Impact Assessment of Lift Irrigation and Rainwater Harvesting in the Tribal Villages of Jharkhand State, India

AND

Insight into the CSR Activities of Tata Motors, Jamshedpur.

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What is TISES…

The Tata Group of companies have a number of policies driving community development with the aim of improving the quality of life and the environment surrounding Tata industries. The **Tata International Social Entrepreneurship Scheme** (TISES) was set-up by a collaboration between Tata and the Judge Business School at the University of Cambridge. The scheme aims to give students experience of living in India while at the same time allowing them to work on a social entrepreneurship project within a Tata company in India. People from diverse educational backgrounds were selected to add a fresh perspective on important development issues.

Some of my favourite pictures…

Photos 1: *Some of my favourite photos from my time in India:*
Column 1:
Top: *Jagdish Soren, Bee-keeper (See Appendix D).*
Middle: *Myself, Nishi Scrivastava and her family.*
Bottom*: Myself and the other TISES interns in Bombay House, Mumbai.*
Column 2:
Top: *A young girl with mindi at a workshop for teenage girls.*
Bottom: *Staff at Community Services Division, Tata Motors, Jamshedpur.*
Column 3:
Top: *Two girls showing me their dancing skills at a leprosy colony school.*
Middle: *Nishi judging a hair competition.*
Bottom: *Myself and fellow interns in Jamshedpur: Andrew Panton and Sian Herschel.*

Summary

I was posted to the Community Services Division (CSD) of Tata Motors, Jamshedpur in the state of Jharkhand, in the North Eastern region of India. Two aspects are presented in this report: First of all, in Section 1, an impact assessment of water management structures in two different tribal villages in the outskirts of Jamshedpur. CSD not only works with tribal villages but also in the local vicinity of Tata Motors in many projects such as schools and healthcare. Throughout TISES I was exposed to the majority of Tata Motors's corporate social responsibility (CSR) activities. A summary is presented in Section 2 alongside my most prominent thoughts and views. Throughout my time in Jamshedpur I met many inspiring and motivated people including Mr. Jagannath Deogam, Mr Jagdish Soren and Mr Jugeshwar Singh who's case studies are presented in appendices at the end of this report. My personal statement and acknowledgements are also included at the end.

The impact assessment focused on two types of irrigation structures: lift irrigation and rainwater harvesting in the tribal villages of Kanikola and Jaskhandih, respectively, located in the outskirts of Jamshedpur. The study was carried out via participatory rural appraisal (PRA), structured questionnaires and semi-structured interviews. In this report impact is discussed in terms of the agricultural, environmental, economic, social and lifestyle changes.

The early-stage impact assessment of the irrigation structures concluded that, in general, income level has been raised due to greater crop yield and the ability to grow a greater variety of crops, which, can subsequently be sold at market. Due to the rise in income level the villagers aim to enhance their standard of living through education and better diet hence, better health. In the future villagers aim expand their irrigation structures allowing larger scale cultivation. Villagers also aspire to create bore wells in their village however I would advise against this as it is would be detrimental to the currently rapidly depleting groundwater level of the earth. Alternative suggestion could be to explore other irrigation schemes such as drip irrigation

An article….

I went to India not really knowing what to expect but if I think about it, I expected to see the extreme poverty as normally conveyed in the UK media. The area in which I was posted allowed me to observe the life of tribal villagers. My impression was of an overall contented but basic lifestyle. Currently, the main problem of the villagers is the lack of water, especially this year due to a lack of monsoon rain. A number of aspect of village life could be improved upon, many of which I think are well summarised in the following article from the Hindustan Times published on 10th September 2009.

Alive to living reality

A foreign delegation, asked to list takeaways from a visit to a village, spoke of basic things than can improve life. But, we overlook these. We have to make ourselves problem identifiers, not overlookers. We need to regularly encourage external audits and be willing to listen, with courage to take criticism

Empowerment

KIRAN BEDI

"What are you takeaways?" I asked this question from a foreign delegation of rural and regional leaders visiting India on a rural leadership programme.

They were travelling to various places, visiting villages, understanding community development projects and allied programmes. The objective was to give an opportunity for personal growth, development of skills, knowledge and networks needed to be effective in regional, state, national and international arenas.

If I had asked this expert group as to what they saw in the development projects, I believe I would have heard some praise or adulation; some deserved and some not really.

But that was not what I had in mind. I was keen to know what it was that they saw which had impacted them, from a rural area I knew they had visited. What was their 'takeaway' which would remain with them.

I urged them to be frank for this would help us in our training modules.

Here are the observations:

- There is a lot of land but of no use (land wastage)
- A lot of garbage was lying there. People were not using any pit for throwing it. There was no separate pit for throwing the bio-degradable waste The cardboards were lying around when they could have been in manure making pits
- Ladies were fetching water, while water was spilling all over (water wastage)
- Men were seen playing cards during the day, or just smoking away long pipes, when women were fully at work
- Small things matter a lot. Roofs are not oriented for rain water harvesting. This wastes a lot of rain water, which can be used for useful purposes
- Corns in fields are malnourished, lacked nutrients
- The reason for malnourishment can be the weeds which ingest nutrients from the soil
- Removal of weeds can help in regaining the nutrient value of corns. There appeared to be effort visible in de-weeding.
- Women carry fodder from the fields. They should allow cattle to graze in fields which will help in increasing milk productivity. This is because cattle grazing benefits plant bio-diversity
- Grazing also destroys the pests and their life-cycles by the hoofed feet of cattle
- There is no community garden where the less skilled men or women can be trained for growing plants. This can be practical training
- There should be a "village award" for the person who adopts better or improved agricultural practices
- There can be sharing of agricultural technologies for improving manure, better plantation, rain water harvesting system
- Being a patriarchal society, womenfolk seemed overconcerned about the male members of the family

I posed another question, "Would you like to do something about this?"

The reply was, "We would like to help by volunteering in education, which will help in improving agricultural practices. We would like to return to villages and work with some of them."

After hearing them, the group decided to mutually put together a small project for a model village, which provides for quality agricultural training programmes.

I thought for myself how on our visits to villages we overlook these basics and let these be. We do not create movements to educate rural inhabitants who live hand to mouth, women as workers, men as masters.

So much for our panchayats, now being moved towards 50% reservation for women. Who will make them aware of so many inadequacies?

Our agriculture products are as weak, as the women are. Weak women give birth to weak children, which further weaken the health and capacity of society. Weak agricultural growth similarly weakens the entire economy of the country.

It's a cycle — which is not really understood with the concern it demands. These are the areas for us to work on as individuals, organised civil society, the government agencies, the panchayats, the education system and most of all, our media, particularly the radio and the visual media with its vast reach.

The way forward is to make ourselves problem identifiers and not problem overlookers! We need to regularly encourage external audits and be willing to listen to the observations with courage to take criticism.

Training and education are the keys in all respects. The methodology can be conventional or otherwise. But the innovative practices must continue to be explored for regular learning and improvement.

The habit of feedback is a worthwhile practice to inculcate at all levels. For, it provides an opportunity for a new awareness and consent renewal.

This sharing could be your takeaway.

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Impact Assessment of Lift Irrigation and Rainwater Harvesting in the Tribal Villages of Jharkhand State, India

1.1 Introduction

Water scarcity is a huge problem for a country such as India [Kelkar, 2008, James, 2005, Bouma, 2007, Kumar, 2007, Mall, 2006] which relies on monsoon weather for a large majority of its cultivation practices. As weather patterns become increasing erratic with time, most likely due to global warming, being prepared for water shortage in the future is essential. Communities greatly affected by water scarcity are the tribal villages of Jharkhand state [Subramania, 2008]. These tribal villages are mainly self-sustained in their living habits and rely heavily on the paddy crop for survival (see Photo 2 for a photograph of a typical paddy field). It is becoming increasingly difficult to maintain tribal lifestyle due to the unknown weather patterns emerging over time and with pressure from society to raise standard of living in terms of health and education [Kerr, 2002]. It is now well known that when times get tough for villagers there tends to be migration from villages to cities to seek employment. This can cause over-crowding in cities and form a less satisfying environment in which to live. It is therefore important to maintain an acceptable standard of living in villages to reduce the likelihood of migration into cities. This can be achieved by ensuring there are sufficient crops to feed villagers and to sell at market to allow income generation.

Photo 2: *A typical paddy field in the East Singhbum district of Jharkhand state.*

Irrigation is now essential in many areas of the world to harness sufficient fresh water supply for the successful growth of crops, in particular paddy which is extremely water intensive. In India, numerous forms of irrigation have been used for centuries [Vermilliotn, 1997]. Here, the impact of lift irrigation and rainwater harvesting [Samuel, 2008] in the form of ponds which occupy 5% of a field are investigated. Two tribal villages in the Jharkhand state of India were chosen for the study: Konikula and Jaskhandih, on the outskirts of Jamshedpur in the north east of India. These villages come under the project area of Gram Vikas Kendra (GVK), the integrated rural development office under the community services division of Tata Motors. In both villages, the irrigation projects were initiated one year ago. The impact study is therefore in its early stages, hence the long-term benefits or failings of the irrigation systems can not, yet be fully determined. The studies were carried out via participatory rural appraisal (PRA) [Chambers, 1994], questionnaires and semi-structured interviews [Maskey, 1996]. The findings are qualitative and are presented in terms of agricultural, environmental, economic, lifestyle and social impact.

This section begins by presenting the background information of the villages under study and an overview of the irrigation techniques employed; lift

irrigation and 5% pond structures for rain water harvesting. The methodology of the study and results and discussion of the impact study then follow.

1.2 Background Information

1.2.1 Village Profile

Two tribal villages form the main foci of the study: Konikula [Gram Vikas Kendra Proposal] and Jaskhandih,. Another village, Dorkasai is also discussed to make comparison to a village without an irrigation structure. The village of Dorkasai is not tribal. The villages are located in the East Singbhum district of Jharkhand state just slightly south east of Jamshedpur as shown in Fig. 1. The population land statistics are presented in Table 1.

Figure 1: *Map of Jamshedpur and surrounding region. The locations of Konikula, Jaskhandih, and Dorksai are annotated. (Map courtesy of Google Maps).*

Parameter		Village			Unit
		Konikula	Jaskandih	Dorkasai	
Number of households		89	215	154	houses
Population		417	1118	804	people
Land	Cultivable	235	400	400	acres
	Irrigated land	235	25	25	
	Non-irrigated land	0	1075	1075	
	Wasteland	0	700	700	
	Other	0	0	0	
Tribe or cast		Santhal tribe	Ho tribe	Mahato cast	

Table 1: *Village statistics for the villages of Kanikola, Jaskhandih, and Dorkasai*

Traditional village or tribal lifestyle dates back to the Neolithic revolution, around 10,000 BC (i.e. 12,009 years ago), when humans stopped a "hunter and gatherer " existence to begin cultivation and settle in one place [Roshen, 2003]. Photos 3 show just how unique tribal lifestyle is: houses are, in general made of mud sometimes with a thatched roof but most commonly with a tiled roof. Living facilities are basic, clean and tidy. Villagers make their own fuel, Kala Gola, by mixing mud and coal powder and then leave it out in the sun to dry. Their lifestyle is very in tune with nature, for example mud utensils are used in cooking practices. The tribal communities are not immune to advancements in technology: electricity is found in the home alongside mobile phones and TVs. Village schools are simple where children of multiple stages are taught in the same class. Some villages may also have a poultry farm as an industry.

There are a number of tribal denominations within India. Table 1 includes the specific tribes of the villages in this study. The total tribal population of Jharkhand was last counted to be 580,1547 [Commission of India, 2001]. Kanikola is of the Santhal tribes men who form 32.52 % of the total tribal population of Jharkhand [Commission of India, 2001]. The Santhali are God-fearing and have boundless faith in Merghbo (Mountain) the ominescient, supreme Santhali God. The most sacred centre of Santhal village is jakesham where the village priest or the Nake Soleminzer perform religious ceremonies. Farming, animal rearing and collection of minor forest produce are the chief occupations.

Photos 3: *Photographs depicting life in a tribal village:*
Column 1:
Top: *Courtyard of a tribal village house. In general, tribal houses are made of mud.*
Middle: *A typical tribal kitchen.*
Bottom*: A typical village bed called a khatia.*
Column 2:
Middle: *Kala Gola fuel left out to dry in the sun. The fuel is made of mud a coal powder.*
Middle: *Typical tribal drums, mandar.*
Column 3:
Top: *A typical village school.*
Bottom: *A village chicken farm.*

The villagers in Jaskhandih are Ho people. The name "Ho" evolved from the word "Horo" meaning human. The Ho village is ruled over by traditional administrator called "Hatu Munda" (village headman). The social organisation of the community is based on "Munda-Maki" system that presides over 10 to 12 "Hatu Murdas". The Ho tribe was last counted to make up 9.24% of the total tribal population of Jarkhand [Commission of India, 2001].

1.2.2 Irrigation

1.2.2.1 Lift Irrigation

Lift irrigation is based around a concept to lift water from a lower point, most commonly a river to a higher point of land where it is the guided to irrigate the required are of land. The main reason behind the need for lift irrigation is due to poor distribution of water rather than the lack of water. Water is lifted by means of a pump from the source of water to the main delivery chamber situated at the top most point in the command area. Water is distributed via channels where the water falls due to gravity. Photos 4 depicts the lift irrigation system in the village of Kanikola. The top left photo od Photos 4 shows the pump house and river (the Subarnarekha River). The pipeline in shown in the top right image of Photos 4 is employed to contain water being pumped up-hill from the pump house (see bottom left photo of Photos 4) to the distribution point in the bottom right photo in Photos 4 for subsequent distribution to fields.

Photos 4: *Lift irrigation system in the village of Kanikola.*
Column 1:
Top: *The Subarnarekha river and pump house*
Bottom*: Pipeline employed to contain water from pump house to distribution point*
Column 2:
Top: *Up-hill view point from pump house up to distribution point.*
Bottom: *Lift irrigation distribution point.*

Lift irrigation is particularly useful in cases where water cannot be provided to a field where at a higher point than the most available water source. In this case, water is required to be lifted at a convenient higher spot from which it can be supplied to the fields under command. To implement the lift irrigation technical knowledge and assistance is required.

The lift irrigation set-up in Kanikola is operated as follows: one person is appointed by election to manage the lift irrigation system in terms of maintenance and running. Villagers are charged 10 Rs per hour for use of the pump and the individual user must provide the oil required to run the pump which costs approximately 38-40 Rs per litre. Villagers hold a meeting 2-3 times a month to decide when the pump is used and who by, a system which the villagers say works well and no conflict arises.

1.2.2.2 Pond structures

To harvest rain and save paddy crops from frequent failure a portion of farmland can be left aside for rainwater harvesting, holding back rainwater in the land itself. In Jaskhandih, 5% of land has been set-aside for this purpose. The main objective of this 5% model is to ensure that all small land holdings have their own water body for harvesting rain. Photo 5 shows a typical pond structure in Jaskhandih. The ponds are normally 10x5x5 m. An added benefit of pond structures is the opportunity for pisci-culture allowing fish to be kept, hence adding potential for income generation and an added source of food for the villagers. In Jaskhandih, it cost around 3540 Rs to dig one pond which includes the employment of labourers and diggers over a period of 3 to 4 days.

Photo 5: *A pond in the village of Jaskhandih.*

1.3 Methodology

In order to understand the impact of the new irrigation structures in the villages of Kanikola and Jaskhandih an impact assessment was performed via the following techniques:

- Semi-structured interviews and questionnaires [Asia Forest Network, 2002] were carried out in both Kanikola and Jaskhandih. The structured questionnaire is presented in Appendix A alongside a list of the village beneficiaries who participated in the questionnaires. Following on from the questionnaires semi-structured interviews were carried out. Other beneficiaries who participated in the group discussions are also listed. In Kanikola 4 beneficiaries were interviewed and in Jaskhandih, 5 beneficiaries were interviewed. If time permitted a greater number of people would have been interviewed to obtain more quantitative data.
- Participatory rural appraisal (PRA) also provided key information in the study of the Kanikola. PRA [Chamber, 1994, Asia Forest Network, 2002] is a concept which aims to provoke discussion within local communities to express, enhance, share and analyse knowledge of village life and conditions. The purpose of which can be to identify the needs and issues of a community. In this case, PRA was used to study the impact of lift irrigation in the village of Kanikola. PRA can consist of a variety of exercises including, for example, social mapping, preference ranking or historical transect. Here semi-structured

discussion alongside social and resource mapping and a preference ranking exercise based around different crops was employed. Around 30 to 40 villagers were present when the PRA exercise took place in Kanikola.

The impact assessment also allowed identification of improvements which could be made to the existing irrigation practices and hopes for the future of the villagers. Under normal circumstances, PRA is carried out over an extended period of time allowing the researcher to build up a strong rapport with the community of interest. In this study, time was limited to a period of two months, therefore limiting the relationship that could be made between myself and the community. Under the circumstances it was possible to carry out a number of exercises due to the strong relationship between GVK staff members such as Sandeep Kumar and R.P. Gupta. Appendix B summarises some exercises which could be carried out in a PRA and also lists the some information I was eager to find out from villagers. In PRA, the conversation determines the path of information sharing, therefore the list presented in Appendix B does not represent exactly what was discussed, it only gives an outline of what I initially thought I would like to know from the village people. Photos 6 depict some of the PRA study alongside some pictures of getting to know the villagers and having fun with them. For example I danced and shared local village music with the villagers.

Photos 6: *PRA study in the village of Kanikola.*
Column 1:
Top: *Group of villagers congregating for the PRA study.*
2nd row: *A villager, Dasmat drawing a map of the village and myself taking notes.*
3rd row: *Sandeep Kumar acting as a translator during the PRA discussion.*
Bottom*: Preference ranking exercise with pebbles.*
Column 2:
Middle: *XLRI students dancing with the villagers after the PRA exercise.*
2nd row: *Sandeep Kumar drumming with the villagers after the PRA exercise.*
3rd row: *A group of villagers who carried out the structured questionnaire.*
Bottom: *Myself, XLRI students and villagers of Kanikola.*
Column 3:
Top: *A village fishing net.*
2nd row: *Tradiational village ploughs.*
3rd row: *Iron ore.*
Bottom: *A newly created pond structure in the village.*

1.4 Results and Discussion

Impact was assessed in terms of agricultural, economic, social and lifestyle changes. To begin with I present two of the PRA exercises; social and resource mapping and one preference ranking exercise carried out in the village of Kanikola. This is followed by presentation of the main findings in Table 3 with subsequent discussion for each village.

1.4.1 Social and Resource Mapping exercise in Kanikola

Social and resource mapping is an exercise in which the villagers drew a map of their village while, at the same time, provoking discussion on a number of topics. This mapped out the village giving information on population, number of households, the geography, the infrastructure and resources. Figure 2 a) is a photograph of the map drawn by the villagers alongside a schematic reproduction in Fig. 2 b).

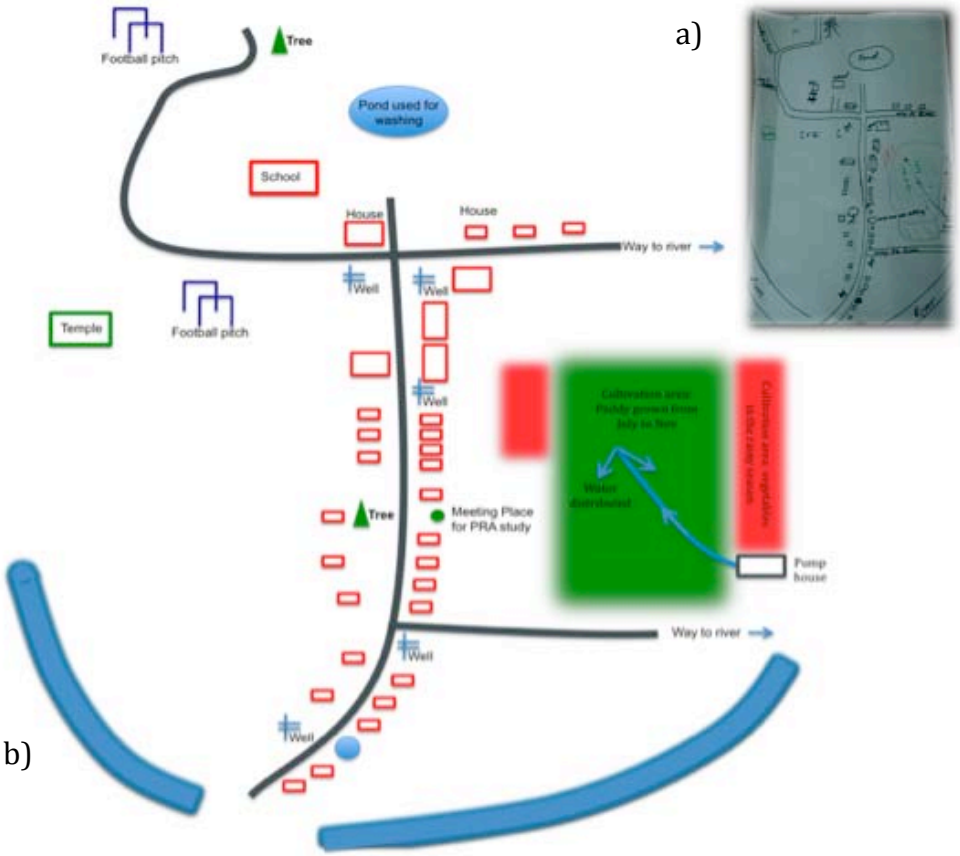

Figure 2: *Social and resource mapping.*

a. Photograph of the social and resource map of Kanikola village drawn by a villager.

b. Reproduction of the social and resource map.

1.4.2 Preference Ranking

Preference ranking was performed with respect to food [Asia Forest Network, 2002]. This process allowed discussion of the importance of a crop in the village and why importance may have changed due to the implementation of irrigation. The main

points noted from this was that greater preference is given to crops which will be sold for more at market rather than a crop which will be enjoyed more by the villagers. The resulting preferences are listed in Table 2 where a preference of 10, marks a high preference. It can be seen that preference of rice is lower after the introduction of irrigation, this is most likely due to a now greater of variety of crops available. Also, interestingly, the crop required for making the local alcoholic drink is now lower in preference. The villagers believe this is due to better education at schools of the detrimental effects of alcohol. Finding out about the alcohol habits of the village presents a good illustration of how preference ranking in PRA opens up discussion of topics out-with crop production.

Crop	Before	After
Fish	10	10
Rice	10	7
Tomatoes	2	6
Ladies finger	2	6
Bottle Gourd	3	5
Wheat	1	5
Corn	4	4
Potato	7	4
Brinjal (Aubergine)	3	4
Repree	3	4
Fruits	5	4
Alcohol crop	6	3
Rice beer	8	3
Full gram	3	1

Table 2: *Preference ranking of crops for the village of Kanikola*

1.4.3 Impact Summary

Table 3 summarises impact of the irrigation structures in both villages, Kanikola and Jaskhandih in terms of agricultural, economic and social impact.

	Kanikola	Jaskhandih
Irrigation	Lift Irrigation	Pond Structure
Farming Practices	Manmade irrigation did not exist in Kanikola previous to the lift irrigation system. Although there is a river nearby manpower alone was not sufficient carry water for irrigation required hence the need for lift irrigation.	Due to the pond structures alternative transplanting method of paddy was employed rather than broadcasting. Area of cultivable land has increased (see Table 4).

	The planting style of paddy was changed from broadcasting to a more efficient technique called transplanting. This technique is likely to achieve a greater yield than the previously employed, broadcasting method. Area of cultivable land has increased (see Table 4). In some households people from outside the village are employed to work on the fields hence creating employment and further income generation for not just their own community.	
Growing Season	Before the irrigation system was introduced the growing season was just during the rainy season, i.e. June to September. Vegetables could only be harvested around 10 days/year before lift irrigation. Now, however, crops can be grown all year round.	Previous to the pond structure, the growing season was just the rainy season. Now however the growing season is all year round as vegetables can be grown in 10 months of the year. In previous years, paddy may have been lost between the first and second rain due lack of rainfall. Now, the water saved in the ponds can be employed to top up the paddy water and therefore loss of paddy is unlikely as long as there is sufficient water in the ponds.
Crops grown	The type and yield of crops allowed to grow have increased significantly. The basic crops which used to be grown were rice, potatoes, brinjal (aubergine), repree, fruits (e.g. mango, jamoon). The crops which are now grown include paddy, tomatoes, ladies finger, bottle guard, wheat, brinjal (aubergine), repree, full gram. Less fruit is grown as the fruit trees have been chopped down to make way for farmland. Crop yield has increased by around 3 fold.	Previous to the pond structure, paddy was the only crop grown. Now, vegetables can also be grown such as Thurso, pisparo, ladies finger, maize.
Environmental	Soil moisture has improved.	Soil moisture has improved and underground water

		level has increased therefore better access to drink water from the wells.
Annual Income	Average annual income increased (see Table 4) .The main reason being, greater crop yield to be sold at market. Preference of crops grown is given to ones which have a higher value at market. Manual labour also brings in extra income and is carried out by members of the family who do not work in the fields.	Previous to the pond structure all the paddy crop was kept for consumption by the family. Vegetables are now sold at market therefore increasing the annual income of a village family (see Table 4). Some vegetables are sold at market. Ladies finger sells for 15-20 R/kg. Many villagers sell their vegetable to other villagers rather than taking them to market. In particular, one villager Mr Jagannath Deogam (see Appendix C) owns a shop. Last year the income was 4000 Rs. This year, 5000 Rs. Mr Deogam does not think that this change in income is related to the new pond structures.
Expenditure	The community is currently unsure what to do with the extra income generated. Each household have opened a bank account and will save the money until they know what to do with it. In the future a possibility would be to buy more land. Some extra income is now used to purchase more food from the market. Their BPL (Below Poverty Line) card can be used to obtain discounts at market and it is used more now in comparison to before	The extra income is currently saved and it is hoped that it will be spent on the children's education.
Loans	Loans have never been taken out.	In the past a loan has been taken out to buy fertilizer. This year, this has not be necessary.

		Most family's have never take out a loan.
Migration for work/ manual labour	Manual labour is carried out by members of the family who do not work on the land. Typically, 8 hrs/day. Due to the close proximity of Kanikola to Jamshedpur manual labour is accessible on a daily commute so villagers do not need to migrate from their village to find work. The number of hours of manual labour carried out since the introduction of the irrigation system has not changed.	Migration for work has not been necessary in the Deogam family. Manual labour time has not changed but is still carried out. It is probably too early to tell the effect of this.
Employment	Due to the irrigation system, the village now employ people from other villages to work in their fields. Women are paid 40 Rs/day which involves weeding, fertilisation, planting. Men are paid 50 Rs/day for jobs that are more physically intensive such as ploughing.	
Culture and traditions	Culture and traditions have not been affected.	Culture and traditions have not been affected.
Health	As yet, health implications have not been observed. The villagers expect health to improve as they have more income to buy better food, e.g. apples. This summer, there have not been as many illnesses which could be due to a change in weather conditions where monsoon rains have not been as severe as usual.	As yet, health implications have not been observed.
Education	Children used to study until 10th class. Now, they study until at least 12th class. There is one primary school in the village, Assamani. For secondary school or college, children can either go to Jamshedpur or Gaharhuter. The added extra income has made this possible however, income is	There is now more money to send the children to school. The aim is to send children to school until they are at least 17. The ability to send the child to school until this age is due to the extra income earned through cultivation.

	still not sufficient for further study after 12th grade. It is thought that if further education opportunities were available the villagers would take up the opportunity	
Social status	The social status of the village has increased as other village communities now come to Kanikola to ask for advice on irrigation and farming practises.	Other villages now have more respect for the village of Jaskhandih due to the success of the pond structure. Other villages are keen to learn about carrying out similar projects in their village.
Diet	There is more variety in diet as new crops are grown such as wheat. Rice is the favourite and most important crop. Alcohol consumption has decreased due to better education with respect to understanding priorities in life and education.	More variety in their diet

Table 3: *Impact table for irrigation structures introduced to the villages of Kanikola and Jaskhandih.*

Village	Cultivable area before irrigation	Cultivable area after irrigation	Income before irrigation	Income after irrigation
Kanikola	3.125 acres	6.1 acres	13,750 Rs	22,500 Rs
Jaskhandih	4.5 acres	5.5 acres	7,250 Rs	18,250 Rs

Table 4: *Impact on cultivable area and income in the villages of Kanikola and Jaskhandih due to the introduction of irrigation.*

1.4.4 Kanikola Discussion

Photos 7: *Photographs depicting the impact of irrigation in the village of Kanikola.*
Column 1:
Top: *Kanikola Paddy fields.*
Bottom*: Vegetables grown in Kanikola.*
Column 2: *A tribal villager surrounded by vegetables grown in Kanikola.*

The majority of the information gained in Kanikola village was via PRA and 5 questionnaires (see appendix A for the names of the beneficiaries questioned). The main impacts of the irrigation system was found to be the extension of the growing season in that vegetables can be grown all year round – thus increasing family income by selling vegetables at market. Another major impact is the increase in cultivable land and hence income. It emerged that the villagers were currently unsure as to what they should do with their extra income. I would suggest that the villagers invest the money somehow. CSD could provide the villagers with information on how to do this.

The villagers of Kanikola hope that, in the future they will be able to develop a second lift irrigation system. In asking how they expect fund another irrigation structure, it emerged that they hoped GVK would fund this. It would be my suggestion that they find alternative sources of funding or use their extra income and save to build a lift irrigation system for the future.

1.4.5 Jaskhandih Discussion

Photos 8: *Photographs from the village of Jaskhandih:*
Column 1:
Top: *Pond structure and Jagannath Deogam.*
2nd row: *The villagers of Jaskindhi, Dr Helen Haugh and myself.*
3rd row*: A semi-structured interview with Mrs Deogam.*
Bottom: *Munniram, a farmer in Jaskindhi whom I interviewed.*
Column 2:
Top: *A picturesque scene in the garden of the Deogam family home.*
Bottom:*. Jagannath Deogam walking through his paddy field.*
Column 3:
Top: *Three member of the Deogam family.*
Bottom: *A villager of Jaskhandih using a machine to obtain rice from paddy.*

The impacts of pond structures in Jaskhandih were similar to the impact of lift irrigation in Kanikola. Key to the success of the pond structure initiatives is a man called Mr. Jagannath Deogam (see Appendix C) with whom I had much interaction and very much enjoyed talking to. Jagannath taught me about his village while at the same time showed great interest in my country and held a very open mind to new ideas.

Jagannath mentioned he would like to change the mindset of people in the village. He believes that superstition should be abandoned for more scientific fundamental understandings. For example, crops grow because of water not because of a ritual that was carried out. It was also apparent that many villagers are not opened minded to introducing pond structures in the village as it takes away from cultivation area. This is slowly changing as people can now see the positive impact the pond structures have made so far.

In Jaskhandih it seemed certain that the villagers aspired to spend their extra income to educate their children. When asked: “What improvements can you envisage in the current cultivation or irrigation system?”. The villagers said they would like to have more vegetable farming. This would allow them to sell more at market and therefore raise their income.

In Jaskhandih it emerged that a hope for the future would be to have a borehole well to access groundwater supply. However, I would advise against this as it would be environmentally detrimental [Changon, 1998, Garrido, 2006, Rodell, 2009]. -It has been observed globally that groundwater level is rapidly decreasing with time as it takes much longer to replenish groundwater. This would lead to further lack of fresh drinking water for communities. It is much better to harvest rainwater hence maintaining top soil moisture.

While speaking to the villagers, I found them to be very content people. The main problem this year (2009) has been the lack of monsoon rain, however the lift irrigation and pond structures have enabled them to keep paddy crops going. The villagers seem to have no debt problem and have access to manual labour in nearby Jamshedpur when required.

1.5 Dorkasai

A semi-structured interview was carried out in the village of Dorkasai to understand what life could be like in a village where no irrigation structure exists (see Photo 9 for a photograph of some villagers from Dorkasai). This year, due to lack of sufficient monsoon rain, paddy has not been grown. The villagers have therefore had to reply on manual labour jobs to maintain a living. A significant difference in the attitude of the villagers could be observed. This may have been due to their lack of contentment in not being able to cultivate this year.

Photo 9: *Dorkasai villagers*

1.6 Personal viewpoint of Impact study

I really enjoyed getting to know the villagers and wish I had the time to get to know them better. It proved difficult to obtain meetings with the villagers during monsoon season, as this is the busiest period of time in the fields and at home with festival celebrations. If time permitted, many of the other PRA exercises in Appendix B could have been carried out for a more in depth study. Also, more questionnaires could have been conducted to obtain more quantitative data. While carrying out my study I came up against much frustration in trying to find out how the villagers expected to will deal with water scarcity in years to come. The main barrier in communication came in translation in which, I think a huge amount of information was lost and conversation stifled.

1.7 Conclusion

The main impacts observed due to the introduction of irrigation in both Kanikola and Jaskhandih were a rise in cultivable area and hence a rise in annual income due to the ability to sell more crops. Both villages have aspirations to expand or add new irrigation structures. It would be useful for GVK to advise the villagers on how they can find their own funding to carry this out. On the whole, both villages exhibited a contented lifestyle.

2

Insight into the Corporate Social Responsibility Activities of Tata Motors, Jamshedpur

2.1 Introduction

Tata Motors undertake a variety of initiatives to support and improve the communities in its vicinity, by promoting health, education, environment and economic self-sustenance. In Jamshedpur, initiatives are also in place to improve the quality of life in its adjoining rural areas. The Community Services Division (CSD) of Tata Motors consists of five sections with the following responsibilities.

- **Gram Vikas Kendra (GVK):** integrated rural development. The water management project presented in this report was run under the GVK group.
- **Parivar Kalyan Sansthan (PKS):** health care
- **Shiksha Prasar Kendra (SPK):** education
- **Nav Jagrat Manav Samaj (NJMS):** leprosy

A recently published report [Tata Report] describes the activities of each in detail. Here I will give a brief summary of some activities followed by photographs depicting the many visits I was privileged enough to make.

Programmes for economic fostering economic, social and environmental improvements of the villages such as self-initiated cottage industries, sericulture, community and social forestry, drinking water projects, road projects, pulse polio drives, family planning, sanitation projects, plantation projects and self-employed training to name but a few. CSD also supports other agencies such as START, a centre of adult disabled, Asha Kiran School and Mahila Sharan.

2.2 Education

Providing children with a happy and safe environment to grow up in is essential to ensuring stability of the world for generations to come. Photos 10 depicts the three very different schools I visited: Ahsa Kiran school for disabled children, Hill Top School, an English medium school, and a school for the children of leprosy sufferers.

Asha Kiran school was the first CSD visit I made in Jamshedpur in which I had to learn about being the centre of attention and develop my idea of the purpose of me visiting the CSR activities of Tata Motors. At first I was uncertain as to my purpose or what I could contribute as a visitor. In the end, I chose my purpose to share my culture with the children, and open their eyes to other aspects of the world and also for me to learn about their life and in general what children are like. I have much respect for the parents and teachers who have brought the wonderful children I met to be very polite and respectful.

I was surprised to find that in India there is a huge emphasis on being competitive and there is great pressure on children to become scientists, engineers or doctors. I think it is excellent to drive children in such a direction if they are interested. However I think it could prove to be detrimental for children who are not interested in these core subjects or style of learning. From visiting Hill Top School, the English Medium school I could see many similarities with education in the UK.

Leprosy is an illness of the past, however there is still a social stigma attached to the disease resulting in exclusion of leprosy suffers and their children from mainstream activities such as schooling. NJMS is successfully working towards eradicating this negative social attitude. My most memorable time from TISES was my visit to this school where children sang, danced and recited poems for me. I enjoyed telling them about where I was from and it was a privilege for me to be, in many cases, the first foreigner the children had ever met.

From my visits to these schools it was evident to me that children are the same world over: they love to learn and they love to play no matter where they are from. I hope the negative social stigma attached to leprosy dies soon.

Photos 10: *Schools in Jamshedpur:*
Column 1: *Asha Kiran School (SPK)*
Top: *dance class,*
Middle: *two young deaf boys who gave me their paintings and*
Bottom: *a class for deaf children.*
Column 2: *Hill Top School (SPK)*
Top: *computer class*
Middle: *primary class*
Bottom: *secondary class*
Column 3: *School for the children of leprosy sufferers (NJMS)*
Top: *A young boy performing for me,*
Middle: *a young girl performing for a song for me*
Bottom: *the leprosy community surrounding the school.*

I also particularly enjoyed visiting workshops run by SPK to teach young girls about dressing in a sari, mindi, hair dressing, make-up application and knitting. There was a wonderful atmosphere where I could see the girls were having fun and making new friends. I was lucky enough to have a young girl apply henna to my arm.

Photos 11: *Workshop for teenage girls.*
Column 1:
Top: *Girls taking a break from a workshop*
Middle: *Knitting class.*
Bottom: *Kolam picture.*
Column 2:
Middle: *Hair competition.*
Middle: *Knitting.*
Column 3:
Top: *Application of henna.*
Middle: *Mendi competition judging session.*
Bottom: *Kolam picture.*

I would like to thank Nishi Srivastava (Photo 12) for introducing me to the activities mentioned in this section and many more.

Photo 12: *Nishi Srivastava*

2.2.1 A Business Opportunity?

I also visited a pre-school, Little Angel School. From my visit there it was clear that they need more money to keep the school running. As I understood, Little Angel School is very different to an average Indian School: emphasis is made on adapting education to a child's personality, encouraging play and creativity. I was impressed to see that staff made all the toys (see Photos 13). As the school is short of money, I enquired weather or not they sell the toys or not. As it stands they do not but they would like however, they lack the business knowledge to carry out such a venture. If possible it could be useful for CSD to advise Little Angel School on how to sell their beautiful products.

Photos 13: *Little Angel School*
Column 1:
Top: *The head-mistress of Little Angel School*
Middle: *Applique textile picture made by the teachers of Little Angel School.*
Bottom: *A teacher showing me an applique textile picture of an elephant.*
Column 2:
Top: *Teachers at the school.*
Middle:*.Puppet theatre.*
Bottom: *Applique textile picture book.*

2.3 Agriculture

GVK run a strong plantations project images from which are depicted in Photos 14. Employees are also encouraged on a Sunday to go out and plant trees on a Sunday. I think this is a wonderful scheme, primarily for the environment but also for providing a fun, family relationships.

Photos 14: *Plantation project.*
Column 1:
Top: *Myself helping to weed sapplings to be ready for plantation.*
Bottom: *Villagers digging ready for plantation*
Column 2:
Top: *Plot of land ready for plantation of saplings*
Bottom: *A fully grown plantation spot.*

GVK also run agricultural development centre, some photos of the work done in the centre are shown in Photos 15. Many new cultivation techniques have been tried and tested here such as novel paddy cultivation techniques to obtain higher yields, mushrooms growing and the growth of potential new crops, which may be suitable for growth in the Jamshedpur region. Another successful project include “wormy compost” which is now sold in Jamshedpur.

Photos 15: *Agricultural centre.*
Column 1:
Top: *Experts at the agricultural centre.*
Bottom: *Wormy compost.*
Column 2:
Top: *Mushroom growing stacks.*
Bottom: *Saplings.*

2.4 Personal Viewpoint of my Visits

I greatly enjoyed my visits to all the CSR activities of Tata Motors. I felt extremely privileged to be, in many cases, the first foreigner some individuals had ever talked to – most importantly children.

3

Conclusion

An impact study of two different types of irrigation structures: lift irrigation and rainwater harvesting in the tribal villages of Kanikola and Jaskhandih respectively, located in the outskirts of Jamshedpur in India was carried out. The study was carried out via participatory rural appraisal (PRA), structured questionnaires and semi-structured interviews. Impact was qualitatively assessed in terms of agricultural, economic, lifestyle and social impact. One year on from implementation, this early-stage impact study concluded that income level has risen due to greater crop yield and the ability to grow a greater variety of crops, which, can subsequently be sold at market. A challenge encountered for GVK in project implementation was, in some cases, that villagers were not open to adopting a new technique – in particular in the 5% rainwater-harvesting model as the pond structures would take away from cultivable area. Now, one year on, many farmers can see the positive impact of the ponds and the farmers who were not open to such irrigation structures previously, now are. In this case, it became evident that a strong and open-minded leader to guide villagers is crucial in reaping the benefits of a new project.

It was also clear that it is crucial to include villagers in every stage of implementing the irrigation structures so that they can become independent in maintaining the system and, in the future, implement irrigation projects for themselves. Teaching one village about irrigation has a knock-on effect whereby, one village can teach a neighbouring village about how irrigation can make a positive impact. A suggestion for an alternative source of irrigation could lie in the implementation of drip irrigation scheme whereby a water-saving technology enables slow and regular application of water directly to the roots of a plant through a network of economically designed plastic pipes and low discharge emitters.

I gained a tremendous amount from the TISES experience including social research skills, the opportunity to learn about Indian culture, most importantly about the work and family culture. Working in country other than my own allowed me to reflect upon my own country, the UK. Most prominently, I realised how much I appreciate my freedom in the UK. The freedom to go where I like from day to day and feel safe mainly in terms of the transport system and also in terms of being able to trust people. The strength of the British pound and the nature of the British passport has allowed me to travel more freely. Having access to a free education up until the age of 18 and also access to a free health care system in the UK has also provided me with great freedom in my life. With all this freedom, I recognize the responsibility to make the most of the opportunities I have – to make the most of my education, to take care of my well-being and my surrounding environment.

On returning to the UK there are many aspects of India I want to take with me: a more open and welcoming attitude to guests in country, more colourful attire and a better understanding of how the world works as a whole. I had a wonderful time in India and I can't wait to go back and explore the diverse and colourful country more!

APPENDIX A

Questionnaire

This questionnaire aims to understand the impact of a……irrigation system introduced to the village of…….……., near Jamshedpur, India.

General Information	
Name of Beneficiary	
Age	
Gender	
Main profession	
Main Source of income	
Household	
Number of family members (Adults/ children)	
Literate/ illiterate	

Agricultural Information		
	Before	After
Type of Crop grown		
Crop kept for the family of sold at market?		
Cultivable area		
Growing season		
Does conflict arise between past methods and timescales?		

Economic Information		
	Before	After
Annual Income		
What are the main reasons for the change in income, if any?		
Have loans ever been required?		
Migration for work?		
What gadgets do you own? E.g. Mobile phones, TV, bicycles...		
What was/ is money spent on? What do you hope to spend your extra income on, if any?		

Lifestyle Information			
		Before	After
Education	Number of children going to school and to what age		
Health	Dominant diseases and number of cases?		
Working Hours & on what	Woman		
	Man		
	Son(s)		
	Daughter(s)		
Has happiness of the family changed?			
Main problems of the village			
Have dynamics between villagers changed?			

Table of beneficiaries interviewed for questionnaire:

Village	Name	Age	Main Occupation
Kanikola	Jagdish Soren	44	Secretary of the irrigation system, farmer
	Dorga Mara	60	Farmer
	Baralam Baski	55	Farmer
	Bourdray Medi	35	Farmer
Jaskhandih	Jagannath Deogam	47	Farmer, shop keeper
	Munniram	52	Farmer
	Jagannath Deogam 2	55	Farmer
	Selai Samad	60	Farmer
	Baboola Samad	58	Farmer

Other beneficiaries who participated Jaskhandih discussions

Rahul Deogam	Usha Honhaga
Suraj Deogam	Tulsi Deogam
Sabrit Deogam	Sunil Deogam
Sarita Deogam	Nirso Deogam
Sarina Deogam	Gambi Deogam
Nandini Deogam	

APPENDIX B

Participatory Rural Appraisal (PRA) Exercises

In this work social and resource mapping, preference ranking and general discussion points were employed for the PRA study. If time permitted other exercises would have been employed such as a seasonal calendar and historical transect [Asia Forest Network, 2002]. The PRA discussion points are only a guideline as to what could be discussed if the point did not arise through the initial exercises.

Exercises employed in this work:

Social mapping

This will map out the village giving information on population, number of households. If the village already has a map drawn take a picture and let the villagers discuss around the map. See Table 1: Village profile.

Different castes/ tribes/ income level living on different areas of the village.

Resource Mapping

Map the rivers/ anything and any other natural resources important to the village. Map where lowland / upland lies.

Preference ranking

Preference ranking involves ranking a specific element of society in importance allowing for discussion and insight into how certain elements of village lifestyle may have changed.

Other exercises which could be employed:

Transect Walk

Walk through village, what you have seen on your left and right.

Seasonal Calendar/ Time line of a year:

Go through the growing seasons and describe the weather, what is grown and what volume. Also find out if there have been any marked differences in the growing season in the past years and what are the reasons.

Organisational chart

Illustrate organisational structure and individuals who contribute to the community. This can reflect indigenous organisations including village chiefs, council of elders, healers, water management organisations, and leader ship positions.

Historical Transect

Go through the history of the village and find out about important events. This exercise could help to identify successful and unsuccessful irrigation systems so that a new management system can avoid the same mistakes and promote the positive aspects endorsed by the community.

Draw from village elders for experience.
E.g. Weather. Land/ drought? Crop disease? Water availability?

PRA possible discussion points

1. How does the irrigation system/pond based irrigation work? How does it differ from past techniques

2. What is the cost of the irrigation system/ pond based irrigation system and how is it managed and funded? Financial cost to villagers – is this manageable?

3. If there are any problems how is that solved.

4. If there is lack of water – how is the water distributed.

5. Impact on Agricultural
    a. Crop volume and type, growing season
    b. Change in the food habits?
    c. Agricultural practice/ irrigation practice
    d. Land coverage: cultivable area
    e. Idle months – has the growing season changed?
    f. Could any new technologies assist in crop collection/ growth?
    g. Is the irrigation system sufficient for current needs?
    h. Future of crop growth?

6. Does conflict arise between past methods and current practice?
    a. Who can collect the harvest?
    b. Is there enough time to collect harvest?
    c. Have traditions been lost due to different harvest timescale?
    d. Planning to buy a tractor.

7. Impact on the environmental:

a. Surface run-off
b. Soil erosion
c. Soil moisture
d. Groundwater recharge – do you notice a difference in the wells.
e. Were the fields already there or were trees cut down to make fields

8. Impact on natural resources:
    a. Impact on natural resources. E.g. availability of water?
    b. Are they using the same water for other jobs…e.g. washing body, utensils, and clothes?
    c. How have things changed - do you now wash your hands after toilet due to greater availability of water.

9. Economic impact:
    a. How has income level changed and why?
    b. Migration of workers?
    c. Loans?
    d. Food habits changed
    e. New shop in the village. In the village shop, how long has it been open for? Has income of the shop increased?
    f. Seed seller – increase in business?
    g. Any change in the price of the land?
    h. Fragmentation: how is land divided between children? Has this changed?

10. Impact in lifestyle:
    a. Education (literacy)
    b. Health: what are the dominant diseases and number of cases?
    c. Medical facilities more pregnant women going to hospital to have babies.
    d. Better relationships…
    e. Happiness/ motivation/ aspirations for the future?
    f. Village infrastructure
    g. Leisure activities for adults and children (type and time spent on activity). Reasons?

11. Social impact:
    a. Has societal status of the village changed and why? Marriage?
    b. Communication: E.g. Mobile phones. Why do you think you need a mobile phone?

12. Impact on village infrastructure (e.g. roads, drainage, wells, hand pumps)?

13. What is the future outlook for the village?:
    a. What improvements could be made to the current irrigation/ pond system?
    b. What plans are there for the future

c. Can you envisage any future problems? E.g. how do you respond to water scarcity?

14. Other:
    a. Do you think water is used efficiently in the village? How do you ensure this?
    b. Is fuel used efficiently for the pump?
    c. Would the community benefit from any other external help/ education? E.g. crop growing expert? Is maintenance satisfactory? Is the financial running of the irrigation system satisfactory?

Appendix C: Case Study

Mr. Jagannath Deogam

***Photo 16**: Jagannath Deogam*

One year ago the tribal village of Jaskhandih did not have any form of irrigation. The villagers subsisted on meager earnings as casual laborers. Crops frequently failed, often due to inadequate rain and the rocky terraine. Mono-cropping of paddy was only possible. Today, one can see a transformation in Jaskandih to vast stretches of paddy fields alongside vegetable cultivation. The reason: the implementation of a rainwater harvesting project entitled "Improved agriculture with 5% model and seepage tanks". Gram Vikas Kendra, Jamshedpur initiated the project in the village in June 2006.

Initially, it was a great challenge to convince villagers to introduce pond structures. The concept of taking away precious land from already unproductive cultivation area to make way for ponds seemed to them more negative than positive. ***Mr. Jagannath Deogam*****,** a villager from Jaskhandih has been instrumental in pushing forward the project resulting in the rapid transformation of the village.

Jagannath could see past initial fears of the village towards the benefits of such an irrigation project. Jagnnath took the initiative to motivate his fellow villagers and to explore the benefits of the project in his own farmland. The result of which has raised the socio-economic condition of the villager through improved agriculture practices by creating rainwater harvesting structures in the form of ponds.

A 'Gram Vikas Samity Jaskhadih' constituting of 60 farmer families was formed as a beneficiary group to carry out the project. The committee undertook the job of implementing the project, making proper use of all resources available. Jagannath took on the role of President using his persuasive powers to educate villagers on the benefits of rainwater harvesting.

The first pond was dug on Jagannath's land demonstrating it's positive effects thus leading to the creation of other ponds in the village. Jagannath has selflessly acted as a great community facilitator, making change possible. Whether it was organising village meetings by making door-to-door contacts or convincing his neighbours to contribute labor, he has always given his valuable time for the upliftment of Jaskhandih.

Jagannath has also run small grocery shop in his village and a small rice hauling machine whose clients mainly came from paddy growers of other village, demonstrating the energy Jagannath has. Jagannath hopes that the paddy now grown in his village, after the rainwater harvesting project will be hauled with his machine. Thanks to the MESO officer of the District Rural Development Agency (DRDA) for giving GVKJ the opportunity to work, the funding support, its Engineers and the District Soil Conservation Officer for extending all the guidance and help in the project without which this development could never have been possible.

Up until now, GVK has been able to create 157 ponds in the village and has been instrumental in bringing many changes: an increase in income level, the promotion of newer agriculture methods, and better health and educational standards. The village outlook has been transformed under the leadership of where the water management project has proved to be the catalyst to re-shape the village for the better.

Appendix D: Case Study

Mr Jagdish Soren

***Photo 17**: Jugeshwar Singh*

Bee keeping was introduced by ***Mr. Jagdish Soren*** in collaboration with Gram Vikas Kendra, Jamshedpur in 1981. Trained as an expert on bee keeping for honey in Khadi Gram Udyog, he had a vision to create bee keeping as a profitable venture for farmers. Initially, people did not buy his concept with ease, if at all. However, a handful of people believed in his idea and took up bee keeping as a domestic activity on an experimental basis. Slowly, the word of success spread with the possibility of harvesting fresh and pure honey of several varieties with very little investment, risk or effort.

There has been great demand for training in bee-keeping practices where over 500 bee-rearers have been trained. The passion and professionalism of the honey makers shines through as a result of the effective training received from Jugeshwar.

Today Jugeshwar finds his dream come true as these bee-rearers, commonly known as 'palaks' move around on trucks loaded with bee boxes to several orchards, gardens & forests of many districts of Bihar & Jharkhand. The palaks know the detailed nature of bees, their attractions, their reasons for migration and, of course, the seasonality factors such as the different flowering and pollination timings of different plant species such as Lichi, Karanj, Neem, Jhamun and Mango. Movement of the palaks is very much governed by these factors to have the optimum collection of honey.

So far, 600 bottles of pure honey from the palaks have been sold through the Vikas Show Room, a facility created by GVK for sale of rural products for the villagers. The producers have also sold an additional 800 bottles of honey independently. The honey has a unique brand image due to its purity and variety.

Appendix E: Case Study

Mr Jugeshwar Singh

Mr Jugeshwar Singh is a progressive tribal farmer from the village of Kanikola in the Potka Block of East Singhbhum. Jagdish has a passion for agriculture and depends solely on it for his livelihood, growing both paddy and vegetables.

Jagdish's passion for farming came to the attention of Tata Motors when Gram Vikas Kendra implemented a social forestry project in Kanikola a few years ago. GVK subsequently exposed him to agriculture training upon recognising his energetic attitude. It became apparent agricultural productivity in the village was hindered due to the absence of an assured irrigation facility that could cater to the large tracts of paddy and vegetable cropping. GVK therefore set-up a lift irrigation project last year with the help from Rotary International. Jagdish was nominated by the villagers to become the Secretary of Lift irrigation committee in the village. Following on from this the idea of combining lift irrigation and pond structures formed water could be lifted from the nearby river of Subarnarekha to a pond structure an added source of irrigation could be formed. An integrated village development plan was prepared in full consultation with the villagers: three ponds, one lift irrigation unit, agriculture training, piscine-culture, formation and promotion of self help groups (SHGs) and afforestation. A detailed layout for construction of ponds and the lift irrigation unit was constructed alongside experts of Pradan, an organization specializing in water management. Resources were mobilized from willing donors: Telcon provided an excavator and the Rotary International provided further funding.

The villagers were willing labourers; digging 641 m of trench lain with pipelines. An 8 HP diesel motor pump having 6 discharge outlets capable of irrigating 40 acres of land powered the irrigation system. Two ponds were also created allowing irrigation of a further 15 acres of land.

Jagdish says: "When I found agriculture to be not only profitable but a profoundly dignified vocation, I only wondered when would my villagers be able to fight out the vagaries of monsoon and think the same way. But now with the lift irrigation system and two ponds created in the village through GVK and many other developments in the offing, it is my dream come true.". Jagdish's leadership qualities are immense, he has motivated all villagers to contribute to the irrigation project.

Prior to the introduction of the irrigation systems, Jagdish earnt around 8000 Rs from rain-fed agriculture, providing two square meals a day and limited possibilities to think past this. Training provided to villagers by GVK has challenged the villagers to think beyond their boundaries and explore more for themselves and their family.

Taking advantage of the knowledge inputs on multiple cropping, he began growing cabbage, cauliflower, ladies' finger and different varieties of gourds, apart from the rain fed paddy, which now fetches him Rs40,000/- per annum. He is market sensitive and grows and sells his vegetables on time directly at the markets of Dorkasai, Jadugada, Narwa, Govindpur and Tata Motors colony. All this has made Jagdish a model farmer in his village.

Appendix F

Personal Statement

For as long as I can remember, I have been extremely interested in learning more about life in India. This curiosity began at a young age, sparked by the many stories I heard of the time my Great Grandfather spent working for the jute mills of the East India Company and the time that my Grandfather spent working on an Indian tea plantation in the 1930's. TISES provided the perfect opportunity for me to experience working in India, to learn about its contrasting culture while at the same time to take a break from my career in science and develop my social and communication skills. With no previous experience in the field of water management or in social research I was very excited to take on a new research topic and use my previous experiences of problem solving to add a new perspective on the water management issues of the tribal villages of India.

Most of all, the TISES project has allowed me to see, first hand that the world has a dilemma: there are not enough resources to sustain the current human population for generations to come. With a thriving human population relying on water for survival and an ever-decreasing supply of accessible water sources, the ability to manage water efficiently is essential for future survival of our race. India's population is booming and it's land over cultivated. It is therefore evident that we must find a way of living with the world in a more ecologically balanced way. This must either be done by changing the way in which we live or by developing new technologies to maintain our standard of living without causing a detrimental effect to our surrounding environment.

I have enjoyed the TISES project immensely, I have not only learnt about water management but I have also been privileged enough to learn about tribal lifestyle, a culture vastly different to my own. Talking to people so content with their lives without a great number of material possessions provided a refreshing change. The vibrancy of the Indian culture and the open, friendly nature of the many Indians I have met and worked with has been wonderful - the Indians treat their guests with great respect. The main challenge I faced, as a scientist was the realisation that in social work, there is no perfect solution to a problem - compromises must be made along the way.

When deciding on my next career step, the social entrepreneurship activities of a company will be a key factor in who I decide to work for. TISES has enabled me to observe how a large company can make a positive impact upon the world with its drive to make a difference in the communities surrounding Tata industries. My time in India has also given me a greater perspective on the world as a whole and has confirmed to me that my actions and lifestyle in the UK affect the entire world, in particular, the fragility of the weather forecast, most likely due to the effects of global warming. I will therefore make the upmost effort to lead a more environmentally conscious lifestyle on my return to the UK.

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Although I only spent two months in India, there are an incredible number of people I would like to thank. Many are depicted in Photos 18.

Sandeep Kumar provided me with excellent guidance throughout my time in the Community Services Division (CSD) of Tata Motors. Although extremely busy, he always provided the patience for discussion and taught me a great deal about water management. Alongside Sandeep in the rural affairs team R. P. Gupta and Sunil Kumar Mahto and C.M Singh were instrumental in allowing me to carry out my field research both of whom exhibited much patience.

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India is a wonderful country and I cannot wait to come back and visit the many great people I met in my time here and explore the country further.

Photos 18: *Some of the wonderful people I met during my time on the TISES programme.*

Column 1:

Top: *Nishi Srivistava, Sandeep Kumar, R.P. Gupta, myself, Jyantti Datt.*

2nd row: *On the tour of the Tata Motors plant: Nishi Srivistava ,driver, Dev Das, Sian Herschel, Andy Panton.*

3rd row: *Ila teaching girls to knit at a knitting workshop.*

Bottom: *Nishi's family and myself.*

Column 2:

Top: *Dilith Castleton of Tata Steel.*

Middle: *Jayanti Datt, Sian Herschel, myself, Andy Panton and Nishi Srivistava.*

Bottom: *Rockmina, a tribal lady and Sian Herschel*

Column 3:

Top: *A young girl showing me her mindi at a workshop for teenage girls.*

Middle: *Kamlah*

Bottom: *New pond structure for rainwater harvesting in the village of Konikula: a villager, R.P. Gupta and C. M. Singh.*

Column 4:

Top: *A waiter at Dalma House.*

2nd row: *Andy Panton, Dr. Helen Haugh and a tribal lady.*

3rd row: *Sian Herschel, Andy Panton and myself on a beach near Chilka Lake, Orissa.*

The Bottom: *The Deogam family and myself in Jaskandih.*

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