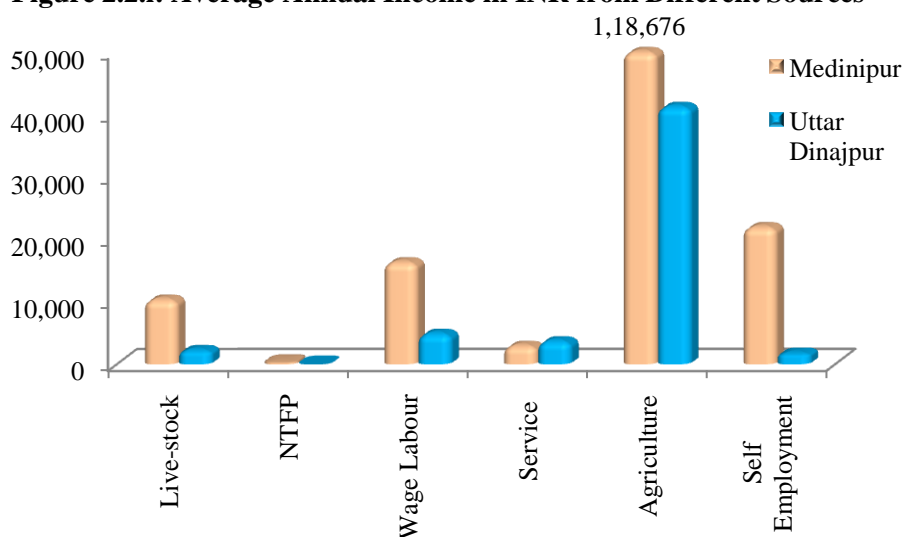
Income of TP users from various sources reveals that agriculture was the major contributor (72.3% of total income). Wage labour and self employment contributed almost equally (9.3% each).

Average annual income of TP using households (inclusive of all sources) was ₹ 1, 70, 528 in Medinipur district and ₹ 53, 625 in Uttar Dinajpur with 70% and 77% of it respectively from agriculture.

Annual income from agriculture was more than ₹ 1 lakh for 9%, between ₹75, 000 to ₹ 1 lakh for 29%, between ₹ 50, 000 to ₹ 75, 000 for 38%. For 24% it was between ₹ 20, 000 to ₹ 50, 000.

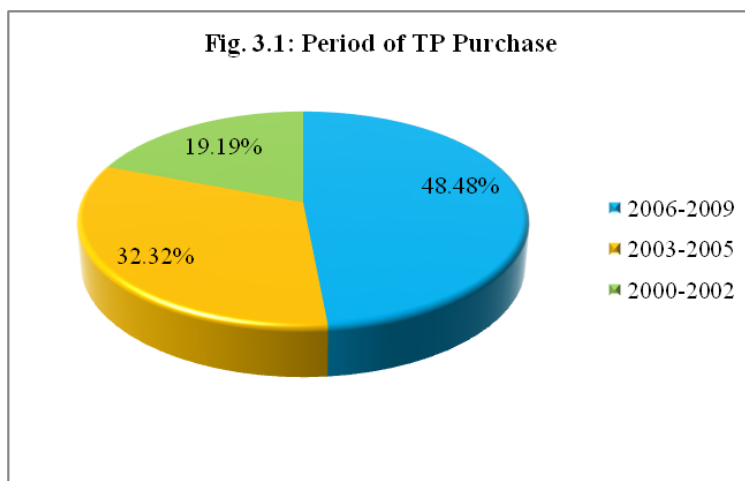


**Figure 2.2.i: Average Annual Income in INR from Different Sources**



### 3. ADOPTION OF TREADLE PUMP TECHNOLOGY

#### 3.1 Period of Purchase:



The exact year of adoption of TP was documented to approximate the period of usage of TP by the users. Adoption of TP started since 2000. Nearly half of the

respondents (48.5%) had purchased TP during the period 2006 to 2009, which indicates that TP was used for a period ranging from 10-11 months to four and a half years by this set of users. A good number (32.5%) had purchased TP during 2003 to 2005. There were also very old TP users (19%) who had purchased TP during 2000-2002.

### 3.2. Sources of Motivation:

Various sources acted as motivating factors for the farmers to purchase T.P. These may broadly be categorized as IDEI staff, neighbor TP users, and demonstrations by IDEI, along with motivation by members in the family. IDEI staff were the major source of motivation (55.7%) followed by demonstrations (28.8%)

**Fig. 3.2: Sources of Motivation to Purchase TP**

Sl. No.	Sources of Motivation	Responses		
		Medinipur	Uttar Dinajpur	Total
1	IDEI Staff	49.9%	61.2%	55.7%
2	Neighbor TP Users	10.8%	16.4%	13.7%
3	Family Members	1.4%	2.5%	1.8%
4	Demonstrations	37.8%	19.9%	28.8%
	<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Only in five percent cases (all such cases in Uttar Dinajpur) TP users had purchased the product from private sales center (local shop keepers purchased from dealers and sold to farmers) while 95 percent purchased from TP dealers only.

## 4. IMPACT OF TREADLE PUMP ON CHILDREN

Nutritional impact of food is an important aspect when one talks of food security of rural population. Keeping this in mind the study highlights the dietary pattern of the children and changes overtime of TP using farm families. In order to substantiate the data on impact of TP on the food chain of the TP using households, it also explains the sources of diets, average consumption expenditure on food items, contribution of TP to the food basket of the family, family livelihood and overall living of the family.

### 4.1 Food & Nutrition:

The income basket of TP user families was calculated and analyzed according to various sources. Agriculture contributed almost 70 percent of the TP using households in case of

Medinipur and 77 percent in case of Uttar Dinajpur district. In total, agriculture contributed around 72.30 percent of the total income.

#### 4.1.1 Contribution of TP in Agricultural Production:

Contribution of TP to family income was calculated in terms of production and thus, cash returns. The data in figure 4.1.1a indicates that TP contributes almost 100 percent in irrigation, thereby production, of spices and vegetable crops. In addition, TP contributed substantially in production of pulses in Medinipur (87.5%). In Uttar Dinajpur TP's contribution in irrigation of other crops was very minimal. The details of contribution of TP in production of various types of crops are mentioned in figure: 4.1.1

**Figure: 4.1.1: Average Contribution of TP in Total Agricultural Production by TP User Households during 2009-10**

Sl. No.	Agriculture Produces	Production			
		Medinipur		Uttar Dinajpur	
		Total	TP Contribution	Total	TP Contribution
1	Cereals	100%	0%	100%	7.19%
2	Pulses	100%	87.50%	100%	0%
3	Oil Seeds	100%	0.13%	100%	6.73%
4	Spices	100%	100%	100%	100%
5	Vegetables	100%	100%	100%	98.88%
6	Horticulture	100%	1.17%	100%	5.92%
7	Others (Jute, Betel nut)	0%	0%	100%	1.53%

#### 4.1.2 Consumption Expenditure:

Use of agricultural produces for both consumption and sale was quantified. Data on consumption and sale of different agri produces indicates that in Medinipur district, of the total produces, around 59 percent was consumed, while 41 percent was sold. While much of the produces like cereals, pulses and horticultural products were consumed, bulk of

vegetables were sold. In Uttar Dinajpur district around 56 percent agricultural produces were consumed and 44 percent sold in market. Unlike in Medinipur, here bulks of pulses as well as vegetables were sold. In total around 42.5 per cent of crop produces were sold in the market indicating that increasing agricultural production due to irrigation support with the help of TP has helped in the food security of the family members (Table-29).

**Figure 4.1.2a: Consumption and Sale of Agri produces by TP Users during 2009-10**

Sl. No.	Agriculture Produces	Consumption and Sale					
		Medinipur			Uttar Dinajpur		
		Total	Consumption	Sale	Total	Consumption	Sale
1	Cereals	100%	75%	25%	100%	69%	31%
2	Pulses	100%	74%	26%	100%	27%	73%
3	Oil Seeds	100%	58%	42%	100%	85%	15%
4	Spices	100%	56%	44%	100%	71%	29%
5	Vegetables	100%	28%	72%	100%	42%	58%
6	Horticulture	100%	89%	11%	100%	95%	5%
7	Others (Jute, Betel nut)	0%	33%	67%	100%	2%	98%
	<b>Total</b>	<b>100%</b>	<b>59%</b>	<b>41%</b>	<b>100%</b>	<b>56%</b>	<b>44%</b>

Average annual consumption expenditure of TP households on food items in pre-TP and post – TP period was compared. The data indicates that for all types of food items, expenditure by TP users in post –TP period in both the districts had increased. More specifically there was a substantial increase in expenditure on vegetables (107% in Medinipur & 54% in Uttar Dinajpur) and spices (66% in Medinipur & 76% in Uttar Dinajpur). TP using households also spent increasingly on non-vegetarian items, which is reflected by the expenditure incurred on meat/fish in both the districts. Simultaneously there were expenses on other food items which were occasional. The details of expenditure for various food items by TP users in both pre and post TP period are mentioned in figure 4.1.2a

**Figure 4.1.2a: Average Annual Consumption Expenditure of TP Households on Different Food Items (in ₹)**

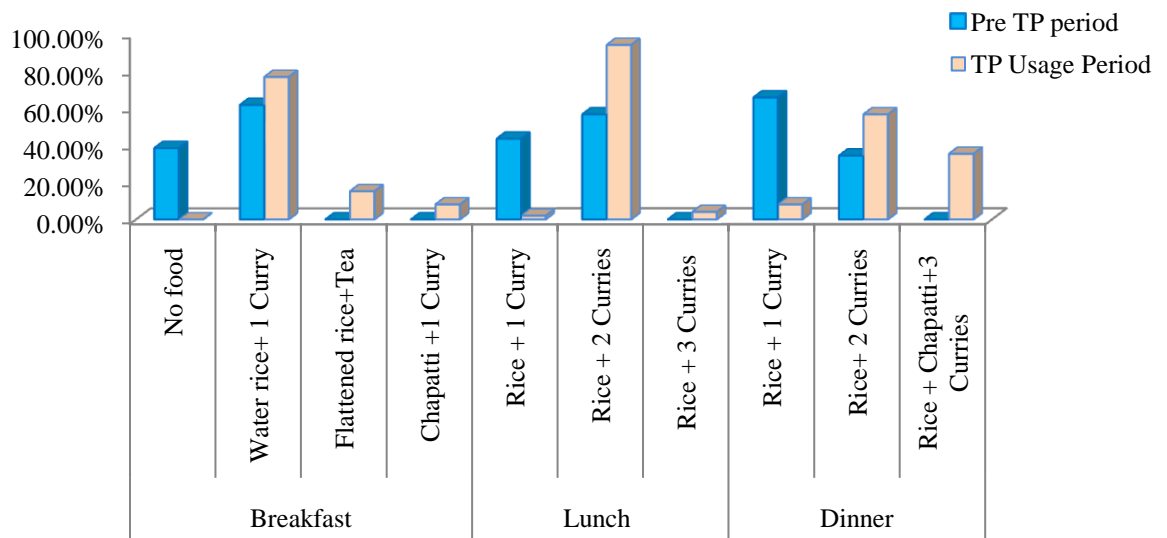
Food Items	Expenditure in ₹					
	Medinipur			Uttar Dinajpur		
	Pre-TP	TP Usage	% of Increase	Pre-TP	TP Usage	% of Increase
Cereals	11,907	15,748	32%	11,633	14,873	28%
Spices	1,782	2,965	66%	1,448	2,542	76%
Oil	2,857	4,173	46%	2,993	4,131	38%
Vegetables	9,051	18,754	107%	10,664	16,443	54%
Fruits	3,023	3,926	30%	5,156	6,691	30%
Meat / Fish	5,671	9,077	60%	6,703	9,867	47%
Others	214	1,461	583%	00	1,080	1,080

### 4.1.3 Nutritional Impact on Children:

Frequency of intake of food per day by children is equally important indicator of food security. The study also covered frequency of food intake and type of foods provided to children in TP using households during breakfast, lunch and dinner. In pre TP period around 38.39 percent TP using families were not able to provide their children with breakfast, while in TP usage period children in all the families had breakfast. Most common breakfast in the region was water rice and curry (Water rice is a traditional preparation where leftover cooked rice is mixed with water and allowed to ferment overnight. The same is taken next morning as breakfast. It is believed that it not only provides energy but also meets the water requirement of the body when farmers toil in their fields). Additional items like flattened/beaten rice, chapatti and curry were also taken in some families. During lunch time around 43.43 percent of TP using households took rice and one curry, while in TP usage period 93.93 percent families took rice and two different curries. Similarly, during dinner time majority (65.65%) families in pre TP period gave their children rice and one curry, while in TP usage period more number of families fed their children with two (56.56%) or three different curries (35.35%). The TP

users felt that there was a total change in their food habits, both in quantitative and qualitative terms.

**Fig. 4.1.3: Changes in Dietary Pattern of Children in TP Using Households**



Certain qualitative responses were collected with respect to expenditure on family food, extent of TP's support to spend on family food and status of food insecurity of the family. Almost all the households in study districts agreed that with the adoption of TP, family expenditure on food increased because of extra income raised from agriculture. All households felt that food insecurity is inexistent. The children get adequate food throughout the day.

The reasons for change in the dietary pattern of children were also asked. There was very little or no differences in the responses of TP users in both the districts. Common reasons put forth by TP users were as follows:

- Increased vegetable production in post-TP period helped in food availability for family.
- Quantity of consumption of food in family increased in TP usage period increased due to own production and affordability to purchase from market.
- Access to fresh vegetables in all seasons (summer & winter in particular) due to own production.
- Income raised from sale of vegetables during TP usage period helped TP families purchase other food items from the market.

**4.1.4 Impact on Family Food Security:**

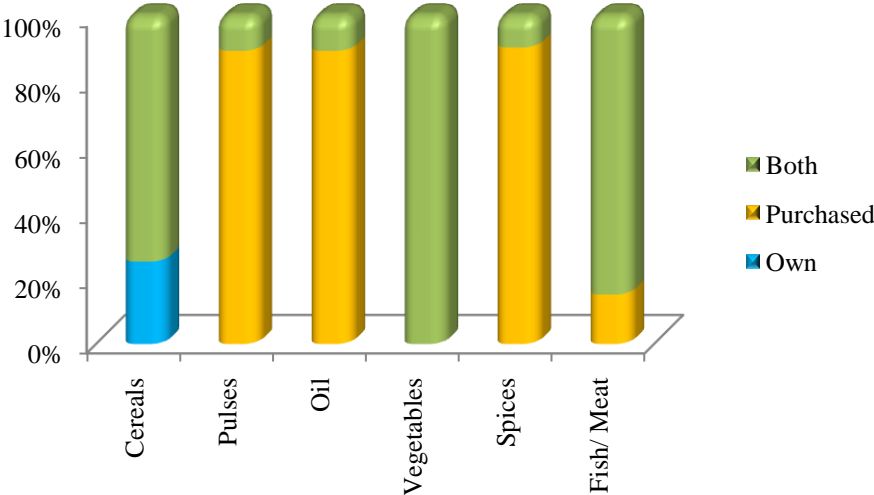
Almost all TP users felt that TP helped them lift ground water for irrigation more conveniently, which was primarily being used to raise vegetables in winter and summer. Increased vegetable production not only helped them consume fresh and better quality vegetables, but also receive cash returns by way of selling vegetables. Extra income allowed them to purchase choicable food items.

TP created employment opportunities for the family members in winter and summer. This didn't happen in pre-TP period. In pre-TP period the cropping pattern was basically mono-crop based, while post usage of TP multi-cropping was possible, hence increased agricultural production. Not only food availability for family was assured, but also varieties of food were available.

**4.1.5 Sources of Diet for the Children:**

Various sources of diet of the TP using families were understood. The sources were either own production or local markets or both. Food items like pulses, cooking oil and spices were primarily purchased. Vegetables are largely taken from own farms. However, some amount is spent to purchase vegetables which are not grown.

**Fig 4.1.5: Sources of Diet for Children**



## **4.2 Healthcare and Treatment:**

Good health is one of the natural properties of human being. Various external and internal factors also influence the health of a person. Food is one of the constituent of human health. Availability, accessibility and affordability to quality food in adequate quantity influence the health of the household. Lack of food and access to health services provided by the State affects easily the health of the children. It is commonly observed that children in India in general and eastern India in particular do suffer from health problems more compared to other parts of the nation. Among them the children of scheduled castes, and scheduled tribes are more vulnerable compared to other caste and communities.

Children of small and marginal farmers of rural West Bengal are common victims of certain deficiencies, under nourishment, underweight etc. This is basically due to the fact that small and marginal farmers are unable to provide good food because of their poverty. Lack of irrigation facility on their small land holding reduces the yield and thus the production capacity of their land, affecting the family livelihood basket.

The present study tried to assess the magnitude of health condition of TP users, their health care, treatment capacity etc. during last one year. Further assessment was made whether with surplus money TP users have changed their attitude towards diseases and their treatment.

### **4.2.1 Expenditure on Treatment:**

The study indicates that the children of TP users had suffered from various diseases. The common diseases reported were fever, dysentery and diarrhoea. Expenditure by the TP users for treatment of diseases was documented with a comparison between pre TP and TP usage period. Expenditure by TP users were calculated specifically for purposes like payment of consultation fee to doctors, cost of medicines, cost of commutation, cost of food and other treatments.

The data indicates that in TP usage period frequency of consulting allopathic doctors increased in both the districts. TP users had spent a good amount towards doctors' consultation fees. With respect to expenses towards medicines, in Medinipur district there was an increase of 103.74 percent, while in Uttar Dinajpur district it increased by 84.34 percent. Cost of food as well as other treatments was also calculated in during TP usage



period. On an average a TP using household in Uttar Dinajpur district spent Rs. 310 which was 278 percent more when compared with pre TP period. In Medinipur district there was an increase of 221 percent towards food and other treatment. The details of expenditure by TP users in both pre and TP usage period for both the districts are given in figure 4.2.

Certain qualitative data were collected from TP users with respect to their attitude towards health and treatment of diseases. The attitude of TP users were assessed in a three point scale as follows

With respect to consultation with doctors, the data indicates that around 78.78 percent TP users were of the view that consultation with the doctors had increased since they were able to afford during TP usage period

82.82 percent TP users opined that their attitude to treat any health issues had also changed positively in favour of immediate treatment in case any sickness. In addition to various other factors TP also helped them approach allopathic treatment (83.83%) which was comparatively more expensive.

TP users were asked whether overall investment by TP users on family health had increased. Almost all TP user households agreed that in TP usage period the investment on family health had increased.

**Figure 4.2.1: Average Annual Expenditure (in INR) on Health Care of Children during 2009-10.**

Expenditure	Responses					
	Medinipur			Uttar Dinajpur		
	Pre TP	TP Usage	% of Increase/Decrease	Pre TP	TP Usage	% of Increase/Decrease
Consultation with Doctors	00	51	100%	6	86	1333%
Cost of Medicine	881	1,795	104%	658	1,213	84%
Cost of Transport	00	00	00	14	14	14%
Cost of Food and other Treatment	122	392	221%	82	310	278%

### 4.3. Impact on Education of Children:

Education is the vehicle of development which starts at childhood. Social and economic inequalities with a child at birth influence adoption to various processes of development. Education is one such area of development where the children of small and marginal farmers are lack access to educational institutions. As a result one finds low enrolment, low retention due to high dropouts and low level of educational achievements. With this premise the study attempted to find out to what extent educational development has taken place in the TP using families; whether TP adoption which brought in economic development of family has any impact on the educational status of children and attitude of the parents towards education.

#### 4.3.1 Enrolment of Children in School:

Educational achievements of the children were also covered during the study. Children within the age group of 0-6 years were not considered for the study. The data indicates that around 30 percent children in Medinipur and 44 percent in Uttar Dinajpur were at primary level. In total, there was a good representation of children in TP using families at different levels of educational institutions. In all TP using families all children were attending different educational institutions and not a single drop out was observed in these families. Around 10 percent attended classes in colleges. Interest to educate children was observed irrespective of cast and creed. TP had provided confidence of regular income which was insurance for children education.

**Table No. 4.3.1: Educational Status of Children n TP Households**

Sl. No.	Education Level	Responses		
		Medinipur	Uttar Dinajpur	Total
1	Primary ( 1 – 5 <sup>th</sup> )	30%	44%	37%
2	M.E. School (6 – 7 <sup>th</sup> )	21%	25%	23%
3	High School (8 -10 <sup>th</sup> )	29%	23%	26%
4	College (12th)	17%	7%	12%
5	Above (graduation)	3%	1%	2%
	<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

### 4.3.2 Expenditure on Education:

Actual expenditure on various aspects of education of children by the TP users showed their willingness to invest in educational development of their children and their financial capability to afford such expenses which was once not possible. The study tried to find out extent of spending of TP users on various educational inputs required for their children. The requirements are categorized as payment of school fees, cost of books and copies, cost of pen, pencils, cost of school uniforms, story books and cost towards purchase of game items. The expenditure was compared for both pre and TP usage period to find out the extent of change in investment.

In Medinipur district there was a substantial increase in spending for all forms of educational input to children by TP users. The percentage of increase was very high in case of payment of school fees (274%), tuition fees (179%), and towards purchase of stationeries (168%). Supply of story books and game items to the children was possible due to the extra income raised with help of TP. In Uttar Dinajpur district the expenditures showed similar trends of investment with an increase in case of school fees, tuition fees and school uniforms and stationeries.

**Figure 4.3.2: Average Annual Expenditure on Various Educational Activities of Children**

Sl. No.	Expenditure Heads	District / Expenditure					
		Medinipur			Uttar Dinajpur		
		Pre TP	TP Usage	% of Increase	Pre TP	Post Usage	% of Increase
1	School Fee	329	1,231	274%	221	448	103%
2	Books & Copies	1,317	3,058	132%	893	1,760	97%
3	Pen / Pencils / Cutter / Eraser, etc.	256	687	168%	165	370	124%
4	Tuition Fees	1,536	4,283	179%	1,114	2,594	133%
5	School Uniform	294	559	90%	238	502	111%
6	Other Books	-	92	92	27	26	3.70
7	Game items	15	252	1580%	18	120	567%

The above facts substantiate the fact that TP not only brought in additional income to the family, but also impacted the attitude of the parents to invest more on educational development of their children. The social capital of the TP using households are created as well as strengthened. In pre TP period enrolment of children in school was not a big problem but investment for quality education with material support and extra private coaching were not possible. TP facilitated in quality of education.

#### 4.4. Household Savings:

Saving in the form of cash and kind for future use during exigency is a part of life of the farmers. Form of saving, extent of saving and place of saving are quite important. Saving by small and marginal farmers is directly dependent on good yield of their crops. TP has a direct impact on yield, hence, influences the economic life and living of TP users families. The study specifically aimed to find out the impact of TP on the saving status of TP users and access of TP users to saving institutions with a special comparison between pre TP and TP usage period.

##### 4.4.1. Access to Saving Institutions:

The data on savings by TP users shows that in Medinipur district 48.57 percent smallholders had savings in formal saving institutions in pre TP period which increased to 62.85 percent TP usage period. In Uttar Dinajpur district 53.12% had savings in formal institutions which increased to 70.31% in TP usage period.

**Figure 4.4.1a: Savings by TP Users in Pre and Post TP Period in Formal Institutions**

Sl. No.	District	Total TP User	Responses	
			Pre TP	Post TP
1	Medinipur	100%	48.57%	62.85%
2	Uttar Dinajpur	100%	53.12%	70.31%
	<b>Total</b>	<b>100%</b>	<b>50.85%</b>	<b>66.58%</b>

The savings institutions accessed by TP users in TP usage period were also considered. The common savings and credit institutions included Banks, Post-Office, LIC and other

institutions. Amongst TP using households who saved with formal financial institutions, 47.2% had accounts in banks, 29.2% with post offices, and 23.6% had accounts with LIC.

**Fig. 4.4.1b: Various Institutions for Savings TP Usage Period**

Sl. No.	District	Total HH with Savings	Institution		
			Bank	Post Office	LIC
1	Medinipur	22 (100%)	50%	27.27%	22.73%
2	Uttar Dinajpur	45 (100%)	44.44%	31.11%	24.44%
	<b>Total</b>	<b>67 (100%)</b>	<b>47.2%</b>	<b>29.2%</b>	<b>23.6%</b>

#### 4.4.2. Saving accounts for Children:

The study also focused on saving accounts by the TP users exclusively in the name of their children. A comparison is made between pre and TP usage period. The data indicates that only 11.2 percent children had savings accounts in the name of their children in pre- TP period which has increased to 61.8 percent in TP period.

As regards the place of opening accounts in name of children around 89 percent had account in banks, while 8 percent in post offices and only 3 percent account in other places like micro finance institutions. TP users felt that TP helped them think of savings in the name of their children.

**Figure 4.4.2a: Saving Accounts Opened by TP users in Name of Children**

Sl. No.	District	Total HH	Savings Accounts	
			Pre-TP	TP Usage
1.	Medinipur	35 (100)	11.42%	65.71%
2.	Uttar Dinajpur	64 (100)	10.93%	60.93%
	<b>Total</b>	<b>99 (100)</b>	<b>11.2%</b>	<b>61.8%</b>

#### 4.4.3 Priority for Children:

All the TP using households in both the study districts expressed that due to TP introduction there was an increase in cash returns and surplus funds were saved which helped them pay heed to the development of their children. It was observed that TP using parents wished to use their funds or savings for various purposes which broadly include education, health and unforeseen future needs.

**Figure 4.4.3: Purpose of Savings by TP Users**

Sl. No.	District	Total TP User	Responses		
			Educational Development	Health Requirements	Meet future needs of children
1	Medinipur	35 (100%)	28.6%	34.3%	37.1%
2	Uttar Dinajpur	64 (100%)	31.3%	34.4%	34.3%
	<b>Total</b>	<b>99 (100%)</b>	<b>29.9%</b>	<b>34.4%</b>	<b>35.7%</b>

#### 4.4.4. Expenditure on Clothing:

In order to assess the spending on clothing of children the study considered all children in TP households. Data on annual average expenditure on clothing by TP using households during both pre and TP usage period shows that on an average expenditure on clothing of boys and girls increased by 31.3% and 60.8% respectively. Figure 4.4.4 shows the increased expenditure on clothing of children, for both the genders, in the study districts. No gender bias was observed in such expenditure. In Medinipur, there was considerable in expenditure on clothing of girl children.

**Figure 4.4.4: Average Annual Expenditure on Clothing of Children by TP Users**

Sl. No.	District	Total HH	Average Expenses (in INR)					
			Boys			Girls		
			Pre-TP	TP Usage	% Increase/Decrease	Pre-TP	TP Usage	% Increase/Decrease
1.	Medinipur	35	623	1,097	<b>76.08%</b>	515	1,039	<b>101.74%</b>
2.	U. Dinajpur	64	620	925	<b>49.19%</b>	682	886	<b>29.91%</b>
3.	Total	99	622	1,011	<b>31.3%</b>	598	962	<b>60.8%</b>

#### 4.5 Other Assets for Children:

Data on assets purchased by TP users for their children was also collected. Assets like bicycle, wrist watch, wall clock, radio, mobile, etc. were found to be purchased by TP users for their children.

**Figure 4.5: Assets for Children**

Sl. No.	Assets	Medinipur (N=35) Nos.	Uttar Dinajpur (N=64) Nos.	G. Total (N=99) Nos.
1	Cycle	100%	100%	100%
2	Wrist Watch	51%	45%	48%
3	Wall Clock	77%	66%	72%
5	Radio	6%	-	3%
6	Mobile	74%	66%	70%
7	Fan	6%	14%	10%
8	TV	6%	14%	10%

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