

POWERING DIGNITY: MANTRA AND MICRO HYDRO

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ABSTRACT

Gram Vikas is a rural development organization, working with poor and marginalised communities of Orissa towards making sustainable improvements in their quality of life. To reach its vision of an equitable and sustainable society where people live in peace with dignity, Gram Vikas has established the Movement and Action Network for Transformation of Rural Areas (MANTRA), evolving from Gram Vikas' nearly thirty years of experience in rural development. Building upon its successes in using MANTRA, Gram Vikas has recently embarked on implementing micro hydro projects using the MANTRA approach.

MANTRA, an integrated habitat development program guided by the belief that all people deserve to live with dignity, has two key aspects. First, it refers to Gram Vikas' programmatic elements of rural health, self-governance, education, livelihoods and food security, and enabling infrastructure. Secondly, it refers to these elements being implemented upon the core values of inclusion, social equity, gender equity, sustainability, and cost-sharing. MANTRA characterizes Gram Vikas' vision of an equitable and sustainable.

While MANTRA can be considered innate to community-based micro hydro projects, Gram Vikas has undergone a dynamic learning process to understand how best to integrate the MANTRA elements and to nurture the MANTRA values in micro hydro projects. Gram Vikas has implemented two community-based micro hydro projects in Kalahandi District, ranging from 5kW-25kW, with several projects planned for the near future. Although the first micro hydro project was designed to follow MANTRA, some project aspects faltered as a result of applying MANTRA narrowly. Learning from its first micro hydro project, Gram Vikas prevented significant challenges in the second project. New challenges experienced in the second project have been studied and resolved to prevent them from occurring in future projects.

This paper will present why Gram Vikas has approached community development for micro hydro projects using MANTRA. It will summarize the challenges that arose and solutions that evolved as the implementation of MANTRA evolved from one micro hydro project to the next. Gram Vikas' micro hydro experiences reinforce the significance of community drive in development projects, especially in the context of appropriate technology being implemented in remote, isolated communities. Micro hydro implementation that is community-driven reflects the MANTRA aspects of all having a stake and sharing the costs, regardless of gender or social stratification.

Gram Vikas wishes to share its MANTRA micro hydro experience, with the aim to create partnership amongst local, national, and international groups, resulting in a movement of *powering dignity* in rural Orissa and in other poor, rural areas that are blessed with natural resources required for micro hydro.

INTRODUCTION

Gram Vikas is a rural development organization, working with poor and marginalised communities of Orissa since 1979, towards making sustainable improvements in their quality of life. Founded by a group of student volunteers from Chennai who came to Orissa under the umbrella of the Young Students Movement for Development (YSMD), Gram Vikas was registered as a society on January 22, 1979, under the Societies Registration Act, 1860. The organisation currently serves a population of over 189,000 (~36,000 households) across 559 villages in seventeen districts of Orissa. Gram Vikas' mission is to promote processes which are sustainable, socially inclusive and gender equitable, to enable critical masses of poor and marginalised rural people or communities to achieve a dignified quality of life.

Evolved from Gram Vikas' nearly thirty years of experience in rural development, Movement and Action Network for Transformation of Rural Areas (MANTRA) is Gram Vikas' tool for fostering social inclusion among poor and marginalized communities and establishing sustainable systems in rural areas. Participation of all households in the habitation is a non-negotiable condition of the program. In rural Orissa, where discrimination against large segments of communities on the basis of caste, gender and economic status is still deeply entrenched, and where those who discriminate believe it is their right and the marginalized have accepted it as their fate, MANTRA unites communities to overcome these barriers.

To initiate MANTRA, an entry point activity, which transforms hierarchical stratification into equitable inclusion in order to induce democratic self-governance, is required. Gram Vikas' entry point activity has typically been water and sanitation, however this activity can vary per the community's interests. Pertaining to the topic at hand of micro hydro, the entry-point would be de-centralized electrification. Once the community has self-shattered its hierarchy via the entry-point activity, Gram Vikas then facilitates the united communities to undertake further development activities. These are based on a combination of the MANTRA elements--Self-Governing People's institutions, Health, Education, Livelihoods and Food Security, and Enabling Infrastructure--to improve the quality of rural habitations and to demonstrate a socially inclusive, gender equitable, people friendly, and financially viable model of sustainable and holistic development can be constructed, where everybody is a winner. These programmatic elements are implemented using MANTRA's core values of:

Inclusion: 100% coverage of all families in every habitation where the programme is being implemented. All households must be involved in the development process and must benefit equitably.

Social Equity: Representation of all sections of the community in decision-making processes across caste, economic status and other barriers. Making available the same minimum level of services and decision-making space for all creates a level playing field.

Gender Equity: Equal representation and participation of men and women in community level decision-making and control. Women participate alongside men in articulating concerns, taking responsibility and actively participating in development processes.

Sustainability: Development processes have built-in institutional and financial mechanisms for sustainability beyond the life of the project and are necessarily based on sound environmental values.

Cost sharing: Poor people *can and will* pay for beneficial development services but there are some social costs which society at large must meet. These ‘social costs’ are resourced from government, donor agencies and individual donations.

Gram Vikas’ responses are context specific, based on the needs and priorities of the communities. Given the diverse social and economic situation of the communities, the relative importance of the sectors varies across regions and communities. Further, MANTRA is undertaken with clear sustainability mechanisms established from the outset facilitating systematic role transformation and the incremental transfer of responsibility to the communities themselves. A typical program cycle is between 3 to 5 years after which Gram Vikas withdraws from the habitation and the community takes full responsibility for the management, operation and maintenance of all systems thereafter.

Using MANTRA with water and sanitation as the entry-point activity, Gram Vikas is empowering poor and marginalized rural communities. Regardless of the specific entry-point activity, MANTRA is effective because it touches every section of the community, emphasizing on the importance of “all or none”. Building upon on its challenges and successes, Gram Vikas is now using MANTRA to implement micro hydro projects.

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The formula for MANTRA did not surface overnight. Gram Vikas persevered in studying and tweaking the approach its initial projects, where the entry-point activity was water and sanitation, in order to reach its goal of establishing projects on the core values of MANTRA. Despite the early challenges, Gram Vikas did not surrender its goal because it believes that the values which constitute MANTRA address the entire community’s well being and as a result create dignity and sustainability for all.

Similarly, Gram Vikas believes that using MANTRA to implement de-centralized rural electrification projects will lead to equitable and sustainable projects that truly enable critical masses of poor and marginalised communities to empower themselves. Access to electricity has widely been proven to bridge the gap between urban and rural areas; and access to uninterrupted electricity bridges the gap between the poor and enabled. However, in order for electrification to be sustainable in poor rural areas, it must be sustained *by the community*. Being labour intensive and requiring centralized-hardware, micro hydro solutions for de-centralized rural electrification can be sustained only if they are community-driven. The community creates the drive when it has the confidence and dignity to think for itself and when it is empowered with proper tools of knowledge. Micro hydro implementation that is community-driven will be characterized by the MANTRA values of all having a stake and sharing the costs, regardless of gender or social stratification. Such a micro hydro project applying MANTRA to micro hydro creates an invaluable opportunity for people to come together to face external threats which demote marginalized rural communities, e.g. mining and large dams. The project will create for the community the feeling of being inferior to none, leading to dignity and better quality of life for all.

CHALLENGES AND SOLUTIONS

While MANTRA can be considered innate to community-based micro hydro projects, Gram Vikas has gone through a learning process in the field to understand how best to integrate the MANTRA values in its micro hydro projects. Gram Vikas has implemented two community-based micro hydro projects in remote areas of Kalahandi District, ranging from power output of 5kW-25kW [see Appendices B and C for technical details and photographs], with additional projects planned for the near future. Gram Vikas' agreement with the benefiting community involves: formation of a micro hydro committee, labour contribution from each family, Rs.1000/household contribution to the community corpus, and Rs. 30/month tariff from each household to pay the operators salary.

Although the first micro hydro project in the villages of Amthaguda and Kuang was designed to follow MANTRA, various project aspects faltered as a result of applying some of the MANTRA values narrowly. Learning from its first project by assessing how well the project followed MANTRA, Gram Vikas has been able to prevent significant challenges in the second project located in the village of Karlapat. However, similar and new challenges were experienced in the second project also. Because the start of the Karlapat project overlapped with the Amthaguda-Kuang project, there was not enough time at the outset of the Karlapat project to clearly identify the challenges in hind-sight and establish solutions from the lessons-learned in Amthaguda-Kuang. Additionally, the inherent differences between the communities of the two projects, as outlined in Table 1, did not allow the challenges learned in the first project to be directly transferred to the second project. Hence, even the Karlapat project has nurtured new learning to apply to future projects.

Table 1. Inherent differences between Amthaguda-Kuang and Karlapat communities.

	Amthaguda-Kuang	Karlapat
Community Layout	Two small villages	One large village
Ethnic Breakdown	100% Scheduled Tribal	14% Tribal, 15% Scheduled Caste, 71% General
Number of Households	67	108
Population	380 people	540 people
Pro-Activeness of Women's (SHG)	Low	High
Community Alcoholism	High	Low

Amthaguda-Kuang Micro Hydro Project

Excerpt from Gram Vikas 2006-2007 Annual Report:

Amthaguda and Kuang are among the most remote villages in all of India, set in the middle of a nature reserve where wild elephants and tigers still roam, in an area that has been called by Verrier Elwin, 'the poverty basket of Asia'. Canadian volunteer Yannis Banks visited Amthaguda this year and sitting in a community meeting asked, "What Gram Vikas programmes have greatly impacted your lives?" One of the replies he received was, "Electricity. We feel we are now equal to people in the cities because we have electricity."

From a waterfall that cascades down the hillside two kilometres from the village, the community, together with Gram Vikas, built and now manages its own micro hydro system that provides power to light each home with three bulbs and the village environs with street lights. This villager’s reply reflects that electricity has not only brought practical benefits such as the ability for children to do homework at night or villagers to simply see in their homes after sunset, but also a basic sense of equality with urban people. The electricity has also enabled new community activities. This year’s Bridge Course was held in Amthaguda because the lights enabled extended night classes. Videos are now being shown in the community square, exposing villagers to new ideas and information. Gram Vikas plans to develop village livelihoods to increase the benefits allowed by the availability of power. At the end of the meeting, the village president said: ‘We were in darkness, and now we are beginning to see the light.’

The level of success reflected in the case study above of the Amthaguda-Kuang project has been achieved via a process of identifying a series of community development challenges and applying appropriate solutions. Because the project was technically sound, it could have been perceived as a flawless project after the commissioning. The system was built with the community, electricity was being generated, and the community was using it. However, Gram Vikas wanted to ensure that the project was promoting its mission of creating a socially equitable process that improved the lives of rural populations. Hence, Gram Vikas began to measure the results of the project to the core values of MANTRA and was able to clearly identify the development gaps. Table 2 summarizes how well the Amthaguda project measured to the MANTRA values 3 months after the system was commissioned. While there were no problems with instilling inclusion and social equity, challenges surfaced in incorporating gender equity, cost sharing and sustainability.

Table 2. Amthaguda-Kuang’s measurement to MANTRA core values, at 3 months after commissioning.

	Challenges	Solutions	Results
Inclusion	None	--	--
Social Equity	None	--	--
Gender Equity	Women chosen to be reps did not attend meetings because of lack of time and interest.	Schedule meetings when women have time. Introduce use of electricity to women’s SHG.	Increasing numbers of women attend but do not voice opinions. SHG will brainstorm how to productively use electricity.
Cost Sharing	No corpus or tariff was collected, leading to community not valuing the system and no fund for future repairs and maintenance.	Encourage the community to meet smaller goals and to participate in generating the corpus via government programs, e.g. NREGA.	The community has confident plans to raise 1/3 before next year. Future projects will be community-driven, in addition to be technology driven.
Sustainability	Technical and Financial: The system was not being maintained because salary for operator was not being collected since community was not paying the tariff.	Turn off system until community has mobilizes itself to collect tariff.	The community has been able to collect the tariff every two months, based on a flexible scale per household.

Inclusion

The Amthaguda project had 100% inclusion because all the households had decided to commit to building and managing the system. All the households have contributed and benefited equally.

Social Equity

Social equity was also fulfilled because the villages' social stratification did not affect project implementation. Each village is equally represented in the micro hydro committee. Each voiced its concerns during project development. The system operators come from both villages: Amthaguda selected 2 youths to be village operators; while Kuang, being the smaller community, selected one youth.

Gender Equity

Although Gram Vikas made sure to have women representatives on the committee, the women chosen to be the representatives did not attend meetings. This was mostly due to lack of time and interest. As a solution to increase women's participation in the management and use of the micro hydro systems, meetings are scheduled earlier and the times are confirmed with the women leaders. To generate interest amongst the women, Gram Vikas is reaching out to the women's self help groups (SHGs) to practically teach them about load management and brainstorm on how they can make productive use of the electricity.

The result has been that an increasing number of women have started to attend the micro hydro meetings, but do not voice their opinions. To create a space that is free of intimidation for the women, the SHG leaders will be holding separate, women's only meetings regarding the micro hydro system. The women's representative on the micro hydro committee will be coached to voice the group's ideas, and more women will be encouraged to attend the community micro hydro meeting.

Cost Sharing

The Amthaguda-Kuang community and Gram Vikas had agreed that the community would create a community corpus to ensure sustainability of the system, while Gram Vikas would pay for the civil works and hydro electric hardware, partially through available government funds. The costs of sustainability were to be shared by each household by each contributing Rs.1000 to a corpus. The community was to manage itself in identifying families who could not afford Rs.1000 and to finding some way to help them meet their corpus commitment. After commissioning of the system, each household was to share the cost of paying the operators. Each household agreed to pay an electricity tariff of Rs.30 in order to collectively pay the salaries of 3 village operators.

Challenges

Unfortunately, no corpus was formed, and no tariff was being collected. The corpus was not collected because initially the project needed to be technology driven in order to meet donor timelines. The timeline did not allow enough emphasis on developing the community's stakes. The technology driven approach at the outset of the project reflected to the community that Gram Vikas was going to implement the micro hydro system regardless of their involvement. This assumption was affirmed to the villagers when Gram Vikas needed to focus on completing the construction, and its attention to mobilizing the community to form a corpus suffered.

Further, even once the system was running, the community was not paying the tariff and or raising the corpus. The corpus and tariff became difficult to collect because project completion was delayed by one year. Gram Vikas started implementation of the Amthaguda-Kuang micro hydro project in January 2004, and commissioned it in January 2006. It took two years, instead of one year, to complete due to the technical consultant not delivering on time.

Due to these challenges, cost sharing within the MANTRA framework did not happen. The ultimate result was that the community as a whole did not feel it had a stake in the project, and hence did not care that there were no funds to address technical maintenance and repairs.

Solutions and Results

Gram Vikas' solution to these challenges manifested when a small part needed repairing. Gram Vikas was then able to show the community in real-time why funds were needed to keep the system running. The community immediately collected enough funds to fix the part. Gram Vikas highlighted to the community the common technical maintenance and repair costs, while emphasizing that forming a corpus was still possible.

Further, lights are the only loads on the system. If the community is interested in using other electrical applications, such as an oil press or flour mill, they will first have to form a corpus in order to sustain the applications. Having presented the repercussions of no cost sharing to the community, Gram Vikas had to offer tangible solutions of raising a corpus and collecting a monthly tariff.

To help form the corpus, the community has been mobilized to set small and frequent goals to raise a full corpus. Community participation in income generating via government programs, e.g. NREGA, has been encouraged. The result has been the community realizing the need to have a corpus and being confident that they can raise one third of it by January 2007.

Sustainability

There are three aspects to MANTRA's definition of sustainability: technical sustainability, financial sustainability, and environmental sustainability.

Technical sustainability

The system was not technically sustainable because the salary to the operators was not being paid due to the committee not being able to collect the tariff. With the pressure of ensuring technical sustainability of the system *by the community*, Gram Vikas had no choice but to direct the village operators to keep the system off until the tariff was collected and the operators were paid. This was the only way for Gram Vikas to help guide the community in being responsible for its system. The system was shut down for 2 weeks before the community started questioning.

During this exercise Gram Vikas realized people were willing to pay small amounts at frequent intervals. Therefore, the committee decided to have mandatory tariff collection every two months, instead of monthly. The committee and the operators agreed to deposit full salary payments every two months, instead of monthly. The result has been the community being able to collect the tariff every two months, for the last 4 months, based on a flexible scale per household

Financial sustainability

Although the Amthaguda-Kuang project involves financial sustainability for maintenance and small repairs, financial security for large repairs still needs to be thought through. One option would be to allocate some of or the entire corpus towards major repairs. However, Gram Vikas feels that, as much as possible, the corpus should be left untouched. The interest accumulating from the corpus is what should be considered for spending. The reason for this approach is that in most of Gram Vikas projects', in addition to the contributed labour and/or material, it is in fact the formation of the corpus that unites the community. Also, in some repair cases the corpus amount would not suffice, and its symbolic value for community unity outweighs its financial value. Therefore, Gram Vikas is researching alternatives to make the micro hydro project financially sustainable even in the case of a major repair. The options being considered are insuring the expensive components of the system through a private insurance company and building a separate fund from income generating activities that could be established using the electricity. Similar projects in other parts of Orissa have shown that this is possible.

In the case of the latter option, the MANTRA elements become significant. Rural electrification projects that are directly linked to other development elements, like that of MANTRA's, would not be stand-alone projects and consequently become an essential productivity medium for the community. Such projects would integrate the micro hydro with the community's health initiatives, empowerment, local education, and thriving livelihoods; while in the broadest sense provide electricity infrastructure. Integrated micro hydro projects that increase the value of uninterrupted electricity, give the community more opportunity for productive use of the electricity and the implementing NGO rationale for investing the high costs of de-centralized electrification.

Environmental sustainability

As it does in its other programs, Gram Vikas aimed to link the Amthaguda-Kuang micro hydro project to environmental sustainability. In the most basic sense, this would mean educating the community on the connection between trees, watershed, and micro hydro. In the case of Amthaguda-Kuang, the path leading to the area of the civil structure was clear of stone and trees; it did not need to have rocks blasted or trees cut and did not need in. As will be tabled later, the situation in Karlapat is different.

Karlapat Micro Hydro Project

The Karlapat micro hydro project, started in April 2005, is a 10kw – 25KW pump as turbine system. Set to complete in November 2006, it will serve 600 people. The village of Karlapat sits on the boundary of a forest sanctuary and of an area with un-mined bauxite. Being the panchayat headquarters, it houses several government buildings. It even has an old royal palace that now serves as the vacation home for the royal family. Despite its role in housing the panchayat headquarters or the local monarchy, Karlapat had not been electrified. However, its contacts with the outside world have increased its demand for electricity. Unlike Amthaguda-Kuang, the people of Karlapat are self-motivated to use the electricity for productive use. This head-start to community mobilizing, along with applying the lessons learned from Amthaguda-Kuang, has made the Karlapat micro hydro system easier to implement per MANTRA's core values. The ease of the project has generated community unity which has been priceless to ward off external pressures such as mining. The challenges of the Karlapat project, summarized in Table 3, are less intense than the challenges of the Amthaguda-Kuang project.

FUTURE PROJECTS

Gram Vikas aspires to work with 1% of Orissa's population, approximately 100,000 families by 2010, or roughly 500,000 people, covering 1% of the total projected population of Orissa (for 2010). Towards forming 'critical masses', Gram Vikas will attempt to reach a minimum of 20% of the population in each of the Gram Panchayats that become a part of MANTRA. Similar efforts will be made for aggregation of critical masses at the block, district and eventually at the state level.

Achieving the goals of the MANTRA constitutes Gram Vikas' mission of implementing programs that break barriers to equity and to poverty alleviation. Overcoming the challenges in the Amthaguda-Kuang and Karlapat micro hydro projects have given Gram Vikas a better understanding of how to incorporate MANTRA in the field. Gram Vikas would like to continuously improve its implementation of micro hydro projects using MANTRA by applying the following:

Table 3. Karlapat’s measurement to MANTRA core values, at 1 month before commissioning.

	Challenges	Solutions	Results
Inclusion	Some villagers do not give full days of work. Even though contribution days are tracked, contribution time is not tracked.	Encourage community to track work hours, in addition to work days.	Community is more conscious of labour contribution.
Social Equity	Royal family and panchayat building requesting lights without contributing labour and corpus.	Community decides how much non-contributors should pay.	Villagers gaining voice over royal family and panchayat.
Gender Equity	Women attend meetings but do not voice their thoughts. They have voiced wanting to have a separate meeting.	Hold meeting with women’s SHG regarding micro hydro project.	Women have become the driving force to using the electricity for productive use.
Cost Sharing	Difficult to form corpus because community was having difficulty in uniting itself to help those who could not afford.	Reiterating need for the corpus and encourage committee leaders to be examples and contribute to corpus.	60% of the corpus has been collected with the community insisting that it does not want the electricity until the full amount is reached.
Sustainability	Technical: Operators trained Financial: Corpus exists Environmental: Construction was too invasive.	Assess with community if invasiveness could affect water.	Will be known after commissioning

Scheduling

Cost-sharing and sustainability became challenges due to schedule delays. Delays were caused in manufacturing the hydro electric equipment. In future projects, the provider of the hardware will be carefully chosen. Delays were also caused by extreme weather. In future projects, the schedule should include buffers for weather and days for excessive field working days. Also, if the entry point activity is not micro hydro, the micro hydro schedule must be linked with the entry-point activity schedule. Improved scheduling will help meet donor deadlines so that Gram Vikas staff can focus on MANTRA values instead of the deadlines.

Indicators for Measuring Equity

While development of community contribution, corpus, tariff, and operators serve as indicators for the MANTRA values of inclusion, cost sharing and sustainability, better indicators are needed to measure gender and social equity. As the current projects have revealed, community drive is utmost important. Likewise, the community must be involved in the evaluation of its projects gender and social equity. In future projects, Gram Vikas will help the community to understand why equity is important and to self-evaluate the level of equity associated with their micro hydro project. Because the best indicators for measuring

equity will come from the community itself, Gram Vikas will establish the indicators together with the community.

Community Driven Processes

In the current two projects, community contribution, corpus, and construction were largely supervised by Gram Vikas. Because MANTRA includes an exit process for Gram Vikas to leave the village, such that the village is sustainable without Gram Vikas, community managed processes are a necessity. In future micro hydro projects, Gram Vikas will guide the community to manage the project development.

Stronger Voice of Village

Poor rural communities face a myriad of external pressures that make oppress their will. Community based micro hydro project can serve as an invaluable tool for communities to use against these pressures. However, often the community simply has no idea on how such processes work. In the case of Karlapat, the royal family and the state government have been inviting mining companies to assess the village to build a road to a new mining site. If mining were to start at the site, the water flow coming down to Karlapat would cease. Now that the royal family and the panchayat building are asking the community for electricity connections, the community can actually negotiate their needs. The community did not realize initially their negotiating power. In future projects, Gram Vikas will incorporate with the development of the micro hydro system, building the capacity of the community's voice to face external pressures.

In addition to its own engagement with communities across 17 districts of Orissa, Gram Vikas is increasingly working with other NGOs in Orissa and other states across India. With the writing of this report, Gram Vikas wishes to share its MANTRA micro hydro experience, with the aim to create partnership amongst local, national, and international groups, resulting in a movement of powering dignity in rural Orissa and in other poor, rural areas that are blessed with natural resources required for micro hydro.

APPENDIX A: REFERENCES

Gram Vikas Annual Report, 2006-2007.

APPENDIX B: PHOTOGRAPHS

Amthaguda-Kuang

Karlapat



Pelton turbine and alternator.



Fore bay tank.



Transporting turbine.

APPENDIX C: TECHNICAL DETAILS

Amthaguda and Kuang Micro Hydro System

5 kilowatt - 20 kilowatt capacity, with 2 alternators, one 10 kilowatt and one 25 kilowatt (this is for low flow and high flow and refers to potential system output)

Current load on system from both villages = ~4.5 kilowatt

Digital load controller designed by Delhi consultant.

Gross head of site = 114m

Penstock length = 400m (MS and PVC pipe)

Transmission cable = 2km of 35sqmm, 3.5 core insulated overhead strung cable – no transformers - negligible volt drop

~10 streetlights in each village

Each household has two bulb holders and one tube light, one plug-point, one fuse and one isolation switch

Each house is fitted with a variable load controller with manual reset

Total households = 67, population ~380

Karlapat Micro Hydro System:

10 – 25 kilowatt system, using pumps as turbines.

Site gross head = 76m

Penstock length = 206m

Transmission cable = 800m of 50sqmm 3.5 core armoured underground cable

Total households = 108, population ~540