

MULTIFUNCTIONAL PLATFORM FOR VILLAGE POWER

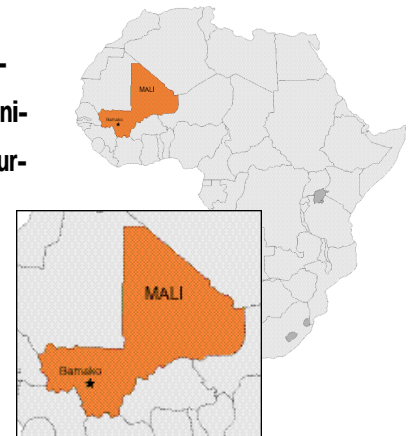
MALI

NALINI BURN AND LAURENT COCHE

The Mali multifunctional platform project provides decentralised energy to rural villages in response to requests from women's associations in these villages. The platform consists of a small diesel engine mounted on a chassis, to which a variety of end use equipment can be attached, including grinding mills, battery chargers, vegetable or nut oil presses, welding machines and carpentry tools. It can also support a mini grid for lighting (150-200 bulbs) and electric pumps for a small water distribution network or irrigation system. The configuration of equipment modules is flexible and can be adapted to the specific needs of each village.

The project was originally developed through a United Nations Industrial Development Organization/ International Fund for Agricultural Development regional project in Mali and Burkina Faso from 1994 to 1995. In 1997, UNDP and the Government of Mali began providing support to existing platforms, recognising the project's potential as an engine of development and poverty reduction for the community as a whole. After a participatory evaluation exercise was undertaken in 1998, the new project was formulated in 1999, with an expected duration of five years.

The goal of the current project is to install 450 platforms, serving 10 per cent of Mali's rural population, of which at least two-thirds will be equipped with water and electricity distribution systems. Through these platforms it is expected that approximately 8,000 women in rural areas will have access to improved community services and opportunities for micro-enterprises. At least 10 manufacturers and 45 technicians from the private sector will be trained to handle all technical aspects of the platforms. Increased income generating activities are anticipated, including oil extraction, production of food pastes and shea butter (used for skin creams and chocolate), soap manufacturing, and extraction of jatropha oil. Oil from the seeds of the jatropha shrub can be used as fuel to run the engines, and is expected to be used in at least 15 per cent of the installed platforms. At the end of the project, all activities are expected to have been taken over by a network of private technicians and financial partners.



Mali is one of the poorest countries in sub Saharan Africa. Over 80 per cent of Mali's nine million people live in rural areas in about 11,000 villages, most of which are remote and isolated. The average size of a village is about 1,000-2,000 inhabitants. Rural transportation and communications networks are very weak. Because of the small size and dispersed locations of the villages, grid electrification is non-existent, and decentralised mechanical and electrical energy supply is the only viable option. At this stage, however, there is still not a clear energy policy for bringing decentralised power to rural areas. In urban areas, the central grid uses a mixture of hydro power and imported diesel energy. Even in urban areas many people cannot afford, or have no access to, centralised grid electrification.

At present most of the energy expended in rural areas is human energy, primarily that of women engaged in small scale agriculture or livestock production, as well as basic subsistence activities. Women expend time and energy collecting firewood and processing biomass for fuel, drawing, transporting, storing, and distributing water, collecting "wild" resources such as shea nuts, seeds, plants, and processing food and beverages. This use of female energy is still largely invisible to energy and environmental analysts and planners.

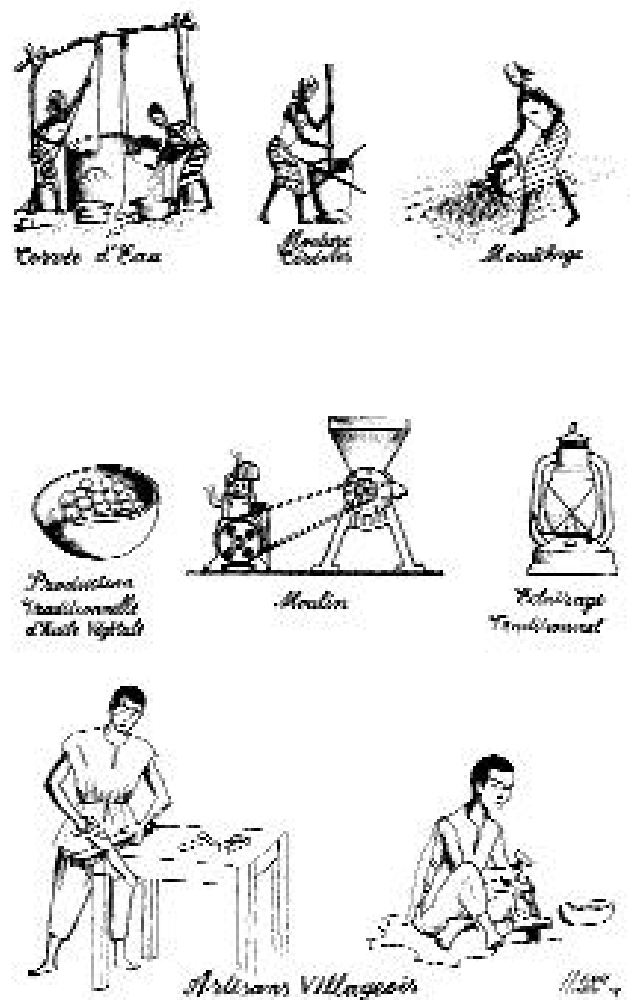
Women's work is physically arduous and time consuming and is characterised by multiple, repetitive and frequent tasks, particularly in post-harvest food processing (grinding, de-husking, and oil extraction), and in water transport and distribution. The use of private grinding mills can save some time, but even when mechanical equipment is available in the household it is generally used by men, and women have no access to it. When activities become mechanised or income-generating, the tasks which were previously seen as appropriate for women tend to be taken over by men.

The fundamental energy need for poor rural women in Mali, as in much of sub-Saharan Africa, is to find appropriate and affordable substitutes for their own energy, so that they can engage in activities that generate income, and that provide benefits for themselves and for others. The compelling nature of this need for energy is what drives interest in the platform at the village level. The platform project is not supply driven; it is user or demand driven. Requests for the installation of platforms are numerous and come from both women and men at the village level, because of the perceived savings of time and energy for women.

Project design

The platform was purposely designed to take into account the multiple end uses for energy in rural economies, and to provide a substitute for human energy. The small Indian-made Lister diesel engine is widely available throughout rural Africa and it is often used by private millers for grinding grain. When mounted on a platform, the engine's uses are flexible and mod-

AVANT LA PLATEFORME MULTIFONCTIONNELLE

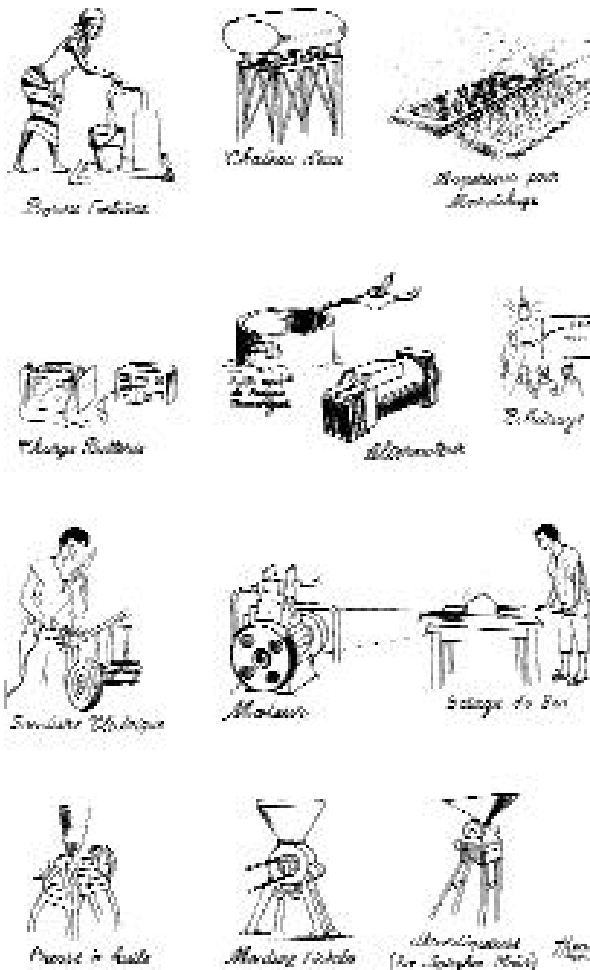


BEFORE THE MULTIFUNCTIONAL PLATFORM

ular. The platform can be fabricated by artisans using locally available parts, and maintained by local mechanics. The project aims to bring together local supply and demand, as well as to build and strengthen local capacity to install, maintain, operate and manage the platform and the equipment.

The fixed costs of the engine can be recovered through fees on a variety of services provided by the platform. Different end use equipment can be used either simultaneously or sequentially. For example, one platform can at the same time run a mill rated at 150 kilogrammes per hour, a water pump with a capacity of one to eight cubic metres per hour, and a battery charger, as well as provide electrical power for 135-180 25-watt

APRES LA PLATEFORME MULTIFONCTIONNELLE



AFTER THE MULTIFUNCTIONAL PLATFORM

light bulbs. Some uses, such as rice hulling, running mechanical saws and welding, cannot be combined with other uses running at the same time. Different combinations of end use equipment are possible depending on seasonal and daily requirements, and different modules can be acquired over time to meet changing or expanding needs.

The broad intervention strategy of the project has been guided by the twin objectives of providing a decentralised and sustainable energy supply, and ensuring that the energy supply is used and controlled by women.

From the outset, the project has focused on alleviating energy poverty, and on generating the means to reduce the

income poverty of both women and men. It has targeted women as prime beneficiaries because energy poverty specifically affects women, due to the nature of gender relations. In response to requests from villages, the project's approach has been to make it a condition that the platform be managed by a women's association. Training is then provided to a women's management committee in literacy, bookkeeping, management and maintenance.

The entry point with the male village chiefs is simple and persuasive: since it is solely women who perform grinding, hulling, and water collection, this equipment has to be their property and under their control. The rigidity of the gender division of labour can be used tactically to women's advantage in this case. Women then effectively become energy entrepreneurs, selling energy services to both women and men clients. Men, for example, might purchase energy for charging batteries, welding, or pumping water for construction projects or raising livestock.

Since the pilot phase, the project has taken a decentralised approach to its intervention support. It has set up decentralised units in four zones of Mali, in Sikasso, Bougouni, San and Mopti-Sévaré, where the national coordinating unit is also located. All the support activities to villages are provided through these units.

Evaluation of the pilot project by participants

In November 1998, at the end of the pilot phase, the project engaged in an extensive participatory evaluation, primarily among users in five villages, to determine the strengths and weaknesses of platform operations and to reassess the project's objectives and strategy.

The evaluation showed that there is a need to be able to assess more accurately the financial, economic, social and technical feasibility of installing a platform in a particular village. The idea is not so much to encourage acquisition but to enable prospective users to make informed choices about the technology. Potential users need to determine whether the equipment is currently affordable and whether it can provide the outcomes and impacts desired. A minimum level of anticipated use and revenues is required to make the investment affordable.

The evaluation also revealed a need to develop village-specific methodologies and tools because village contexts vary significantly enough to affect the outcomes of feasibility studies, and thus assessments of the viability of individual platforms.

The reliability of energy production emerged as a general problem. In many cases, problems with breakdowns and the duration of downtime were major preoccupations because of difficulties with transport, communication and availability of reliable and efficient repair and maintenance technicians. Despite these problems, over 80 per cent of the 45 platforms installed before June 1999 are still operational. The evaluation

also uncovered an additional 19 platforms installed in the Sikasso area without project intervention by private artisans trained by the project.

The users and project staff involved in the participatory evaluation found three elements to be crucial for enhancing project results.

The first was to strengthen institutional capacity all along the line, including among the end use clients, the women's associations and management committees, as well as among the project staff and network of partners. Capacity building is particularly needed regarding the ability to make decisions

based on timely and accurate information, to implement those decisions, and to track progress on the expected results. This capacity building is required both for competence building among platform operators and users, and for consolidation and reinforcement of a network of civil and private sector partners.

The second element concerned revenue — increasing and diversifying energy sales and enhancing the energy clients' ability to pay for energy services by increasing the income-generating potential of using the platform's end use equipment. Due to the income poverty in the villages, the platform's services are needed to release the time to generate income, and at

TYPE OF TRAINING	TYPE AND NUMBER OF BENEFICIARIES	TRAINERS	EXPECTED RESULTS
Feasibility Study	Buyers and managers of platforms [8,000 in 60 villages]	Project Staff and partners	Ability to make decisions on the acquisition of a platform, using baseline information produced.
Conduct of Feasibility Studies	NGO and consulting partners —per zone [40]	Project Coordination Unit	Ability to perform village-specific feasibility studies and undertake follow-up activities based on the results.
Operation and Management of Platform	Women's management committees (average eight women per platform) [350]	Training specialists, NGOs, Consulting Groups	Ability to manage the operation of the platform and present results to Women's Association.
Literacy and Numeracy	Women's management committees and operatives (on average 20 per platform) [800]	Training specialists, NGOs, Consulting Groups	Effective use of bookkeeping and record keeping tools.
Entrepreneurial Activities	Women's committees (on average eight per platform) [350]	DEFSAM, APROFA (programmes supporting women's enterprises)	Diversification and increase of income generated by platforms. Increased time gain by clientele.
Training of Fabrication Artisans	Fabrication Artisans	Association of Artisans ACMGS	More people able to produce batches of platform parts and components.
Training of Maintenance Artisans	Maintenance artisans [eight]	Project Coordination Unit and artisans already trained by project	Reduction of downtime and effective preventive maintenance service.
Training of Rural Artisans	Rural artisans [10]	Rural training centres	Increased availability of end use services to villages.

The artisans have all tended to be men, despite efforts to recruit women. Some rural training centres now train a few women, who may be able to become artisans. Operators and managers of platforms are women.

the same time income is needed to pay for the energy services.

The third element involved reducing costs while maintaining platform effectiveness and increasing the reliability of energy supply. In particular, high transport and communication costs can reduce financial and operational viability. The project has responded to this by attempting to establish supply zones, replying to requests in geographically circumscribed areas rather than those scattered over vast distances. Since June 1999, regional support and advisory units have been reinforced to make them more responsive to local conditions and better able to act as market-making intermediaries between the women running the platform enterprise and a network of financial, technical and commercial suppliers. The costs of financial, technical and commercial services to the platforms can then be supported by a larger number of platforms in a cluster of villages. This concentration of platforms also makes it possible to set up a system of preventive maintenance to reduce downtime and ensure technical sustainability.

Stakeholder participation

The relationship of the project to the two levels of clients—those who purchase the platform, engine and equipment and those who are the end users of the equipment—is now more firmly seen from the outset as a contractual relationship. The contract establishes a collaborative relationship among the project staff, the different clients, and their partners over three broad phases of intervention lasting around two years on average: the feasibility decision making phase; the installation phase; and the operational phase. The capacity building and close support is concentrated in the earlier phase, progressively fading out until the women's energy enterprise can be autonomously managed and a network of private suppliers and partners has been established.

The project only responds to requests for acquisition of platforms from women's associations.

Before a platform is installed certain criteria must be fulfilled: the economic, social and technical feasibility study results have to be positive; the portion of the equipment costs to be paid by the village has to be mobilised; and a woman's management committee has to be appointed by the women's association. At the installation phase, training and technical support is given to the management committee, teaching members to operate the platform, keep books and accounts, and perform simple maintenance. All services required by the platform—including installation, repair, and maintenance—are handled by the private sector and paid for by the beneficiaries. Throughout the feasibility, installation and operational phases, training and follow-up activities take place in the villages, coordinated by project staff.

The support and advisory units based in Sikasso, Bougouni, San and Sévaré are responsible for leading villages through all the stages of the platform process, from the initial feasibility

study to the installation and management of the platform. There is a unit head plus a technician and at least two village level facilitators per unit. Their mission includes helping women to organize themselves into groups, training managers and operators of the platform, verifying orders and installation of the platforms, and assisting clients in fulfilling bank loan conditions.

At the national level, a coordination unit is based in Sévaré to monitor and evaluate the advisory units. It is also responsible for overall programming, management and implementation of the project's field activities, including financial and purchasing activities, for training activities, and for collecting and analysing data. This coordination unit is supervised by a national coordinator, who prepares work plans and budgets and presents progress reports every three months. The staff includes two socio-economists and an engineer.

The national coordinator represents the Government of Mali in the project and is accountable for its overall financial and strategic management. She is also responsible for coordinating the project's activities with government policies and other donor programmes. She is the facilitator of the coordination committee, which meets twice a year to discuss ongoing activities, results and problems encountered. This committee is composed of all the partners of the project, national organizations concerned with project activities and interested donors.

Financial mobilisation and access to credit

The project has an overall budget of about US\$2.5 million provided by UNDP, with co-financing by the Norwegian Government. Up to now it has mobilised local partnerships to finance platforms and training costs, involving non-governmental organisations (NGOs), other donors, the private sector, social clubs and a few individuals. Grants from development agencies, either multilateral or bilateral, are the foundation upon which further resources are mobilised. One of the innovative methods developed by the project has been to use the Internet to find partners for villages. A web site is currently under construction that will enable potential global benefactors to target particular villages, an entire platform, or any combination of end-use equipment.

The project provides grants of up to \$1,500 for platforms, and up to \$10,500 for mini electric grids or mini water networks, provided they are deemed to be financially viable. Without these grants, the women's associations would not be able to afford to purchase the platforms. The size of the grant for a particular village is determined after taking into consideration the cost of the basic modules and the village's ability to mobilise capital for purchasing a platform.

The women's associations that purchase the platforms finance on average between 40 per cent to 60 per cent of the total equipment costs of the platform, and pay for all the maintenance and operation costs.

The project has no line of credit. Up to now, project staff have concentrated on producing feasibility studies to convince financial institutions of how bankable the platforms are. The regional support units can sometimes act as intermediaries in approaching local banks and other financial institutions, providing assurances about platform enterprises on the basis of feasibility studies and collaboration contracts, and helping to reduce the transaction and information costs that often deter risk-averse banks from providing loans for these purposes.

The project management is currently exploring the possibility of negotiating a loan guarantee fund and drawing up a framework agreement with national rural credit unions and savings and loan societies such as the Nyésigiso in Mali.

At this point, if credit is available to the women's committee as an economic entity, it is usually through a village associa-

tion, and depends on the latter's willingness to obtain credit on behalf of the women's committee, as well as on their own creditworthiness. Generally the platform project suffers from the overall weaknesses of the financial system in rural areas. Where credit is developed at all it is in areas where there are traditional cash crops and the system is very much tied to financial cycles linked to agricultural seasons.

The issue of collateral requested by banks also poses problems relating to who actually owns the enterprise. There is a need to tighten up the legal framework in rural areas where the concept of formal individual ownership is not the norm.

Generally only the more well-endowed villages or women's associations are likely to be able to obtain project loans. The modular nature of the technology, however, means that everything does not need to be paid for at the same time, and that

EXAMPLE OF ACTUAL USAGE PATTERNS IN KONDOGOLA, SAN SUPPLY ZONE, OCTOBER 2000

Number of women customers	843.0
Number of men customers	4.0
Number of machine hours	133.25
Number of machine hours per day	4.3
Average number of customers per day	27.0
Time use of machine per customer (minutes)	9.4
Revenue per hour in CFA francs	1269.0
Expenditure per hour in CFA francs	936.0
Expenditure per customer in CFA francs	199.0

Amount in Bank in CFA francs 557,235.0

BREAKDOWN OF EXPENDITURE, KONDOGOLA, OCTOBER 2000

EXPENDITURE

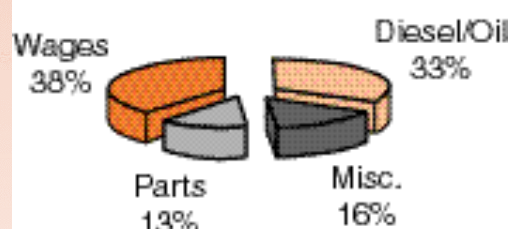
Diesel/oil	40,750
Miscellaneous	20,150
Parts	16,000
Wages	47,915
Total	124,815

RECEIPTS PER END USE (FCFA), KONDOGOLA, OCTOBER 2000

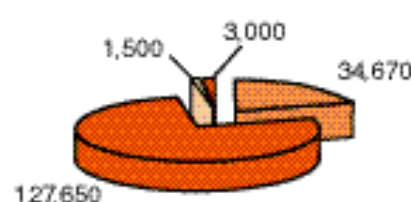
RECEIPTS

Milling	34,670
Crushing	127,650
Battery charging	1,500
Welding	3,000
Total revenue	166,820

BREAKDOWN OF EXPENDITURE, KONDOGOLA, OCTOBER 2000



RECEIPTS PER END USE (FCFA), KONDOGOLA, OCTOBER 2000



gradual acquisition can be possible, especially if there is significant scope for increased cash flows from payments for energy services provided by the platform.

Training and capacity building

The main methodological tools used in the project involve economic analysis, socio-economic gender analysis, and participatory decision making in a non-literate context. In terms of economic analysis, the emphasis is on being able to apply the concepts of willingness-to-pay and ability-to-pay to the structure and functioning of rural economies. This is closely linked to gender analysis, which is crucial for modelling household behaviour, and for understanding the implications of relations between women and men for economic behaviour and outcomes, in terms of income, spending and production.

The design of analytic tools and methodologies, as well as training activities, has taken into consideration the characteristics of those who are being trained, what the training is for and what it should be about. The training puts considerable emphasis on knowledge and analytical skills, but also on attitudes, motivation, behaviour and perception.

The primary beneficiaries of project training are at the village level—the members of the women's management committees. Other beneficiaries include private artisans, as well as local NGOs and consulting firms who receive training to undertake training activities and feasibility studies on behalf of the project.

The table on page 64 summarises the types of training for different actors involved with the platform project. The numbers relate to training conducted in 2000.

Participatory feasibility studies

In the feasibility stage—determining whether a platform is affordable for a village—the project staff must conduct an economic analysis in a rural setting where the essence of the exercise is to save human time and energy by introducing machines. One difficulty is that the principal agents and actors within the village often do not have watches and cannot tell clock time and are not numerate or literate. This calls for special methods of sharing and communicating knowledge among the project staff and the village level clients, and in particular with the women, who tend to be most excluded from participation mechanisms which require attending, and speaking up at, time-consuming meetings.

In a participatory feasibility study, the first step is to present information about the platform and all the available end use equipment, along with the terms and conditions attached to purchase of a platform. The next step is to identify the clientele for each piece of equipment, through a specially-designed “voting” system. For example, with regard to post-harvest pro-



A metal shed houses the multifunctional platform, two of the food processing attachments and a blackboard for keeping track of its use.

cessing, different combinations of price and quantities of grain and shea nuts are arrayed on the ground and potential women clients line up in turn to indicate the frequency of purchase for each season, using counters. Each client's name and household is registered at the time of “voting,” after which a number of indicators can be developed and the data cross-tabulated. The same approach is taken for battery charging, water and electric lighting but the “voters” for these services are more likely to be men.

In the same sitting, the clients are asked to identify what they expect the benefits to be from use of the platform equipment. Frequent responses include: more time for rest or for doing other activities; improved drinking water quality; better trade opportunities; and increased production volume or value added to activities already done manually. An active and direct participation by the clientele is ensured because the exercise does not take more than 10 minutes of a woman's time, she does not have to speak, and can fit the activity even into the middle of meal preparation. It is usually fun—a social event and a welcome break from the daily routine.

This exercise provides the main data for calculating expected receipts from platform operations, to determine financial feasibility, as well as for identifying the baseline situation for the expected clientele, outcomes and impacts.

The feasibility study also examines the purchase of the platform itself by the women's association, including indicators relating to financial mobilisation possibilities, the shares of different parties, the mobilisation of social and institutional capital, and the risks and conditions for long-term financial and institutional viability of the platform. The costs for expected operations in terms of machine hours are then worked out. They include operating costs for fuel, preventive and corrective maintenance, salaries of operatives, credit repayment and depre-

ciation for the end use equipment configuration. The financial viability is then assessed.

Such a study can be conducted with trained and experienced staff or partners over an average of five or six days of field work per village, including travel to the site. At the end of this period, the results and conditions for financial, technical, economic and social sustainability are known and shared, the decision is made about whether to purchase a platform, the elements of a contract are agreed upon and a work plan is established for the installation phase.

Such village-specific interventions must be included in the costs of a viable decentralised energy supply. Infrastructure projects generally fail for management and operational reasons, rather than for technical reasons. The feasibility study represents a substantial but necessary investment of time and resources to minimise the risk that equipment is misused, underused or inappropriate.

Benefits to women

While the overall goal of the installation of a platform is to secure benefits for women, considerations of technical, economic and social viability require a more differentiated gender approach. The project has developed an approach that does not treat all women as a homogeneous category, and which differentiates between women as clients of the energy source and the various end-use equipment, and women as energy entrepreneurs.

For the energy entrepreneurs, benefits to the women tend to be amplified through collective empowerment strategies as they set up the platform and operate it. The creation of a decentralised energy enterprise owned and managed by women can generate strong dynamics for structural transformation in a setting where land and agricultural based assets are primarily owned by men and tasks are performed by women as unpaid obligations to men.

The enterprise functions as a small scale but formal sector industrial operation. It is physically removed from women's residential premises. Operators are taught to run the machinery, keep accounts and stock inventories, maintain a register of clients, and perform general maintenance activities. They develop functional literacy and numeracy. They must manage bank accounts and provide reports on their operations to the Women's Association. Perhaps most importantly, they receive income for their work.

The profile of women user beneficiaries is quite varied and has significant implications for gender-sensitive poverty reduc-

tion. Older women with declining energy levels and strengths—but more time—tend to use the platform for income-generating purposes, such as processing shea nuts into butter and soap. Their willingness to pay is high and is based on their ability to generate income.

For women who are energy poor, access to end-use equipment is particularly important because they cannot mobilise other people's time and energy by means of family networks or access to land. Households with higher food security throughout the year, and women who have access to private plots, can better afford to use the equipment, but for poorer women the existence of an energy supply with a variety of end use equipment is still a benefit, even if their use of it is irregular and infrequent. It enlarges their options for trading during market days or for gaining time to collect "wild" resources. Data collected in drawing up village baseline information concerning platform feasibility can generate such disaggregated data and permit analysis of its socio-economic relevance.

Women's economic and social options are set within parameters prescribed by men, in ways which differ across villages, and indeed across and within households. In some villages, the economic opportunities generated by the platform include the ability of women to have access to small individual plots that they now have time to tend and control for their own use. These opportunities may be limited by men, however, who state that they want to limit the size of such plots to ensure a supply of women's labour for their own fields.

Involvement with the platform enterprise increases the ability of women to bargain and negotiate within existing norms, since an available energy supply reduces the time and energy intensity of women's obligations and also increases the possibility of income generation. In one village, for example, men forego breakfast during the period of shea nut harvesting, because women are out gathering for as much as three hours each morning. With the platform, they can now crush larger amounts for income generation, while still providing butter for household consumption.

There are benefits to men as well that come as a result of the benefits to women, including (generally) more timely meal preparation, greater availability of beer brewed using milled grain, and the release of women's time and energy to work in their fields as unpaid family labour. Men also benefit from women's income by spending less of their money on certain items for which they are normally responsible. Men benefit directly from the availability of the platform's services as well, since they too obtain greater access to energy for their own occupations.

LESSONS AND CHALLENGES

The major challenge is how to build on and expand the learning-by-doing process through which the multifunctional platform project has brought decentralised energy to rural villages.

The scope for the multifunctional platform to reduce energy and income poverty on a significant scale rests primarily on a close integration of village-specific interventions with institutional and policy interventions at the national level. Currently, the national poverty reduction strategy does not explicitly analyse or take into account energy and time poverty, or their connections with gender relations.

In order to affect national policy, the project needs to increase its capacity to collect reliable data and generate monitoring mechanisms, outcome evaluations and impact indicators, which can be aggregated from the village to the national level. This will require strengthening the capacity of project staff and partners, as well as adding staff and resources.

The micro level data generated by the project shows that women identify rest and time for income generating activities as two of the main benefits expected. Changes in the proportion of women's time spent in these broad categories can be used as indicators of increases in well-being related to operation of the platforms. It is precisely this type of micro level data aggregated to the macro level that is needed to mainstream gender in policy

and planning processes.

The need for rest and the willingness to pay for rest by women is a compelling indicator of the depth and severity of their energy poverty. The implication of this need for rest is that a floor has been reached in terms of women's capability to maintain themselves, with significant trade-offs in terms of health, education and well-being. Under these circumstances, any labour-intensive strategy of growth for poverty reduction, if it means a human energy overload, would be counter-productive and bound to fail. Yet this information is not available to inform macro-economic and energy policies, or national planning.

Mainstreaming the platform project at a national level will require enhancement of the capacity of the national director, the national coordination committee, and the decentralised support units (in terms of time, resources, skills and knowledge) to support a bottom-up, village-level process for decentralised energy supply. It will also require development of decentralised credit and financial mobilisation mechanisms.

Significantly, the project has received recognition and attention in other countries as well, and recently a regional programme was set up in West Africa as a result of interest expressed by Burkina Faso, Côte d'Ivoire, Guinea and Senegal in adopting the platform approach.

The creation of a decentralised energy enterprise owned and managed by women can generate strong dynamics for structural transformation in a setting where land and agricultural based assets are primarily owned by men and tasks are performed by women as unpaid obligations to men.