



Micro loans for thermal insulation

A Product Documentation Based on Experience in Tajik Gorno-Badakhshan



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for Economic Cooperation
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1. Introduction

Dear readers,

it is a narrative which can be heard in almost every household in the Tajik Pamirs: When in 1991 the Soviet Union broke down and the supply of cheap coal from outside came to a sudden end, when the civil war broke out in 1992 and Gorno-Badakhshan Autonomous Region (GBAO) was isolated from the rest of the country, local people started using the only resources for heating purposes which were still available: firewood from the riparian forests in the Western parts of Gorno-Badakhshan, teresken shrubs on the high plains in the Eastern parts. After a few years, in many places the forests and teresken shrubs were cut down almost completely. Even today, keeping the house or at least one room warm in winter remains a key issue for local people. The inhabitants of Gorno-Badakhshan continue using natural resources for this purpose, not only spending a significant percentage of their income and much labor on fuel provision, but also harming the sensitive ecosystems.

Many of these problems could be mitigated if houses were properly insulated. The pressure on natural resources could be reduced and the quality of life improved. Thermal insulation means an investment - households have to spend money in the beginning but will save money later thanks to reduced fuel consumption and less health risks. Like other investments, thermal insulation can be financed via micro loans, as the example of the microfinance organization MADINA in Gorno-Badakhshan shows. Supported by the projects „Sustainable Management of Natural Resources in Gorno-Badakhshan“ (implemented by GTZ, DED and CIM) and „Support for microfinance services in rural regions“ (implemented by GTZ), MADINA has been developing a micro loan product for thermal insulation since 2008 and some 150 houses have been successfully insulated until June 2010.

With large parts of the territory of Tajikistan being mountain regions with cold winters, there is a high potential demand for thermal insulation. International donors have identified energy efficiency as a key issue of development cooperation and are making significant funding available for activities in this field. These framework conditions make it attractive for microfinance organizations in Tajikistan and beyond to follow the example of MADINA and to offer a micro loan product for thermal insulation.

This publication is intended to give support to microfinance organizations planning to work in the field of thermal insulation. They will get acquainted with the structures and processes which have been established by MADINA and may decide on their own in how far these structures and processes fit to their specific framework conditions. Although the example cannot be copied without adaptation, this documentation provides an insight view and facilitates a better understanding of what is important when developing a micro loan product for thermal insulation.

MADINA has had to work under extremely challenging conditions in remote Gorno-Badakhshan. The experiment with micro loans for thermal insulation has proved to be successful in the end, but many mistakes have been made and many lessons have been learnt before this result could be achieved. It is one of the main aims of this publication to hand over these lessons learnt so that other microfinance

Gorno-Badakhshan

The high mountain region of the Pamirs extends from Afghanistan in the West and South to Kyrgyzstan in the North and China in the East. Most of the Pamirs, however, cover Gorno-Badakhshan Autonomous Region (GBAO) in Eastern Tajikistan. In the Western part of Gorno-Badakhshan, agriculture is practiced and riparian forests are growing in the river valleys. In contrast, on the high plains in the Eastern parts, at an altitude of about 3,500 meters above sea level, the land is sparsely populated and teresken shrubs form the only vegetation.

Natural resources

In Soviet times, Gorno-Badakhshan was of high strategic importance and therefore enjoyed a generous supply of subsidized goods and fuel. At that time, natural resources in the Pamirs remained largely unused. When Tajikistan became independent in 1991, however, not only the provision of subsidized fuel stopped, but the following civil war also resulted in a humanitarian disaster. Refugees came to Gorno-Badakhshan, governmental control was absent and in many regions the riparian forests were cut down almost completely. Since then, forests have had no chance to recover because they have been overused as pastures and as a source for firewood, without being effectively rehabilitated. In the Eastern Pamirs, teresken shrubs have been used excessively as fuel and vanished in a distance of 70 kilometers around the only major settlement Murgab, which has resulted in massive soil erosion and degradation of pastures.



Microfinance organization MADINA

MADINA was founded in 2001 as a social organization based in the provincial capital of Khorog and registered as the first micro-finance organization in Gorno-Badakhshan in 2005. Its mission is to reduce poverty by supporting the development of businesses and to foster a sense of investment among those who cannot afford a regular bank loan. In May 2010, the organization had 16 staff members and some 600 clients. The loan portfolio had reached 300,000 US-Dollar. Getting support from GTZ, MADINA started developing a micro loan product for thermal insulation in 2008.

organizations do not make the same mistakes and can establish the micro loan product in a more focused way.

This publication contains two kinds of information: The main text describes in a rather abstract but detailed way how a micro loan product for thermal insulation may finally be working, which structures and processes may be established. The grey text boxes on the left and right provide background information and lessons learnt, mostly based on the concrete experience of MADINA.

The micro loan product for thermal insulation offered by MADINA is all but finished. New lessons will be learnt over the next few months and new ideas will emerge. It is highly probable that the users of this first edition will make experiences in the meantime which will be of utmost relevance for the second edition. Therefore we would like to invite you to share your experiences and opinions with us so that we can jointly further develop these micro loan products and contribute to the dissemination of thermal insulation.



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2. Thermal insulation

2.1. Poor state of insulation

In high mountain regions, heating private houses is an important question of quality of life and sometimes even of survival. In many cases, energy is used in a very inefficient way, as the heat provided by the stove or the electric heater gets lost quickly. The efficiency of energy use depends to a high extent on the thermal insulation of the building: If thermal insulation is poor, warm air inside the building and cold air outside the building exchange very easily. There are three types of heat transfer:

- Conduction (through materials)
- Convection (through circulating air)
- Infrared radiation

2.2. Consequences of poor insulation

Such a poor state of insulation has economical, social and ecological impacts. If heat isn't conserved inside the building but gets lost, much energy is needed to keep it warm inside the building. But energy isn't cheap any more: Expenses for electricity, coal or firewood form a significant part of the household budget, which then isn't available for necessary investments any more. Many households don't buy firewood or dried manure, but collect and prepare it on their own. This work consumes much time and prevents adults from generating further income and children from studying.



A typical roof-hatch window on a Pamiri house. The high consumption of firewood for heating is closely related to the bad condition of wooden constructions. As warm air concentrates in the upper part of the room, particularly much heat is transferred through poorly insulated roof-hatch windows.

In many cases, families decide to heat only two or three times a day in order to save fuel in winter. This would be no problem if the heat was kept inside the room for a few hours. In most cases, however, it gets cold inside the room very quickly once the fire has gone out. Temperatures vary often and significantly, which decreases the comfort of living and causes additional health risks particularly for children and elder people.

Pamiri houses

In the high mountain region of Gorno-Badakhshan, winters are particularly cold. At the same time, traditional Pamiri houses usually have only one large living and sleeping room which is difficult to heat under the harsh climate conditions in winter. In Soviet times, little attention was paid to the thermal insulation of floors and ceilings because sufficient cheap fuel for heating was available. Moreover, after the Republic of Tajikistan gained independence, many houses have fallen in a state of disrepair: Windows are only single-glazed and glasses are broken, big slots prevent a hermetic closing of the door and in some cases roof-hatch windows are only covered by cellophane instead of glass. As a result, such houses emit much unused heat.

Finally, as in rural areas mostly natural resources are used for heating, a bad thermal insulation has negative ecological consequences as well. The more firewood is used for heating, the more trees in the forests are cut down. The more manure is burnt in the stoves, the less of it can be used as fertilizer. Especially in dry regions, the consequence is increasing land degradation which severely hinders socio-economic development.

2.3. Thermal insulation

Thermal insulation is aimed at reducing the transfer of heat out of the building. As a result, the inside temperatures are more constant and less energy is needed for keeping the building warm. Among others, the following measures can be applied to insulate a building:

- Using double-glazed windows and sealing them off (e.g. with silicon) in order to use the greenhouse effect - the sunlight can come in and heat up the room, but the warm air cannot get out.
- Using well-closing doors so that hot air cannot pass through any slots.
- Insulating the floor with insulation materials in order to avoid heat losses.
- Insulating the ceiling and the roof with insulation materials in order to avoid heat losses.
- Insulating the walls with insulation materials in order to avoid heat losses.



A typical Pamiri house in the village of Barvoz in Gorno-Badakhshan. In spite of the long periods of cold in winter, single-glazed windows are still quite common in the region.

All these measures are intended to reduce heat transfer through conduction and convection. Most of the heat, however, is lost through infrared radiation which can be reduced by using reflective foil.

2.4. Effects of thermal insulation

Thermal insulation contributes to a reduction of heat exchange between indoor and outdoor, and therefore may have two main effects: Either less fuel is necessary to heat the house or room, or with an equal quantity of fuel the indoor temperatures can be significantly increased.

A reduction in fuel consumption means a reduction either of financial expenses or of labor, so the saved money or time can be used for other purposes - ideally for mak-

ing investments and creating additional income sources. Higher and more constant indoor temperatures can be expected to contribute to a reduction of health risks and to a more comfortable life in winter.

Going beyond the level of the individual household, a reduction in fuel consumption means less pressure on natural resources: The less firewood is used for heating, the less the forests will degrade, and the less manure is burnt in the stoves, the more of it can be used as fertilizer on the arable land.

3. Micro loan „Warm comfort“

3.1. Background

Microfinance organizations in Tajikistan usually give micro loans for business purposes, education, labor migration and other investments. However, also thermal insulation can be regarded as an investment, as it helps saving money in the future. Therefore, as the example of the microfinance organization MADINA shows, which has developed a micro loan product „Warm comfort“, it makes sense for microfinance organizations to give micro loans for thermal insulation purposes.

3.2. From the perspective of the microfinance organization

In addition to the usual products, the microfinance organization offers a micro loan for thermal insulation of up to 500 US dollars. In the case of MADINA, it gets the loan reimbursed within up to 12 months and an interest of 2.5 percent per month on the remaining loan amount. The interest rate is that high for several reasons: Under local conditions in Gorno-Badakhshan, there is a significant risk that the credit is not reimbursed. The interest has to compensate for the inflation which is to the disadvantage of the microfinance organization. Moreover, the micro loan product should be sustainable, so the income from the interest must allow the microfinance organization to increase its portfolio continuously.



Teresken reserves on the high plains of Eastern Gorno-Badakhshan. In many areas, the teresken bushes have been cut down almost completely for heating purposes. Thermal insulation helps in reducing the consumption of teresken and in protecting the fragile ecosystem.

Besides managing the loan, the microfinance organization also offers technical support to the client by giving recommendations for thermal insulation measures, and by organizing the provision of insulation materials and trained workforce.

As the microfinance organization is in full control of the whole thermal insulation process and the loan is given in kind, it is guaranteed that the loan is used for the agreed purpose. Provided that the microfinance organization has a mission of

Nabot Dodkhudoeva, Director of the microfinance organization MADINA (Khorog, Tajikistan)

“If we just wanted to earn money, of course it would be more convenient to focus on business loans. But we have a mission of improving the economic and social living conditions of the population in



Gorno-Badakhshan. The micro loan product „Warm Comfort“ for thermal insulation highly contributes to the fulfillment of this mission. When closing the loan, we usually have a visible result – a well-insulated house in which people live more comfortably than before. Moreover, thanks to this innovative product we got support from GTZ and could increase our portfolio significantly, which makes it easier for us to approach other donors in the future.”

improving people's livelihood, giving micro loans for thermal insulation can highly contribute to the fulfillment of this mission, considering the positive social and ecological impact of thermal insulation.

Moreover, offering micro loans for thermal insulation microfinance organizations can attract new clients who are not interested in business loans but would like to invest into the improvement of their own living conditions. At the same time, an innovative micro loan product for thermal insulation may be particularly convincing to funding organizations, thereby helping the microfinance organization to increase and diversify its portfolio. In our days, climate change is an important issue and many donors are looking for opportunities to financially support projects and activities in the field of mitigation and adaptation to climate change.

3.3. From the client's perspective

Especially in rural areas, where income is often seasonal and not regular, many households do not have sufficient financial resources available at the right time to afford thermal insulation measures. For such households, a micro loan for thermal insulation may be the optimal solution.

If all financial and technical conditions are fulfilled, the client can get a micro loan of up to 500 US dollars for the implementation of the recommended thermal insulation measures. Instead of receiving money in cash, however, he is provided directly with the thermal insulation materials and construction services, so that high quality is guaranteed and little work remains to be done by the household members themselves. Besides this, as the microfinance organization purchases materials for its clients in large quantities, individual clients also profit from discounts.

Thanks to the micro loan, clients don't have to pay a large amount of money at one and the same time, but have up to one year to reimburse the loan. For example, with a flexible reimbursement schedule the micro loan makes it possible to implement the thermal insulation measures during the construction season in summer, but to reimburse most of the money during the harvest season in autumn, when enough financial resources are available. In addition to reimbursing the loan, clients have to pay the monthly interest on the remaining loan amount. As a result of thermal insulation, clients will consume less fuel in following seasons, thereby saving financial resources so that the investment finally pays off.

3.4. From the outside perspective

Thermal insulation has many advantages: Households can save financial and time resources which can be used for other purposes. The living comfort is increased and the frequency of having a cold decreases. Moreover, with less firewood and manure being needed for heating, the overuse of natural resources and land degradation are reduced significantly.

For international funding organizations, of course it would be an option to support NGOs or state institutions in insulating houses for free, instead of funding a micro loan product for thermal insulation. However, the micro loan product has two crucial advantages over any support free of charge: Firstly, through a micro loan the money is not only invested once but is used again and again by the microfi-

Bekchoroev Khomakmat, micro loan client (Murgab, Tajikistan):

"I took a 500 dollars (2,200 Somoni) micro loan in 2008 and used it to insulate the floor, the ceiling and the window of our winter room. Here on the high plains of the Eastern Pamirs, we use coal and teresken shrubs for heating. In earlier times we needed three tons of coal and 100 bunches of teresken, spending more than 3,000 Somoni per winter. After implementing the thermal insulation measures, however, we only consumed half the amount of fuel, saving some 1,500 Somoni each winter. So in our case the micro loan pays off after two years already."



Heike Volkmer, DED technical advisor for energy efficient technologies (Khorog, Tajikistan):



“In 2009, we supported the microfinance organization MADINA in insulating some 70 houses. Our monitoring has shown that those households which implemented thermal insulation

measures correctly could reduce their fuel consumption by 30 percent in average. 75 percent of them said that it had become warmer inside their winter room, and 35 percent said that household members had got ill less often. However, we have also understood that the poorest part of the population is not eligible for micro loans and that we do not reach them with this approach. The idea therefore is to establish an additional micro loan product for this target group: The poorest households have the chance to take a micro loan but get the interest rate paid by a donor, so that they only have to reimburse the loan amount. From the perspective of the microfinance organization, this concept does not imply any changes and the micro loan market is not distorted.“

nance organization to finance thermal insulation measures. Secondly, a micro loan creates ownership and helps to identify the motivated target group which is really interested in thermal insulation and ready to pay for it. Households taking a micro loan have made a conscious decision in favor of thermal insulation and regard it as an investment which is worth the money. They can be expected to have understood the advantages of thermal insulation much better and to be much more interested in maintaining the double-glazed and sealed windows, for example, than people whose house has been insulated for free.

In many regions there is still little knowledge about thermal insulation. In such places, microfinance organizations have to raise awareness and promote the supply of thermal insulation products and services on the local market. In the end, they do not only serve their own interest in making money with micro loans, but their activities will also have a positive long-term effect. Once people see the effect of thermal insulation in their neighbor's house, and once well-insulated windows are available on the local market, thermal insulation will be disseminated even without facilitation by the microfinance organization. Moreover, the efforts of the microfinance organization in promoting the supply of thermal insulation products and services by local craftsmen and businessmen can be expected to have a positive effect on business development.

4. Conditions for the product

4.1. Potential for thermal insulation

When developing and establishing a micro loan product for thermal insulation, a few requirements should be kept in mind. First of all, such a product only makes sense if there is a significant demand for thermal insulation in the respective region. There are several factors which should be taken into account in order to understand the market potential for a micro loan product for thermal insulation, for example:

- Climate: If winters are long and cold, people have a particularly strong motivation to make it warmer inside their house.
- State of insulation: If houses are poorly insulated, the potential for attaining good results through thermal insulation is particularly high.
- Awareness about thermal insulation: If people already recognize and understand the problem of poor insulation, they will be more interested in a micro loan for thermal insulation. However, in many cases awareness can also be built in the framework of the product marketing.
- Fuel consumption patterns: The more financial or time resources are spent on fuel, the more people usually are interested in reducing their fuel consumption. This depends on the energy sources (e.g. coal is usually more expensive than manure), the quantity of fuel consumed (e.g. in colder regions the consumption is usually higher) and the way of fuel purchase (e.g. in some regions people cut firewood in their own garden, in others they have to buy it from the forestry agency).
- Potential for reimbursing the loan: There should be a significant number of households which are both interested in taking the micro loan for thermal insulation and able to reimburse it.



A house in the village of Langar in Gorno-Badakhshan, at an elevation of almost 3,000 meters above sea level. Winters here are long and cold, and firewood is not cheap, therefore thermal insulation is an attractive option for the villagers.

4.2. Capacities of the microfinance organization

A micro loan product for thermal insulation requires particular structures and processes which are not necessary for business or consumer loans. Therefore the microfinance organization should have the capacities to establish such structures and

Nabot Dodkhudoeva, Director of the microfinance organization MADINA (Khorog, Tajikistan)

“In many cases additional structures and processes have to be established for thermal insulation loans. For example, MADINA has set up an energy efficiency department with one engineer who conducts technical analyses, gives recommendations with regard to thermal insulation measures, organizes the delivery of construction materials and manages the construction works. In order to assure good quality of the thermal insulation measures, we also have had to become involved in the training and coordination of carpenters and construction workers. Even if framework conditions may be better elsewhere, it should be kept in mind that offering micro loans for thermal insulation is a more complex business than offering conventional loans.”

processes, i.e. it should

- have a relevant social or ecological mission, to the fulfillment of which a micro loan product on thermal insulation can contribute.
- have a portfolio of at least 100,000 US dollars, so that sufficient organizational capacities are available.
- offer other micro loan products as well, so that risks are diversified. The micro loan product for thermal insulation should account for not more than 35 percent of the whole portfolio.
- be able to establish and to finance an energy efficiency department which manages the technical aspects of thermal insulation.
- have good contacts to local craftsmen and businessmen in order to organize the supply of thermal insulation products and services.

4.3. Funding for the product

Sufficient funding for the micro loan product for thermal insulation is indispensable. In most cases, support from a funding organization will be needed in order to increase the portfolio. When approaching potential funding organizations, the microfinance organization should have elaborated a convincing concept for the micro loan product for thermal insulation, which includes the development of the supply side and awareness raising, and point out the innovative character of the micro loan product (see appendix 2.2.). With such a concept, funds can be raised from organizations which promote energy efficiency and would otherwise be rather disinterested in microfinance products.

4.4. Production and service environment

The launching of a micro loan product for thermal insulation only makes sense if thermal insulation products, materials and services in appropriate quality are available on the local market and can be financed through the micro loan. This means that there should be

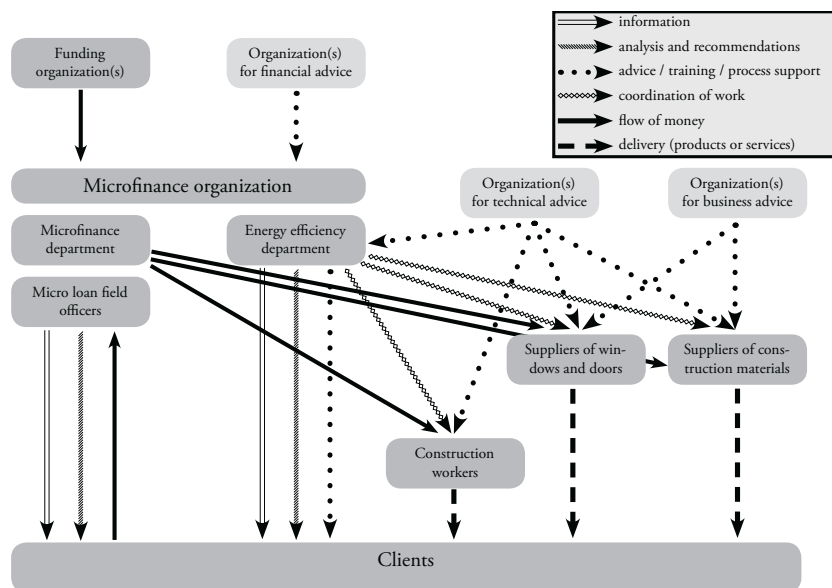
- local producers or importers of well-insulated and good quality windows and doors
- businessmen trading insulation materials and
- qualified construction workers able to implement thermal insulation works in appropriate quality.

If this condition is not fulfilled, the microfinance organization itself or local partners may have to get involved in the development of the supply side of such products, materials and services (see chapters 8 and 9).

5. Involved stakeholders

5.1. Background

In the process of giving micro loans for thermal insulation, different financial and technical stakeholders are involved. It is indispensable for the success of the micro loan product that both financial and technical aspects are well integrated into the structures and processes, and that the responsible persons communicate and interact in an effective way. This makes it necessary to establish well-working procedures and to assign clear responsibilities.



Overview over the stakeholders and their interactions. The individual steps of the procedures of a micro loan for thermal insulation will be explained in detail in chapter 6.

5.2. Funding organization(s)

Funding organizations help the microfinance organization to increase the portfolio. In many cases, funding is bound to a specific purpose, i.e. to use the money for pre-defined micro loan products (like loans for thermal insulation). Ideally, the funding organization should not only provide funding for increasing the portfolio, but also support the development of capacities. Special funding for capacity development is particularly recommended in the case of thermal insulation loans, as they require extraordinary structures and procedures for technical consulting and implementation.

5.3. Management of microfinance organization

The management of the microfinance organization is responsible for most of the conceptual work in developing the micro loan product, for strategic decisions and monitoring, and for the contact with the funding organizations. Besides this, in most microfinance organizations the management is involved in the micro loan committee, which takes decisions about the granting of loans.

5.4. Microfinance department of the microfinance organization

This department is responsible for the financial aspects of the micro loan product for thermal insulation. It defines the conditions for the loan and the procedures, coordinates the work of the micro loan field officers and is represented in the micro loan committee.

5.5. Micro loan field officers of the microfinance organization

The micro loan field officers are usually based in the villages and are the main contact persons for the loan clients. Their main task is the financial analysis of households interested in taking any kind of micro loan. Based on this analysis, they give a recommendation to the micro loan committee. After the conclusion of the micro loan contract, the responsible micro loan field officer is involved in the financial monitoring, i.e. visits the client regularly and – depending on the rules of the respective microfinance organization – also controls the reimbursement.

It is important that the micro loan field officers have at least some overview knowledge about thermal insulation so that they are able to answer simple technical questions of clients. Moreover, they should play a significant role in technical monitoring by controlling the process of thermal insulation works.

5.6. Energy efficiency department of the microfinance organization

The existence of an energy efficiency department is a specific feature of microfinance organizations offering micro loans for thermal insulation. It is responsible for the technical questions related to thermal insulation. Representatives of this department visit the client's house in the beginning, make the technical analysis and give recommendations with regard to the thermal insulation measures to be implemented. They coordinate the cooperation with material suppliers, craftsmen and construction workers who are involved in the thermal insulation process, and monitor the quality of thermal insulation works.

Serving as a link between the stakeholders involved in the financial procedures and those dealing with the technical work, the staff of the energy efficiency department should be well-integrated in the microfinance organization and have close contacts to the financial staff. They should have a technical background and be familiar with the details of energy-efficient building and the thermal insulation of houses. Additional trainings on thermal insulation are necessary even for excellent architects and engineers. The members of the energy efficiency department also need to have a good knowledge of the financial questions of micro loans and understand the procedures of the respective microfinance organization.

When the microfinance organization starts working in the field of thermal insulation, it should be enough if the energy efficiency department has only one staff member who is based in the headquarters but goes to the field regularly. With the portfolio for thermal insulation growing, however, it may become indispensable to

Nabot Dodkhudoeva, Director of the microfinance organization MADINA (Khorog, Tajikistan):

„In 2009, we cooperated with freelancing technical consultants who gave technical recommendations in the beginning and then supervised the whole process of thermal insulation works. This decentralized system of technical responsibilities proved to be rather inefficient because the technical consultants were only loosely connected to our financial staff. A close link between the financial and technical aspects of the micro loan was lacking, which often led to delays and communication problems. Once it happened that we could pay the loan to a client only after four months because the technical consultant did not finish the required analysis earlier. Things like this should not happen again because they might severely damage the image of the micro loan product. Therefore it was decided to create a new full-time position: The engineer, who forms the Energy Efficiency department, is based in our headquarters in Khorog and manages the technical analysis, the implementation of the works and the monitoring. As all the technical aspects are concentrated in one hand now, it is much easier to coordinate with the financial staff.“

increase the staff of the energy efficiency department. In the long term, the micro loan field officers could be trained in thermal insulation so that they can take over the technical analysis and monitoring and the separate energy efficiency department becomes superfluous. Another option is to set up cooperation with a partner (e.g. some energy agency) which takes over most technical consulting and monitoring tasks.



A representative of the energy efficiency department and a micro loan field officer are jointly doing the technical and financial analyses in the village of Barvoz, Gorno-Badakhshan. Close and reliable cooperation between all stakeholders is necessary to make the micro loan product a success.

5.7. Suppliers of doors and windows

Single-glazed windows and slots in the doors are a major source of energy losses. In some houses, the windows and doors can be easily insulated, in others they are in such a bad condition that they should better be replaced. Therefore, apart from construction materials, it is necessary to organize the supply of well-insulated doors and windows. In some places, they can be bought in proper quality on the local market. There are other places, however, where only low-quality doors and windows are available, which would show little or no effect with regard to thermal insulation. In such cases, there are two options: purchasing quality doors and windows from elsewhere, or training local craftsmen in producing them. Both options will require considerable efforts from the microfinance organization in coordinating the supply side (see chapter 8).

In contrast to an insulated floor or ceiling, windows and doors are visible objects. If the windows and doors provided by the microfinance organization are not only well-insulated but also appeal to the aesthetic feelings of the local population, they will show positive effects for the marketing of the micro loan product.

5.8. Suppliers of construction materials

For any thermal insulation measure, construction materials (cement, clay, reflective foil etc.) are needed. In order to facilitate the process of purchase and delivery, the microfinance organization should conclude framework agreements with suitable suppliers of construction materials, which may include discount prices for large quantities. In most cases, these suppliers are businessmen on the local market, but some materials may not be available there and have to be bought from elsewhere.

Training craftsmen

Under the difficult conditions of remote Gorno-Badakhshan, no well-insulated windows and doors were available when MADINA launched its micro loan product. Local craftsmen only produced non-insulated standard windows and doors, and the quality of the plastic windows imported from China was so low that they were absolutely useless for thermal insulation. Therefore, in cooperation with the GTZ/DED project „Sustainable management of natural resources in Gorno-Badakhshan“, MADINA started training local carpenters in producing double-glazed wooden windows and wooden doors in comparatively high quality. This created many additional challenges and made it necessary, among others, to give business training to the craftsmen and to organize the coordinated purchase of quality raw materials. As a result, however, a market for well-insulated doors and windows is emerging in Gorno-Badakhshan and local craftsmen are using the opportunity to make a business with these products.

A coordinated purchase of construction materials should bring advantages for the clients, i.e. better prices, delivery conditions and quality than if they bought the materials on their own. Such advantages, which can be negotiated in framework agreements, can make up an additional marketing argument for the micro loan product.

5.9. Construction workers

Once the construction materials and the doors and windows are purchased, the thermal insulation measures have to be implemented. In order to guarantee quality, the implementation should be done by qualified construction workers. They should not only have general experience with construction work, but also have got an extra training with regard to the thermal insulation measures offered by the microfinance organization, e.g. the installation of new windows and doors, the insulation improvement of existing doors and windows, the insulation of floor and ceiling.

The construction workers have their own independent business, but they have a framework contract with the microfinance organization which says that they are ready to implement construction measures according to the agreed conditions and prices, observing pre-defined quality standards. Such framework contracts are also important to make sure that the workers are actually available during construction season, which lasts only a few months in some regions. On the basis of these framework contracts, the energy efficiency department gives orders to the construction workers to implement specific insulation measures in a certain house. In the end, they are paid directly by the microfinance organization.

5.10. Clients

In principle, every person owning a private house can receive a micro loan for thermal insulation. However, there are two preconditions: The financial analysis must show that the household is able and willing to reimburse the loan, and the technical analysis must show that the planned thermal insulation measures will have beneficial effects with regard to living comfort and fuel consumption.

Clients do not receive any money in cash, but only get the needed construction materials, products and services delivered in kind. This makes the whole process much easier for the clients, because they get the whole work done by professionals and only have to reimburse the loan according to the agreed schedule.

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„In 2009, the clients themselves had to organize the implementation of construction works. They were supervised by freelancing technical consultants who had been trained in the implementation of



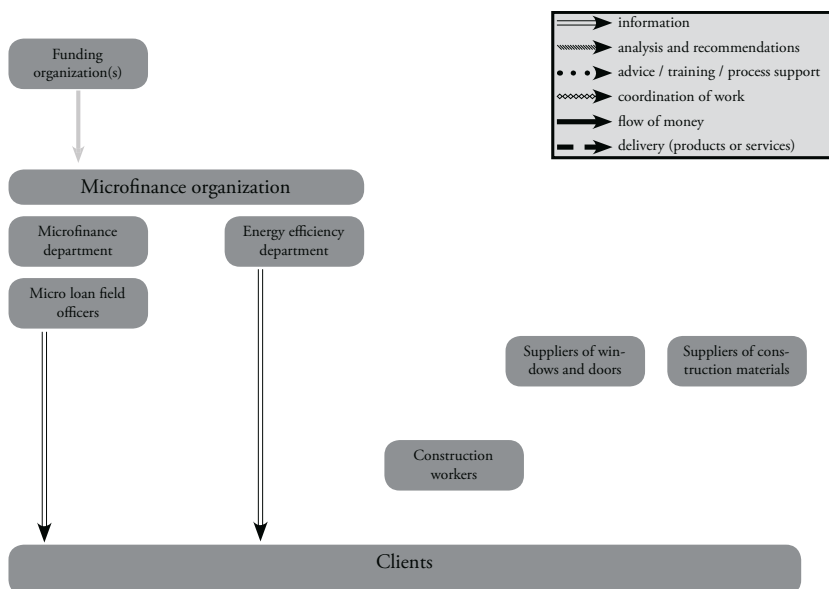
thermal insulation works. These technical consultants, however, mostly were no professional construction workers and had other jobs as well, so in many cases they showed little commitment to the thermal insulation issue. Some of them were also based in the provincial capital of Khorog and had little understanding of the situation in the villages. Besides this, it was a strange situation that the know-how was with the supervisors, but not with those who actually implemented the works. I remember one case when the house owner installed the window upside down and the technical consultant did not even recognize it. In 2010, we therefore started training directly the construction workers who actually implement the insulation measures. This makes the position of technical consultants superfluous, and the fact that the work is done by trained craftsmen guarantees good quality.“

6. Micro loan procedures

6.1. Background

The cycle of micro loans for thermal insulation is particularly complex because financial and technical steps are closely intertwined. These financial and technical steps can be combined in different ways, depending on local framework conditions with regard to awareness among the population, locally available technical know-how and the regulations of the specific microfinance organization. The following step-by-step description just gives a detailed example of how this process might work and highlights potential challenges. It is based on the experience made by the microfinance organization MADINA in Gorno-Badakhshan.

6.2. Information and marketing among the local population



The first step is the information of potential clients about both the technical and the financial aspects of the micro loan product.

Awareness about thermal insulation varies in different regions. There may be places where people are well-informed and are only looking for an opportunity to get the thermal insulation of their house financed. In many regions in Central Asia, however, awareness can be expected to be rather low, so the microfinance organization has to inform the local population about the advantages of thermal insulation and to do marketing for the micro loan product (see chapter 7). If this is not possible via mass media, the following approach of information events in the villages can be followed. It consists of several steps (see appendix 2.1.):

1. Identifying target regions: Two aspects should be kept in mind when defining in which regions the micro loan product should be disseminated. First, there should be a high potential for thermal insulation (see chapter 4.1). Secondly, the cost of technical consulting (e.g. the transport expenses of the representatives of the energy efficiency department) should not be too high and logistics should be rather easy to manage, unless the number of clients is very high.

Ifitkhor Mirshakarov, communication expert (Khorog, Tajikistan):

„In the villages of Gorno-Badakhshan, no regional TV or radio can be received. People usually watch Russian or national Tajik TV. Reading newspapers is rather uncommon. Therefore, mass media are no viable way to disseminate information about thermal insulation. Instead, MADINA has opted for an approach of information events in the villages in order to communicate to the local people directly.“



Iftikhor Mirshakarov, communication expert (Khorog, Tajikistan):

„In 2009, we simply contacted the local authorities and asked them to invite the village population to the information events. But it happened that nobody came to the event because the information had been lost somewhere. In another case, all participants were employees of the sub-district administration - obviously the authorities had disseminated the information only internally. Therefore we had to think about how to contact more than one key stakeholder and how to create commitment on their side from the very beginning.“

Energy efficiency exhibitions

When MADINA tested exhibitions in 2009, it was found out that visible and touchable products (e.g. double-glazed windows, insulation materials, small models) are highly suitable for arousing villagers' interest. However, exhibitions only make sense in larger villages at locations where many by-passers decide to have a look at it spontaneously (e.g. governmental building, market).

Selection of place and time

Formerly, information events were conducted in schools or other official buildings. However, MADINA discovered that the atmosphere was much more relaxed when the event took place in private houses. Besides this, it is important to find out in each village which time is most convenient for local people, as in spring and autumn most of them may be working on the fields at daytime.

2. Contacting key stakeholders in a specific target village: In order to prepare the event in a specific target village, key stakeholders (village chair(wo)man, religious leader, etc.) should be contacted. A representative of the energy efficiency department goes to the villages in order to visit such key stakeholders individually or to gather them in one place. In this discussion, he collects information about the fuel consumption patterns and specific characteristics of the village, arouses interest in thermal insulation and in the micro loan product, and finally asks for permission to have an information event take place in the village. In the end, there should be an agreement on the further steps, among others on the place (e.g. private house, school building) and the date of the information event. The interview should be based on a standardized checklist in order to make sure that the right information is collected and conveyed.
3. Invitation of the local population: When conducting the interview with the key stakeholders, the representative of the energy efficiency department should bring some information material about the micro loan product (see appendix 2.3.) and invitation flyers for the information event (with the exact date and place still to be filled in). In the end, the key stakeholders are given these materials and asked to invite the local population. Moreover, posters should be hung up in central places (school, government building, shop, etc.) so that all villagers have the chance to find out about the information event. An additional option is to organize a preliminary exhibition of thermal insulation products in the village in order to arouse people's interest, to create some talks within the village about thermal insulation and to invite the villagers personally to the information event. Finally, if construction workers cooperating with the microfinance organization are based in the village, information can also be disseminated through them, as they should be interested in attracting clients.



Employees of the microfinance organization MADINA are discussing the micro loan product „Warm comfort“ with local people in the village of Kosideh, Gorno-Badakhshan.

4. Information event – thermal insulation: Both a representative of the energy efficiency department and the local micro loan field officer should take part in the information event. Ideally, some 20 to 30 villagers are present. The first part of the event aims at raising awareness about the problems connected to bad insulation and about the advantages and risks (obligation to reimburse the loan and to pay the interest) of thermal insulation. It should be designed in a participatory

way and could include the following steps:

- Welcome the participants, introduce the facilitator and present the aim and the agenda of the information event.
- Discuss the meaning of “energy” and “heat” (sources of energy and purposes of energy use in the village) with the participants.
- Discuss the financial expenses and the amount of labor related to energy use (electricity bill, collecting firewood, etc.) with the participants.
- Ask participants for suggestions how to make it warmer inside the house and visualize the associations.
- Explain the reasons and effects of bad insulation and introduce the concept of thermal insulation, referring to the suggestions made by the participants and using visualization materials (e.g. posters, house models, samples of insulation materials, well-insulated window).
- Ask participants to think about the advantages and disadvantages of thermal insulation, or do some experiment to show the effect of thermal insulation.
- Explain the advantages of thermal insulation, giving some concrete examples (e.g. how much fuel is usually needed per heating season, how much money and time is spent on it, how much fuel can be saved with thermal insulation, what positive impact can be expected with regard to health).

5. Information event – micro loan product: After the first part of the information event, participants should have understood why thermal insulation is beneficial for them. In the second part, they get to know the micro loan product as a way to finance and implement such thermal insulation measures in their house. As exact information has to be conveyed by now, this part of the information event should be more focused than the first one. It could include the following steps:

- Explain what thermal insulation measures are offered and what each of them costs.
- Explain why it is advantageous for the clients to finance thermal insulation measures via a micro loan.
- Explain the features of the micro loan (e.g. application conditions, interest rate, reimbursement procedures).
- Explain which services are included in the micro loan product (e.g. technical consulting, quality warranty, provision with construction materials and coordination of qualified workforce).
- Explain the steps of the micro loan product (financial analysis, technical analysis, etc.).
- Explain that the loan is an in kind loan, i.e. that the clients directly receive the products, materials and services, but no money in cash.
- Hand over the information flyer, organize the follow-up and close the information event.

During and after the presentation, the participants should have the chance to ask questions and to discuss details of the micro loan product. In the end, they should get to know how to contact the microfinance organization if they are interested in a micro loan for thermal insulation.

Ideally, information events are necessary only in the beginning when the micro loan product is launched. Once the first houses in a particular village have been insulated and the first winter has passed, the inhabitants usually feel the positive effect and spread the information about it in the village so that the success generates further demand.

Iftikhor Mirshakarov, communication expert (Khorog, Tajikistan):

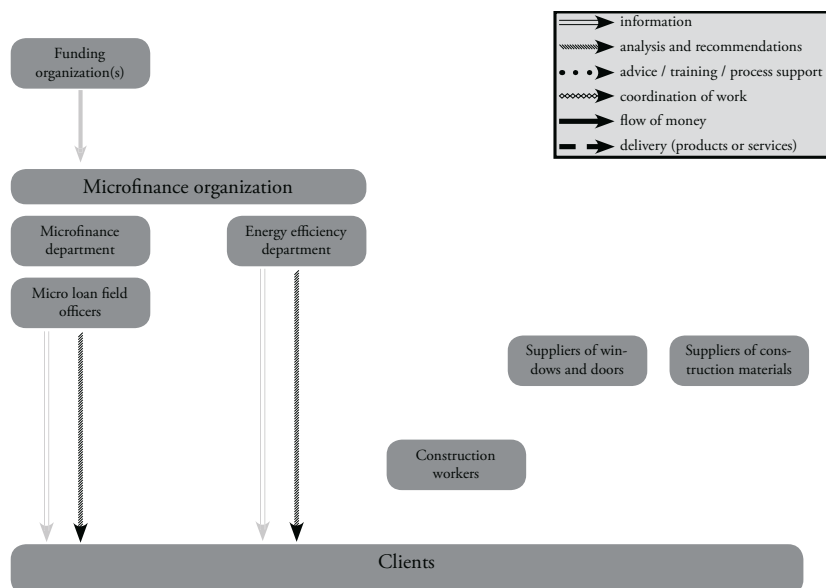
„The aim of our communication efforts is to make thermal insulation fancy. In the beginning, our key argument for thermal insulation was that fuel and money could be saved. When we started asking the clients about their opinion, however, we found out that they considered the most important benefit of thermal insulation to be that it becomes warmer inside the house. Now we know that we should focus on the comfort argument and not only on the financial advantages.“

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„Once, we were in a hurry and therefore started the individual analyses without having realized an information event in the respective village. It soon became clear that this had been a mistake. We had to explain all the details individually to everybody, which consumed much time. Moreover, many applicants had shown interest on the basis of vague information and withdrew their applications once they got to know the details, so many house visits had been totally in vain. We have learnt one important lesson: The better we explain the micro loan product during the information event, the less work and troubles we have in the following.“



6.3. Preparation of individual analyses



Once potential clients are informed about the micro loan product and have shown their interest, the financial situation of the household and the technical condition of the house have to be analyzed.

It doesn't make sense to send a representative of the energy efficiency department to do the technical analysis of a house whenever a single potential client has shown his interest. Instead, it saves much money and time if he goes to each village only once and does the technical analyses of the houses of all potential clients there. Such an efficient organization is only possible if all potential clients show their interest shortly after the information event and not throughout the year.

One way to guarantee this is to have the participants of the information event select one reliable contact person which will then be responsible for the communication with the microfinance organization. This contact person takes over the task of preparing a list of all interested households and handing it over to the local micro loan field officer within one week in order to allow for a quick follow-up. The list should include the name of the household head, the phone number and the approximate location of the house.

When he has received the list, the micro loan field officer calculates the amount of time necessary for the financial and technical analyses (including the transport between the houses). Then he contacts the energy efficiency department in order to fix a time frame for these analyses. The micro loan field officer and the representative of the energy efficiency department may visit the interested households separately, but it saves time both for them and for the client if they go to the village together.

Once the time frame is fixed, the micro finance officer should prepare a schedule for the analyses and agree on it both with the potential clients and the energy efficiency department. Houses situated close to each other should be visited one after another in order to save time and money for transport. Moreover, it should be made sure that the household head is at home at the agreed time, e.g. by phoning him again one day in advance.

Heike Volkmer, DED technical advisor on energy efficient technologies (Khorog, Tajikistan):

"In spring 2010, MADINA held an information event in the town of Murgab. Some 17 households took a micro loan and got their houses insulated. Impressed by the quick implementation of the measures and the good quality, within a few weeks some other 30 households showed their interest in getting a micro loan, although MADINA had not done any additional marketing."

Planning of analyses

In 2009, the technical staff went into the field after receiving the list with the contact details without planning the individual visits in advance. Showing up rather spontaneously in the houses of potential clients, they often didn't find the household head at home and therefore couldn't do the necessary analyses. Going to the village a second time meant significant additional investment with regard to working time, therefore a system of planning the analyses well ahead had to be developed.

6.4. Financial analysis

The financial analysis is done by the local micro loan field officer and is quite similar to the financial analyses necessary for other loan products. Even if the potential client has taken part in the information event, it is important to explain the details of the micro loan product once again to him before filling in the financial analysis questionnaire. This serves to check if there are no misunderstandings and if the client is seriously interested in thermal insulation and in the micro loan product.

The financial analysis consists of the following parts (see appendices 1.1. and 1.2.):

1. Household details: Basic information for the financial analysis is the client's name and passport number, his contact details and the number of people belonging to the household.
2. Loan application details: Based on the results of the technical analysis and planning (see chapter 6.4), the micro loan field officer has to find out what amount of money is needed as a loan in order to get the planned thermal insulation measures implemented. Then the loan details have to be defined according to the regulations for the micro loan product: interest rate, reimbursement time, schedule for reimbursement, currency of loan payment and of reimbursement.



In a house in the village of Barvoz in Gorno-Badakhshan, the local micro loan field officer (right) discusses income sources and expenses with the household head (center) in order to gather information about the eligibility of the family for a micro loan.

3. Loan experience: In order to allow an assessment of his reliability, the client is expected to reveal his loan history. If he has already taken loans before and brings evidence that he has reimbursed them on schedule, it increases his credibility. On the contrary, if he already has obligations with the reimbursement of other current loans, he should not receive any further loan. The information about the loan history should be checked with the respective finance institutions.
4. Income and expenses analysis: In order to understand the client's ability to reimburse the loan, it is indispensable to assess the amount of money usually available each month. Therefore both regular income sources (e.g. salaries, pensions, remittances, and income from business) and expenses (e.g. food, clothing, education, public transport, electricity, and assumedly 20 percent extraordinary expenses) have to be listed and summed up. The client should bring evidence for

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„In 2009, it happened quite often that the micro loan field officer and me did the financial and technical analyses of a house, but afterwards the house owner started asking us questions about the micro loan and the reimbursement conditions. In the end, it turned out that he had not really understood how much money he had to reimburse per month, and he cancelled the application. We felt quite annoyed whenever this happened because the whole analyses had been a waste of time. By now, we usually spend some additional time on making clear the conditions in the beginning in order to exclude such misunderstandings.“

the income sources (e.g. a confirmation about the salary from the employer or a receipt about remittances from the bank). If the data given by him seems suspicious, the micro loan field officer should check it with other information sources (e.g. neighbors). Usually microfinance organizations assume that a client is able to use 70 percent of the monthly surplus (i.e. the difference between income and expenses) for reimbursing the loan. Taking into consideration that these 70 percent should cover both the monthly reimbursement rate and the monthly interest, the monthly reimbursement rate must not exceed 80 percent thereof. So the maximal loan amount is defined by the following formula:

$MLA = 80\% \times 70\% \times SUR \times MON$ <p>MLA = maximal loan amount SUR = difference between monthly income and expenses MON = number of reimbursement months</p>

5. Collateral: In case the client is not able to reimburse the loan, the microfinance organization should have the right to take part of his property and to sell it in order to get its money back. Therefore the client must agree on giving part of his property (his TV, his car, his livestock, etc.) as a collateral. The micro loan field officer therefore has to find out which assets are available in the household and can be taken as a collateral, and which value it has. The property given as a collateral should have the double value of the loan amount and the interest amount, and the client should bring evidence that they are indeed his.
6. Warrantor: As an alternative to giving a collateral, the client can also bring a warrantor who signs an additional agreement and shows his readiness to take over the obligations to reimburse the credit if the client himself is not able to do so. The financial situation of the warrantor should be analyzed as well. He should have a regular and good income which is at least equal to the client's one.
7. Analysis of strengths and weaknesses: Based on the income and expenses analysis, the micro loan field officer can assess the strengths and weaknesses of the client and give recommendations for the design of the micro loan. For example, a regular income can be considered as strength. Some clients – especially when working in agriculture – may have significant seasonal incomes and expenses, so that a flexible reimbursement schedule might be suitable for them (e.g. reimbursing most of the loan during the harvest months).
8. Agreement of family members: If there is disagreement within the family about the loan, there is an increased risk that it is not reimbursed according to the plan. Therefore the micro loan field officer has to make sure that all relevant family members understand the implications, are in favor of taking the loan and willing to reimburse the money. He should explain the conditions for the micro loan to them as well and have them sign an additional agreement.
9. Necessary documents: During the financial analysis, the micro loan field officer must get photocopies of the passport and of the tax number certificate of the client (if available), the agreement signed by the family members, the agreement about the collateral signed by the client and finally the loan application signed by the client. If there is a warrantor, a photocopy of his passport and an agreement with his signature are needed.

Mohira Shamirova, microfinance manager of MADINA (Khorog, Tajikistan):

„We have made good experience with micro loan field officers being based in the districts. They visit the clients at their homes and talk a common language with them. Such a system is very attractive for villagers, as many of them would not be prepared to come to our headquarters to apply for a micro loan. Another important trademark of MADINA is the flexible reimbursement schedule. Many farmers have only seasonal income when they harvest crops or sell livestock, therefore we make it possible to agree on higher reimbursement rates during those months in which financial resources are available.“

6.5. Technical analysis

The technical analysis is done by the representative of the energy efficiency department and includes the following steps (see appendix 1.4.):

1. Household details: Basic information for the technical analysis is the client's name, his contact details, the type and the size of the house. Besides this, it should be discussed which room is used as a living room in winter and needs thermal insulation most, and if the family is planning to live in this room in the long term.
2. Outline of the house: The outline of the house (including the approximate proportions of rooms and the situation of doors and windows) is necessary as a basis for the planning of the thermal insulation measures.
3. Assessment of the situation of the house / winter room: This analysis of the individual elements of the house and the winter room (e.g. foundation, floor, walls, ceiling, door, and window) is the basis of the recommendations and of the planning of the thermal insulation measures. It should include
 - the measurement of sizes (e.g. the width and height of the window, and the area covered by the floor),
 - construction details and materials (e.g. single-glazed or double-glazed windows, floor layers) and
 - the condition of these elements (e.g. broken glasses in the window, recently renovated ceiling, cracks in the wall).



On a house in the village of Barvoz in Gorno-Badakhshan, the old roofhatch-window is measured in order to determine if the size of the new one will fit well.

4. Assessment of impact on other houses: In some cases, two houses share a wall or a foundation, therefore it is important to analyze if the thermal insulation of the client's house has any impact on other houses, or if the condition of neighboring houses influences the state of insulation of the client's house.
5. Recommendations for thermal insulation measures: On the basis of the assessments, the representative of the energy efficiency department gives recommendations with regard to the necessary thermal insulation works. The following aspects should be kept in mind:
 - Energetic priorities: The focus should be on the potential of each individual

Winter rooms

Many families in Gorno-Badakhshan have selected one room as a winter room which is kept warm and in which the whole family is living during the winter months. In 2009, it happened in some cases that MADINA and the client agreed on the thermal insulation of a certain room, but in the following winter the family for some reason chose to live in another room. Therefore it is important to check in advance which room is actually inhabited in winter and needs to be insulated.

measure to reduce the loss of heat. For example, if there are huge slots between the door and the door frame, or if the window glass is broken, it doesn't make sense to start with the insulation of the floor.

- Wishes of the client: Many clients already have concrete ideas about what they would like to change. For example, installing new windows may be more popular than insulating the ceiling because it gives a visible effect. Some clients might dream of a complete renovation of their house, whereas others might prefer a small loan amount in the beginning.
- Financial constraints: The cost related to the recommended thermal insulation measures must not exceed the maximal loan amount defined by the financial analysis (see chapter 6.3) and the regulations for the micro loan product. For example, if the maximum loan amount is 500 US-Dollar, but the client wishes to insulate his house comprehensively, it might be necessary to select the most urgent measures covered by the 500 US-Dollar and to postpone the others.

6. Calculation of cost for materials and labor: Once the representative of the energy efficiency department and the client have agreed on the thermal insulation measures, the cost can be calculated. For example,

- if the window is to be exchanged and the size of the window opening is known, the price of the new window can be found out.
- if the floor is to be insulated and the area covered by it is known, the quantity of insulation materials and their price can be estimated.
- transport cost can approximately be calculated by taking 10 percent of the value of the products and materials to be transported.
- the representative of the energy efficiency department knows how much time the construction workers typically need to implement the planned insulation measures, so he can calculate the labor cost as well.

Ideally, there should be framework agreements with the suppliers of insulation materials on fixed prices. If there are no such framework agreements and the microfinance organization has to buy the insulation materials on the free market, the cost should be calculated in a rather conservative way, i.e. estimated a few percent higher than they probably are in order to gain some flexibility at the time of purchase. The difference between the estimated and the actual cost can later be reimbursed to the client.

Once the overall cost of the recommended thermal insulation measures is calculated, the representative of the energy efficiency department forwards this information to the micro loan field officer who needs it for finishing the financial analysis.

7. Planning of measures: At the time of the technical analysis, an exact schedule for the implementation of the thermal insulation works cannot yet be elaborated. But at least responsibilities and deadlines can be agreed on. Usually, the measures are implemented by the construction workers, but the client may take over some preparatory works.

8. Contract: In the end, the contract is read out and explained to the client and signed by him. It should at least include the following paragraphs:

- The client agrees on having his house insulated according to the attached technical plan, provided that the micro loan committee grants the loan.

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„It happened several times that clients signed a contract according to which the installation of a new window was planned, but a few days later changed their minds and told us that they would prefer a new door or even cancelled the window. This highly complicated the procedures, therefore we have inserted a new paragraph in the contract - the client has to agree explicitly on the implementation of the planned measures and has to pay a penalty if he cancels them after the conclusion of the contract.“



- The client agrees on implementing the works and purchasing the construction materials for which he has taken responsibility.
- Judicial claims to the microfinance organization with regard to the implementation of the measures are excluded.
- The client agrees to reimburse the money at once if the contract is violated.

9. Fuel consumption analysis: The technical analysis is an opportunity to find out in detail about the energy consumption of the household. This data is needed for the impact monitoring in the future, when the energy consumption before and after the implementation of the thermal insulation measures will be compared in order to understand the consequences of thermal insulation. Based on a pre-defined questionnaire, the representative of the energy efficiency department should enquire into the energy sources used (e.g. electricity, coal, firewood, manure) and into the quantity of energy consumed during the last heating season (see appendix 1.3).

6.6. Decision by the micro loan committee

During the financial analysis, the loan application form has been filled in by the client and the micro loan field officer. The latter sends this application and the necessary documents to the headquarters of the microfinance organization where they are checked for completeness and quality by the microfinance manager.

The decision about the loan applications is made by the micro loan committee. The meeting should be planned and involved stakeholders should be informed well in advance. Besides the members of the micro loan committee, the representative of the energy efficiency department and the micro loan field officer responsible for the respective clients should be present to explain and defend their recommendations.

The decision about the approval or rejection of a loan application is made according to the regulations of the organization, but the following aspects should be kept in mind:

- Income and expenses analysis: The loan application may only be approved if the client has enough money available each month to reimburse the loan.
- Technical analysis: An application for a thermal insulation loan may only be approved if the energy efficiency department has given a positive and well-justified recommendation for thermal insulation measures which will be financed with this loan.
- Completeness of documents: If necessary documents or signatures are missing, the loan application has to be rejected.
- Unity within the family: If either the micro loan field officer or the representative of the energy efficiency department has got the impression that the thermal insulation plans are not supported by all family members, the loan application should be rejected.
- Character of the client: If either the micro loan field officer or the representative of the energy efficiency department has got the impression or even evidence that the client is not reliable and might cause trouble in the process of reimbursement of the loan, the loan application should be rejected.

In case all requirements are fulfilled and the micro loan committee has approved the loan application, it is signed by the members of the micro loan committee. In

Olga Dmitrijeva, consultant on impact monitoring (Aachen, Germany):

„We started establishing an impact monitoring system in spring 2010. In order to assess how much fuel had been saved, we had to compare the fuel consumption before and after thermal insulation. But as MADINA had not collected detailed data about the fuel consumption of its clients the year before, we had no baseline data. We helped ourselves by asking clients about their fuel consumption before thermal insulation, but often they did not remember exactly. In the future, monitoring will be much easier if the data about fuel consumption before thermal insulation is collected already at the time of the technical analysis.“



special cases, the committee may also decide to reduce the loan amount, to expand the reimbursement time or to agree on a flexible reimbursement schedule in order to make the loan feasible for the client.

6.7. Micro loan contract and work plan

In the framework of conventional micro loan products, the client receives the money and takes over the responsibility to use it for the agreed purposes. In the case of the thermal insulation loan, however, it makes sense to give the loan in kind and not in cash. This means that the client doesn't receive any money to buy construction materials. Instead, he is directly provided with the necessary construction materials and with the construction services by trained craftsmen, and has to reimburse the value of these goods and services to the microfinance organization like with a usual loan.

Thanks to this in kind loan, the microfinance organization keeps full control of the thermal insulation process: It can be guaranteed that the money is not used for other purposes than thermal insulation and that the work is implemented in good quality. The in kind loan is also beneficial for the clients because they do not have to bother for the purchase and the quality of the construction materials. They get the construction works done in a short period of time and are not attempted to use the loan for urgent needs and short-term expenses.

In kind loan

In 2009, MADINA gave the loans for thermal insulation to the clients in cash. But in many remote regions of Gorno-Badakhshan, it turned out to be all but easy to purchase construction materials in good quality or to find qualified craftsmen who were able to implement the agreed thermal insulation measures. As a result, in many cases the clients postponed the implementation of these measures again and again, and finally had spent the loan money without having insulated their house. Other clients from the very beginning had the intention to use the credit for other purposes than thermal insulation. To solve these problems, MADINA decided to take over the responsibility for the implementation of the thermal insulation measures and to pay material or service providers directly, offering only in kind loans to the clients. Considering these conditions, only such persons apply for a micro loan for thermal insulation who are seriously interested in thermal insulation.



The local micro loan field officer (center) and the representative of the energy efficiency department (right) discuss the contract and the work plan with a client (left) in the village of Barvoz, Gorno-Badakhshan.

Once the micro loan committee has made a decision about all the applications from one village, the microfinance manager and the local micro loan field officer jointly prepare the micro loan contracts. At the same time, the energy efficiency department plans the implementation of the thermal insulation measures in the respective village. Estimating how much time it will take to purchase and deliver the required construction materials, a work plan for the construction workers can be elaborated.

When both the micro loan contracts and the work plan for a specific village have been prepared, the local micro loan field officer and a representative of the energy efficiency department go to the village together in order to launch both the micro loan and the thermal insulation process. Once again, the local micro loan field officer should prepare a schedule for the individual visits in advance so that the client is at home when the representatives of the microfinance organization come to meet him,

and no time is lost with waiting.

During the visit, the local micro loan field officer first discusses the loan reimbursement scheme with the client. In general, there are two possible schemes: Either the loan amount and the total interest amount are summed up and distributed equally over the whole reimbursement period, or the client pays back an identical part of the loan amount each month and the monthly interest on the remaining loan amount. Besides this, many microfinance organizations offer flexible reimbursement models, with clients paying back most of the money in harvest season when enough financial resources are available.

As a result of the discussion about the loan reimbursement scheme, a schedule should be defined which fixes how much money is reimbursed by when. When all these details have been agreed on, the client is asked to sign both the micro loan contract and the reimbursement schedule.

During the same house visit, the task of the representative of the energy efficiency department is to bring the client and the construction workers together and to explain to them the schedule for the implementation of the thermal insulation works. Both sides should understand:

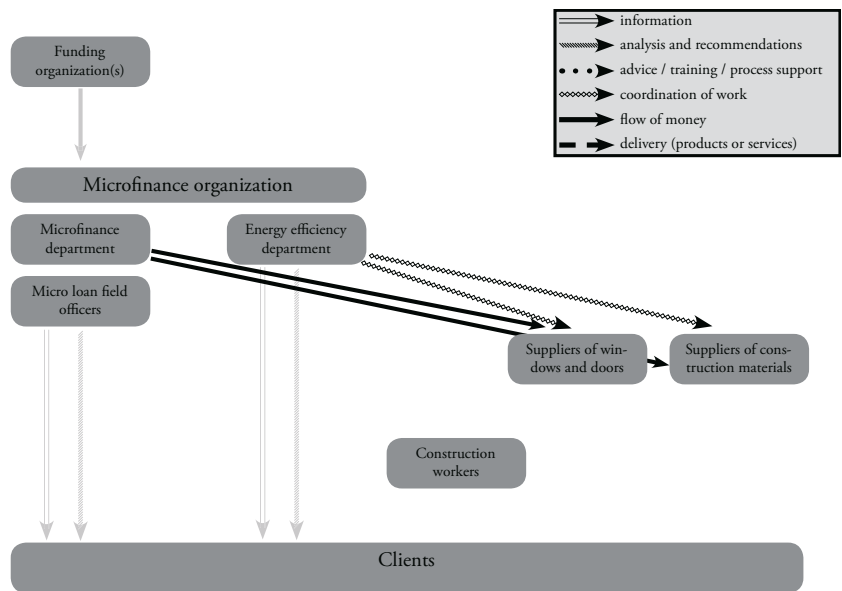
- which thermal insulation measures are planned for the specific house and included in the micro loan.
- which construction materials and thermal insulation products are necessary and when they are going to be delivered.
- when the thermal insulation measures are going to be implemented in the respective house and which construction workers are responsible.
- which additional materials have to be provided and which works have to be done by the client.
- which aspects and problems they should be paid attention to during the implementation of the thermal insulation works.

In the end, the construction workers should be familiar with their specific tasks and the deadlines, and the client should be so familiar with the thermal insulation process that he is able to control the work of the construction workers.

6.8. Preparation of thermal insulation works

With the schedule for the construction works in a specific village being prepared, the energy efficiency department still has to organize the delivery of construction materials and thermal insulation products to the village. Whenever purchasing goods outside of framework agreements, it is important to respect the four-eye principle, i.e. at least two persons should be involved in the process and mutually control each other to exclude corruption.

If several villages are situated close to each other, it makes sense to organize the order and delivery of materials and products for the clients in these villages at the same time in order to increase efficiency and to minimize efforts and cost. Once the micro loan contracts have been signed by the clients in all of these villages, the energy efficiency department can calculate which quantities of materials and products have to be purchased altogether. The following steps are necessary:

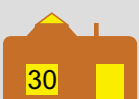


When the details of the implementation of the works have been agreed on with the client, the microfinance organization can purchase the necessary insulation products and materials and pay the suppliers.

1. Order of well-insulated doors and windows: For the microfinance organization, it is most convenient if the suppliers of well-insulated windows and doors offer standard sizes because then these products can be bought directly from the storage. Otherwise they have to be ordered individually, with much time being consumed by the production process. The energy efficiency department orders the doors and windows according to the numbers defined by the technical analyses.
2. Order of construction materials: Reviewing the technical analyses, the energy efficiency department knows what quantities of materials are needed for a certain village and can order them from the supplier on the basis of the framework agreement and the quality standards. The supplier may be a salesman on the local market or a businessman importing the materials from elsewhere.
3. Quality check: When the products and materials have been provided, a quality check by the experts from the energy efficiency department is indispensable. Especially with regard to the doors and windows it must be assured that they have been produced according to the quality standards and that they will have a sufficient insulation effect. For example, the door should close properly, the silicon in the window should prevent the transfer of air and heat, and the wood should be painted. If any product or material does not fulfill the quality standards, the energy efficiency department should send it back to the suppliers in order not to harm the good image of the micro loan product. Ideally, the suppliers give a warranty on their products and promise to exchange them in case they break down within a certain period.
4. Payment for the products and materials: When the quality of the products and materials has been approved by the energy efficiency department, the accountant pays for them. Whereas the receipt reflects the cost of the materials for all clients in a specific village, the accountant has to separate these expenses and attribute them to the individual clients. For example, if the first client has ordered 2 sacks of cement and the second client has ordered 3 sacks of cement, the supplier will write down the cost of 5 sacks of cement on the receipt. The accountant, however, has to note down in the first client's folder how much has been paid

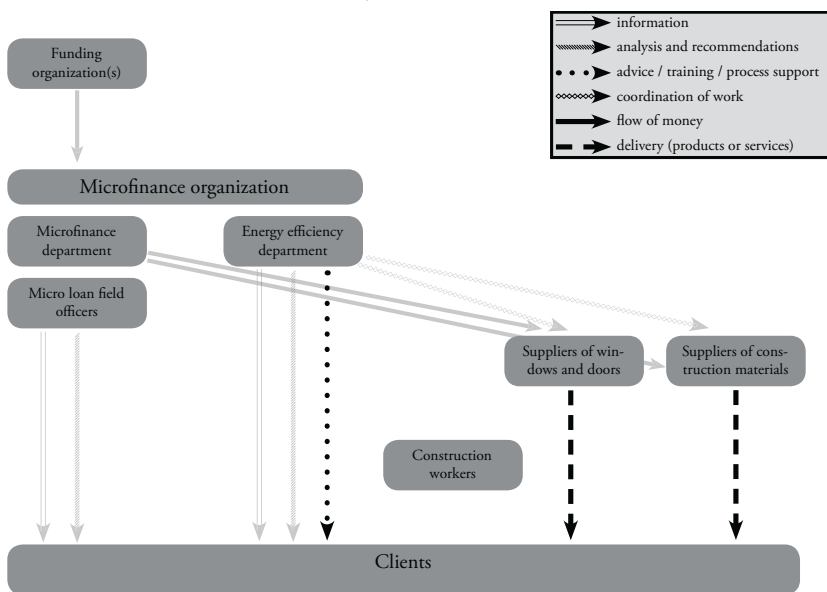
Product warranty

In 2009, in many cases technical problems emerged after the installation of the doors and windows which had been produced by local carpenters. Some doors didn't close properly any more after a few months, and some windows were badly sealed. Therefore MADINA made the carpenters give a one-year guarantee on their products, i.e. they have to be exchanged free of charge in case of technical problems. This has shown positive effects both on the quality of production and on the clients' confidence.



for his 2 sacks of cement, and in the second client's folder how much has been paid for his 3 sacks of cement. This means that the accountant has significantly more workload with an in kind loan than with a cash loan, and good cooperation between the accountancy and the energy efficiency department is required. Alternatively, the suppliers issue separate receipts for the materials of each individual client. These receipts can then be shown to the client to make the whole purchase process more transparent.

5. Organization of transport: In order to prepare the delivery to a specific village or group of villages, the energy efficiency department, first of all, has to organize the transport. Depending on the quantity of materials, either a pickup is sufficient or a truck is needed. There should be framework agreements with reliable drivers, including fixed prices per kilometer and regulating the responsibilities in case of accidents or of products breaking.



Once all necessary products and materials are available and their quality has been approved, they can be delivered to the clients. This is an opportunity to give an additional training to the clients.

6. Preparation of delivery of the products and materials: Once the specific agreement with the driver has been made and a date for the delivery has been fixed, the energy efficiency department forwards the information to the local micro loan field officer who then contacts the individual clients to make sure that they are at home at the time of delivery. The energy efficiency department should also prepare lists (2 copies each) of the materials and products and their prices, which can be handed over to each individual client and be signed by him as a receipt.

7. Delivery of the products and materials: On the day of delivery, the truck or pickup driver collects the materials and products in the storage(s) and a representative of the energy efficiency department to go to the village. There they should pick up the responsible construction workers and deliver to each individual client the materials and products he has ordered. The client should check the quantity, quality and price of the materials and products, and compare them to the list brought by the representative of the energy efficiency department. He should receive one copy of this list and sign on another copy for the microfinance organization that he has indeed received the materials and products. The representative of the microfinance organization should have brought the work plan and use the opportunity to explain once again to the client and the con-

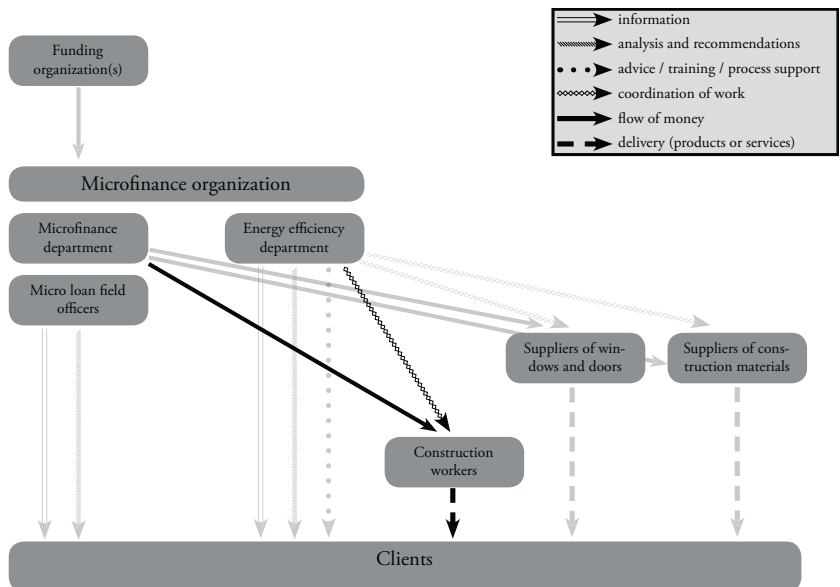
struction workers which works have to be implemented until when, and what they should pay attention to.



A well-insulated door is delivered to a thermal insulation client in the town of Murgab in Eastern Gorno-Badakhshan.

8. Payment for the transport: All clients who have received goods on a specific transport take a share of the transport cost in proportion to the value of their products and materials. Once again, transport cost is paid directly by the microfinance organization and the accountant has to note down in each client's folder how much has been his share.

6.9. Implementation of thermal insulation works



With all necessary products and materials being delivered to the client, the construction workers can finally start the implementation of the agreed thermal insulation measures. In the end, they are paid directly by the microfinance organization.

Implementing the thermal insulation works according to the work plan is the responsibility of the local construction workers who have received training on thermal insulation works and dispose of a manual on thermal insulation which explains all necessary steps in detail. If it is agreed in the work plan, the client himself should already have done some preliminary works. The necessary materials and products

have already been delivered by the microfinance organization, whereas the construction tools should be brought by the construction workers themselves.

Their work is continuously monitored by the client himself, to whom the representative of the energy efficiency department has explained in detail how the measures have to be implemented and to what aspects he should pay attention. If the client has the impression that the construction workers are not respecting the plan or schedule, or that they do the work in bad quality, he is expected to contact the energy efficiency department. It will then solve the problem by phoning the construction workers or by sending the local micro loan field officer, or a representative of the energy efficiency department itself will pass by.



A team of two construction workers is working on the insulation of the floor in a house in the town of Murgab, Gorno-Badakhshan.

Similarly, also the construction workers should contact the energy efficiency department if they face any problems which they cannot solve on their own, e.g. if materials are lacking or have bad quality, if there are constraints with regard to the building structure, or if they are unsure about how to proceed.

For each client's house, a deadline has been defined in the work plan by when the thermal insulation works should be finished. The local micro loan field officer should pass by once during the construction process in order to see if the work is going on well and once again after the deadline. This latter visit serves to check if the work has been completed in time and if there are any major quality problems.

The final monitoring, however, is done by a representative of the energy efficiency department who goes to the village as soon as all thermal insulation works there have been completed. He brings with him receipts to be signed by the clients and construction workers. This final monitoring consists of the following elements:

1. Discussion with the client: At first, the representative of the energy efficiency department should find out the client's opinion about how the construction workers did their job, if he is satisfied with the services, if there have been any problems during the process, and if any problems have emerged in the meantime which might be related to these measures. This interview should be based on a standardized questionnaire.
2. Analysis of the thermal insulation measures: Together with the client, the rep-

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„In order to give an incentive for efficient work to the construction workers, they are paid for work results. Based on our experience, we have defined the average labor necessary for the implementation of a specific measure. For example, the installation of a new window takes eight man-hours. Besides this, we defined a standard wage per man-hour after analyzing the usual wages paid for construction works on the free market. To calculate the total wage of the construction workers, the average labor necessary for the respective measures is multiplied with the standard wage per man-hour.“

representative of the energy efficiency department analyzes the individual thermal insulation measures implemented by the construction workers. The aim is to find out if the measures have been implemented according to the quality standards and if any problems still have to be solved. For example, it has to be checked if there are no slots between the window and the wall, and if the door has been painted.

3. Signing of the receipt by the client: If both the client and the representative of the energy efficiency department are satisfied with the implementation of the thermal insulation measures, the client signs a receipt which shows the construction services he has received and their price (i.e. the wage of the construction workers). If the client is dissatisfied with the job the construction workers have done and the representative of the energy efficiency department agrees, the receipt is not signed yet and the construction workers have to redo the work or at least improve its quality.
4. Heating and ventilation recommendations: Finally, the representative of the energy efficiency department should explain to the client and the other family members a few recommendations regarding the heating and ventilation. The thermal insulation measures will show positive effect only if these recommendations are followed. For example, the client should understand that it doesn't make sense to heat the room and to ventilate it continuously at the same time. In this case the heat leaves the room through the open window, good insulation notwithstanding. It is more efficient and better for the living climate to open the window just for some 10 minutes two or three times per day.
5. Discussion with the construction workers: At the end of his visit in the village, the representative of the energy efficiency department takes interviews from the construction workers as well. The aim is to give feedback on the work they have done and to ask for recommendations regarding the improvement of the process.
6. Payment of the construction workers: Provided that the client and the representative of the energy efficiency department are satisfied with the work, the construction workers get paid in cash the amount of money which has been agreed in advance as a payment for the implementation of the thermal insulation works.
7. Signing of the receipt by the construction workers: Finally, the construction workers have to sign on the receipt which construction services they have delivered and that they have received the specified payment. At least one receipt with the signatures of the client and the construction workers remains with the microfinance organization and has to be processed by the accountant, noting down in each client's folder how much money has been spent on the labor for the implementation of the thermal insulation measures.

The energy efficiency department should use the information gained during this final monitoring in order to improve the quality of materials and products and the processes of delivery and implementation of thermal insulation works.

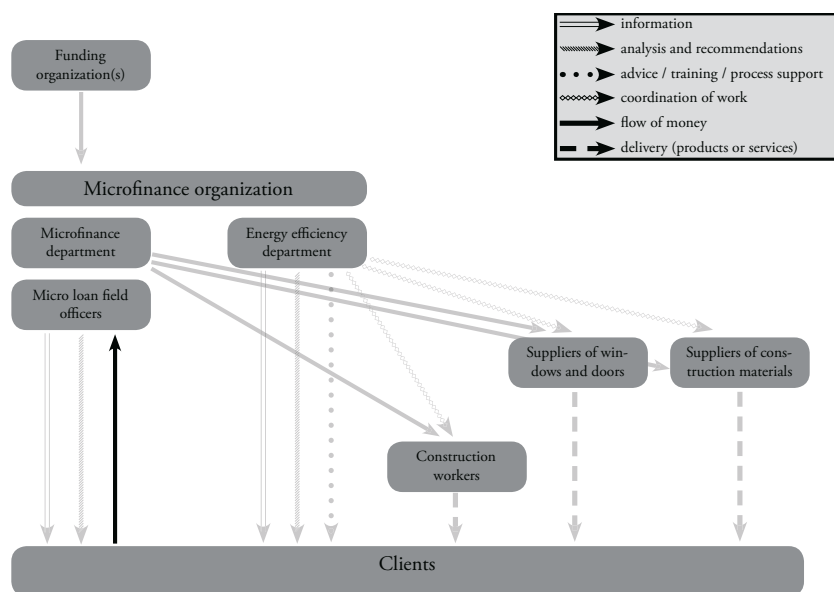
As a general rule, not more than a month should have passed between the signing of the micro loan contract and the final monitoring by the energy efficiency department. It is in the very interest of the microfinance organization to finish work in a village or in a region as quickly as possible. Moreover, if clients already have to

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„When we trained construction workers in Murgab in spring 2010, we thought that two teams with two workers each would be sufficient. In the following months, however, the demand for thermal insulation in Murgab proved to be much higher than we had expected, and the two teams were not enough to satisfy the demand as the construction season in Murgab lasts only five months. We solved the problem by splitting the teams: Each of the two trained and experienced construction workers forms a new team together with a young and reliable colleague whom he trains during practical work. By this, we could not only make four teams out of two, but also spread the know-how about thermal insulation and create new opportunities for income generation.“

reimburse the loan though not yet having received the materials and services, they will probably get unsatisfied.

6.10. Reimbursement of the micro loan



One month after the conclusion of the micro loan contract, the implementation of the works should be finished and the reimbursement of the micro loan by the client starts.

The reimbursement of the micro loan should start only one month after the conclusion of the contract. As mentioned above, the implementation of the thermal insulation measures should be finished within this month, i.e. the client has received the materials and services included in the in kind loan, and the exact cost of these materials, services and the transport have become clear. As the exact amount of money to be reimbursed may be known only at this stage, it may be necessary to update the reimbursement schedule.

As far as the reimbursement process is concerned, there is no significant difference between conventional micro loans and micro loans for thermal insulation. The client has to reimburse the monthly loan share and the interest according to the agreed schedule on a specific day of each month. Collecting the money and issuing the receipts is the task either of the local micro loan field officer or of a mobile cashier, depending on the regulations of the organization. If the client has problems with following the schedule, the responsible micro loan field officer has to visit him more often in order to insist on the reimbursement and to enforce reasonable solutions.

In the end, when the last rate of the loan has been reimbursed, the responsible field officer closes the micro loan by issuing a final receipt. The client can then use this receipt to give evidence of his reliability when he applies for further loans.

6.11. Impact monitoring

Depending on the requirements of funding organizations and on the interest of the microfinance organization in the effect of its own work, it may be necessary or desirable to establish a system for impact monitoring. In contrast to conventional micro loans, with in kind loans for thermal insulation the microfinance organization keeps full control over the use of the loan. In the end of the year, it can write in its

report that a certain number of houses have actually been insulated, and not only that a certain number of micro loans have been given to clients for thermal insulation purposes.

Still, it may be interesting to find out what impact this thermal insulation has had. Do the clients feel more comfortable inside their houses in winter? Do they need less fuel to heat a specific room, and does this mean reduced financial expenses and labor effort? Are they still satisfied with the micro loan product after a year? One of the ways to find answers is to select some of the insulated houses randomly, visit them again after the first winter and ask for example the following questions (see appendix 1.3.):

1. How much fuel have you consumed during the last heating season? This question is indispensable for measuring the impact of thermal insulation. Ideally, data about the fuel consumption before thermal insulation has already been collected during the technical analysis, so the data about the fuel consumption after thermal insulation can be compared to it. Knowing the price of fuel, it can be assessed how much financial resources have been saved thanks to thermal insulation. However, it may be tricky to estimate the amount of fuel, as many households are not able to give exact quantities.



A pile of manure in the town of Murgab in Eastern Gorno-Badakhshan. Estimating the quantities of fuel is not an easy task, but indispensable for impact monitoring.

2. How often have you heated each day this winter? More or less often than last season? The answer gives a general idea of changes in heating habits and fuel consumption. If the family has heated less often, it has probably consumed less fuel.
3. What has changed for your life after you implemented the thermal insulation works? Such a question is important to find out if the quality of life has improved due to higher indoor temperatures, less moisture or more light. First ask the question openly in order not to predefine the answer, and then ask more concretely if the interviewee doesn't have any associations on his own.
4. Are you satisfied with the micro loan product and have you recommended it to others? This question helps to assess the general satisfaction of the client and the market potential of the product. Satisfied clients are the best advertisement if they tell the success story to others. If the large majority of clients have recommended the product to others, this means a significant potential for expansion.

Olga Dmitrijeva, consultant on impact monitoring (Aachen, Germany):

„We developed an impact monitoring system for the thermal insulation loans offered by MADINA in spring 2010. It showed that the sample households in average had consumed 30 percent less fuel after thermal insulation than before, and that almost all clients felt that it had become warmer inside their house. However, collecting the data and analyzing it consumed more time than we had planned. One of the main challenges was to estimate the quantities of fuel, as interviewees used very different units: Coal was measured in kilogram, firewood was measured in cubic meters, manure was measured in truck loads. During the monitoring, the individual quantities were converted first to kilogram and then to Mega Joule, so that the energy consumption could be compared.“

5. In how far have you followed the recommendations regarding heating and ventilation? This question is necessary to assess not only the impact of the recommendations given, but also understand the fuel consumption figures. If the recommendations have not been followed, this may explain that the reduction in fuel consumption is not as high as expected.

7. Marketing

The micro loan product for thermal insulation is quite complex and its benefits may not be obvious at the first glance. Therefore, marketing is not as easy as with a touchable and attractive product which gives a direct benefit, like a car or an electric heater. Before people can develop interest in the product, they have to understand what thermal insulation means and which benefits they can get from it. Therefore, when launching the micro loan product, a major marketing campaign may be necessary. In order to design this campaign properly, a few key questions should be considered:

1. Which are the target groups? For example, one can distinguish between poor households and rich households, educated people and people without higher education, men and women, young and old people, households in a specific region and in another.
2. What knowledge about thermal insulation do the different target groups already have? If they do not know anything yet, first of all this knowledge needs to be disseminated before the micro loan product can be marketed.
3. What attitude do the different target groups have towards thermal insulation? It might happen that a specific target group has understood the advantages of thermal insulation perfectly but believes in rumors about disadvantageous side-effects. In such a case one of the main objectives of the marketing campaign should be to disprove such rumors.
4. What obstacles have hindered the different target groups from implementing thermal insulation up to now? If people have been dreaming about thermal insulation all the time but only have been lacking the financial resources or the technical know-how, this is good news for the micro loan product.
5. Which are the main problems resulting from the current house condition and the advantages of thermal insulation in the eyes of the different target groups? If a specific target group, for example, uses firewood for heating and collects it on its own without paying for it, it doesn't make sense to highlight the argument that they can save financial resources through thermal insulation.
6. Which information channels does the target group use? For example, newspapers are often read only by a small minority of educated people, whereas TV is watched by many people. In some regions, mass media are not used at all, so it is necessary to go to the villages and to communicate to the local people directly.

In some cases, these questions can be answered easily by reflection and internal discussion; in other cases at least some interviews with people from the target groups are necessary. On the basis of this analysis, the marketing campaign can be designed, defining the aims, the message and the arguments, and finally the information channels to be used. The message should be easily understandable and convincing for the specific target group – if the target group is local farmers, for example, they can't be expected to know the term “thermal insulation”.

Use of terminology

In the beginning, MADINA often used technical terms for the marketing of the thermal insulation loan: “thermal insulation”, “natural resources”, “energy efficiency”. However, it soon became clear that these terms did not really appeal to the farmers in the villages. Other terms had to be found which were easier to understand and closer to the everyday life of the target groups. For example, thermal insulation can be explained as “preparation of the house for winter” or as a way to save the heat inside the house.



There is a great variety of information channels, and it is important to select the appropriate ones according to the specific aims and the messages to be conveyed. Just a few ideas:

- Mass media: Newspapers, journals, radio and TV can serve to convey short advertisements as well as detailed background information. They are useful as a first step to inform people, but for convincing them often a follow-up with interpersonal communication is needed. Especially in rural areas, it has to be analyzed which mass media are actually used by the specific target group.
- Exhibitions: Experience shows that people are more interested in concrete and touchable products than in theoretical explanations. An exhibition of nice-looking and well-insulated windows or house models can attract the attention of the people. They can then be convinced of the product in interpersonal communication.



At an exhibition in the town of Khorog in Gorno-Badakhshan, potential clients have a close look at well-insulated windows and doors. Experience shows that touchable products contribute particularly much to arousing people's interest.

- Film screenings: Like exhibitions, film screenings offer attractive and convincing visual material. They can take place in a public building (e.g. school or youth club) or even in the street, but require some technical equipment.
- Information events: Information events might be the most efficient way to discuss thermal insulation in detail with a significant number of people at the same time. It should be participatory, promoting discussion and reflection, and may be combined with an exhibition or a film screening.
- Posters and information materials: Few people will be convinced of the micro loan product only through a flyer. However, posters and information materials may at least arouse the readers' interest and give them the contact details to get in touch with the microfinance organization (see appendices 2.2 to 2.5). Flyers, for example, should be distributed after any marketing event. In any case, it has to be kept in mind that some people may not be literate.
- Model houses: Especially in the beginning, when the dissemination of thermal insulation is launched in a certain region, the insulation of model houses free of charge may be recommendable. Such model houses set concrete and touchable examples, and once the house owners feel the effect of thermal insulation, they usually disseminate the success story independently. When selecting model houses, the houses of opinion leaders in a village or region (i.e. often the rather well-educated and well-off households) should be chosen whom others find worth to imitate.

Iftikhor Mirshakarov, communication expert (Khorog, Tajikistan):

„In our villages, local people usually get news and information from neighbors and relatives. If a client is satisfied with the thermal insulation measures and feels more comfortable inside his house, the other villagers will know about it quite soon and some of them will show interest in following the example. On the other hand, I know of one client who was not satisfied with his window because the sealing was done in bad quality. He told all his neighbors about the problems, who consequently developed a skeptical attitude towards thermal insulation in general. Therefore we have advised MADINA to make sure that the thermal insulation is implemented in good quality, so that clients are satisfied and tell the success story to others.“

- Seminar for local leaders: The most credible and impressive success stories are those about which you are told directly, instead of reading about them in the newspaper. One way to give direct access to success stories is for example to invite local leaders to an insulated house (e.g. a model house) and have the satisfied house owner explain the principles and advantages of thermal insulation.
- Resource persons in the villages: Another marketing approach is to create a system of energy efficiency advisors in the villages. They are trained in assessing the energetic condition of houses and in giving recommendations for increasing energy efficiency (e.g. installation of a well-insulated window, insulation of the ceiling, new stove). Receiving a fixed share of the micro loan income, they have a financial incentive to win new clients. Such energy efficiency advisors combine marketing and technical analysis. They should not only have some basic technical understanding, but also be innovative and respected by their fellow villagers.

After a few months or years of campaigning, knowledge about thermal insulation should be so widespread and the micro loan product so popular that no more marketing is necessary.

8. Doors and windows

8.1. Product selection

In many houses, doors and windows are among the main sources of heat losses.

These heat losses can be significantly reduced if well-insulated doors and windows are installed. Often the choice is between plastic, metal and wooden products. The decision on what kind of products should be offered in the framework of the micro loan depends on several factors:

1. **Product quality:** For the long-term success of the micro loan product, it is indispensable that the doors and windows have a high quality. Otherwise clients will not be satisfied and recommend the micro loan product to others. This means, among others, that they should be durable and have a good thermal insulation effect.
2. **Product price:** The identified target groups should be able to afford the products in the framework of the micro loan, and the relation between the price and the quality should be a reasonable one.
3. **Clients' preferences:** In some regions, clients might have clear preferences with regard to the material, size and look, connected to tradition or fashion. Such cultural and aesthetic aspects should be analyzed and taken into consideration.
4. **Product availability:** Especially in rural areas, it may be hard to find adequate products on the local market. If this is the case, there are two options: promoting the import of the respective products from other markets, or facilitating the development of the local supply, e.g. by providing technical knowledge, training craftsmen, supporting local producers in organizing the supply with raw materials and marketing their products.

8.2. Doors

Metal doors may be recommended as exterior doors because they are more resistant to weather conditions, whereas wooden doors usually are more convenient as interior doors because their insulation effect is higher. In both cases it should be taken into consideration to cover the door with insulation material, which is a simple and affordable method to improve the thermal insulation. If wooden doors for interior use are produced or bought, the following aspects should be kept in mind (see appendices 2.5, 3.1. and 3.2.):

- For the construction of the door, dry wood must be used. Otherwise the whole construction is easily warped and loses its thermal insulation effect. The humidity of the wood should not be higher than 18 percent.
- There are certain points in the door which are particularly exposed to the pressure through the weight of the door. At these points, the connection between the wooden parts must be particularly strong so that the construction does not get warped and no slots emerge.
- The door must be well-anchored within the doorframe with at least three strong door hinges, otherwise the whole construction is easily warped and

Standard sizes

MADINA has been cooperating with local carpenters producing wooden doors and double-glazed windows. Formerly, the carpenters were used to producing individual sizes only on demand. This meant that they did not have any work in winter because people ordered windows and doors only in construction season. In order to make production for storage in winter season possible, it was decided to introduce three standard sizes for windows and one standard size for doors. This indeed made production much more efficient, but the standard sizes were not easily accepted by all clients. It was found necessary to adapt them to the actual demand – for example, the smallest window was only rarely sold.

Zubayda Kirgizbekova, GTZ advisor on production of wooden products (Khorog, Tajikistan):

„Our wooden doors are usually used as interior doors between the winter room and the corridor. But some clients used the wooden door as an exterior door between the corridor and the



street. After a few months they wondered why the door didn't close properly any more, but actually the reasons are quite obvious: There are huge temperature differences, and the exterior door is directly exposed to harsh weather conditions, therefore the wooden construction gets easily distorted.“

the door does not close properly any more.

- With wood expanding or decreasing under the influence of temperature and humidity, the size of the door may change minimally. There should be notches with rubber sealing in the doorframe which allow some flexibility and a hermetic closing of the door even under different environmental conditions.
- In some regions, local people have already got used to distortions of the door and do not close it hermetically any more. In such cases, it might make sense to install some mechanism which makes the door close automatically.

8.3. Windows

Similarly, there is no *a priori* difference in quality between wooden and plastic windows. Plastic windows can be more quickly produced and do not have to be painted each year, but the cheap ones are not durable, have a bad smell and change in color when exposed to the sunlight. Wooden windows look more traditional and may be more accepted by the local population. They are durable and give an effect for thermal insulation only if they are double-glazed and produced in good quality. As far as quality and prices are concerned, on most markets different standards are available, depending on the quality of raw materials and their processing. If wooden windows are produced or bought, the following aspects should be focused on (see appendices 2.5, 3.1. and 3.2.):



Carpenters are discussing quality improvements with regard to well-insulated windows in the town of Khorog, Gorno-Badakhshan.

- Indispensably, the windows must be double-glazed. The two panes let solar energy from outside pass through, but heat from inside is prevented from leaving the room due to the greenhouse effect of the non-circulating air or even vacuum between the panes.
- In order to prevent the circulation of air between the two panes and a loss of insulation effect, the panes should stick tightly in the wooden construction and be inserted into notches cut into the wood. The wooden construction and the glass should be linked with silicon, putty or rubber sealing.
- If the window can be opened, there will be certain points which are highly exposed to the pressure through the weight of the window. At these points, the connection between the wooden parts must be particularly good so that the construction does not get warped and no slots emerge.
- In order to allow for a hermetic closing of the window, there should be

Torsten Swoboda, market analyst (Leipzig, Germany):

„At the moment, most clients in Gorno-Badakhshan who install a new window opt for a plastic window. The plastic windows are cheaper than wooden windows, but the low price is only due to the bad quality of the raw material, which results in a bad smell and changes in color. We have found out that double-glazed wooden windows could easily compete in price with plastic windows once clients started to require higher quality. I have even met a producer of plastic windows who admitted that he would prefer installing wooden windows in his own house if they were available on the local market in good quality.“

Roof-hatch windows

The traditional Pamiri house gets light and fresh air through a roof-hatch window called „roetz“ which in some cases makes Western-style windows dispensable. Producing double-glazed roof-hatch windows in sufficient quality has been a particular challenge due to the complex shape, but the principles of double-glazing, notches, sealing materials and opening mechanism are the same as with conventional windows. As the roof-hatch windows are strongly exposed to sun light and rain, it is important to protect the wooden parts with sheet metal.

notches with sealing rubber in the window frame.

- The wood used for the window construction must be varnished in order to be weather resistant and to protect the wood from mildew or from drying.
- All timber beams of the window should be beveled so that rain water can easily flow away and does not penetrate the wood.

8.4. Training of craftsmen

In places where neither wooden nor plastic doors and windows are available in sufficient quality on the local market, it may be necessary to train craftsmen in producing them. First the technology should be adapted and standardized, taking into account general thermal insulation standards, local architecture and construction habits, the equipment of local carpenter workshops and the local availability of raw materials. For this adaptation and standardization, it may be convenient to invite an external consultant who analyzes the abovementioned aspects, gives recommendations for the standardization of the products and the production process, and develops a training module (see appendix 3.3.). Besides this, he should train some local craftsmen in producing well-insulated doors and windows, who in the future may act as local trainers and pass their knowledge on to their colleagues.



Local carpenters are trained in producing well-insulated wooden doors and windows in the town of Khorog, Gorno-Badakhshan.

The microfinance organization should also establish some mechanisms for selecting the craftsmen with whom it cooperates and whose products it sells to its client. The key criterion should be the quality of the products, which can be guaranteed through the establishment of a system of quality certification, a quality check of the product before purchase, a warranty given by the producer.

Experience shows that the products and production processes are constantly developed and improved, either through external impulses or thanks to the ideas of craftsmen and clients. In order to moderate this process and to promote a quick dissemination of innovations, it makes sense to have regular meetings with carpenters on the future technical development of the products.

Zubayda Kirgizbekova, GTZ advisor on production of wooden products (Khorog, Tajikistan):

„In Gorno-Badakhshan, the framework conditions have made it very difficult to establish the production of well-insulated wooden doors and windows. For example, formerly local carpenters delivered the wooden window frame without the panes and did not manage the procurement of raw materials on their own. We invited an international consultant from Germany who developed a manual on the production of well-insulated doors and double glazed windows under local conditions. We also trained some 30 local carpenters free of charge. After the one-week training, each of these carpenters had to produce one sample of each product so that we could assess the quality and decide with whom we wanted to cooperate further. Another challenge was that the carpenters were lacking basic business skills, so we had to organize trainings in price calculation for them. In order to facilitate the production process, we are working on the establishment of an association of carpenters to manage the supply of raw materials jointly. By now, we have several carpenters who not only do their work reliably, but also strive to improve their products technically and have a regular income from the production.”

9. Construction works

9.1. Thermal insulation measures

When designing the micro loan product, the microfinance organization should think about which measures to include, taking into account the effect with regard to thermal insulation, the priorities of clients and the availability of capacities. The following list gives an overview over the measures which can potentially be included in the services offered by the microfinance organization (see appendix 4.1.):

1. Door insulation: In some cases, it may be enough to insulate the existing door, e.g. by covering it with insulation material or by plugging slots between the door frame and the wall. In other cases, however, heat losses through the existing door are so high that it should be exchanged against a new, well-insulated one.



An old door is covered with insulation material in a village in Gorno-Badakhshan. In some cases, this is a viable alternative to the installation of a new door.

2. Window insulation: Similar to the doors, some existing windows can be insulated, e.g. by repairing the pane or by plugging slots, whereas others should be exchanged against new, well-insulated ones.
3. Floor insulation: The floor insulation is particularly recommended if a wooden floor construction is lacking. It fulfils two purposes - thermal insulation and insulation against moisture, so in addition to the thermal insulation layer there should be a hydro-insulation layer. Floor insulation will have a particularly high effect on the feeling of comfort when walking, sitting or sleeping on the floor.
4. Ceiling insulation: Warm air has a lower density and is therefore concentrated at the top of the room. If the ceiling is not insulated, heat will easily get lost through it. The insulation of the ceiling can be combined with the installation of a new ceiling for aesthetic reasons (e.g. of painted plywood). In this context, it is absolutely necessary to insulate the chimney with clay or other fireproof material. Otherwise the insulation material may be ignited by the high temperature of the chimney. To avoid fire, also electrical cables have to be separated from the insulation material.

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„In 2009, we wanted to insulate a governmental building in the town of Ishkashim. We had a well-insulated window brought from the provincial capital of Khorog and believed that any local craftsman would be able to install it correctly. However, we got a bad surprise when we realized that the installation of the window had been done in a very unprofessional way and that there were huge slots between the window and the wall. The thermal insulation effect of the window was therefore lost. We understood that good products are not enough, but that we also need qualified people to install them.“

5. Roof insulation: The roof insulation from above has the same purpose as the insulation of the ceiling. It is particularly important that the insulation material is surrounded by well-closing roofing felt which prevents that moisture finds its way into the insulation material.



Construction workers are working on the insulation of a roof in a village in Gorno-Badakhshan.

6. Wall insulation: If the walls are not insulated sufficiently, heat losses are significant. However, the insulation of walls is very complex and much more expensive than other measures. When building new houses, ideally a double wall is constructed and the insulation layer is put in between. When insulating existing houses, in contrast, the insulation material has to be attached on the interior or on the exterior side of the wall. In order to avoid moisture and mildew inside the wall, this insulation measure must be implemented in a very qualitative way. Therefore it does not necessarily make sense to include it in the services offered by the microfinance organization.
7. Foil insulation: The installation of reflective metalized plastic foil (e.g. beyond the ceiling of the winter room) is a particularly cheap measure but may have a high effect on reducing the heat losses through radiation.

The decision about the thermal insulation materials to be used should take into account the price, the quality, the availability on the local market, installation requirements and the preferences of clients. In general, insulation materials have inclusions of small quantities of air unable to circulate and therefore preventing a heat exchange. They should have a density of less than 400 to 500 kg/m³ and a low thermal conductivity. In any case, it is very important that the insulation material is dry when it is installed and remains dry, otherwise it might be rotting after some time. Besides industrially produced insulation materials, also natural materials like straw, wood shavings and reed can be used for the thermal insulation of floors, ceilings, roofs and walls. Natural insulation material should be protected against insects, e.g. by mixing it with lime.

9.2. Training of construction workers

Experience shows that the thermal insulation works should be done by professional construction workers who have sufficient knowledge, skills and experience concern-

Rustam Zevarshoev, GTZ advisor on thermal insulation (Khorog, Tajikistan):

„We have experienced and are experiencing a continuous development of the thermal insulation measures which MADINA offers in the framework of the micro loan. International consultants have brought new know-how and recommendations, construction workers have proposed ideas how to improve the processes, and insulation materials have appeared on the local market of which we had not thought before. For example, the idea of preventing heat loss through radiation with reflective foil only came up recently. If we want to achieve good quality, continuous improvement is necessary and construction workers should be flexible to adapt to innovations.“

Rishat Kojonov, consultant on thermal insulation (Bishkek, Kyrgyzstan):



„In 2009, the clients of MADINA had to organize the implementation of construction works on their own. Some of them commissioned professional construction workers; others did

the work on their own. Due to this, many problems arose: One client tried to make the new door smaller and thereby destroyed it. Another client forgot the roofing felt, so the insulation material on the roof got wet and rotted quickly. Still another client could not find a craftsman in his village who was able and willing to install the new window, so it remained in the storage during winter and the heat went out through the slots in the old window as before. Therefore it is a big step forward that MADINA has started to cooperate directly with construction workers and to train them systematically.“

Saparbay Bashurov, construction worker (Murgab, Tajikistan):

„People have been talking a lot about thermal insulation and the micro loan here in Murgab. Therefore I applied at once when I heard that the MADINA engineer was looking for reliable construction workers. They sent a consultant from Bishkek who gave us a one-week training. I do not get a fix salary, but at least MADINA negotiates fair prices with the clients. Our team is quite busy with thermal insulation during this construction season, and orders are reliable. In general, thermal insulation is becoming quite popular here and I think this opens many opportunities for construction workers, provided that all of us do our work in good quality. One neighbor has already asked me if I could insulate the floor and ceiling in his house - he could pay for it even without a loan.“

ing the processing of insulation materials and the implementation of thermal insulation measures. In some cases it might be necessary to give them additional trainings so that they can do the work in good quality and the clients are satisfied.

Like with the production of wooden doors and windows, first the technology should be adapted and standardized, taking into account general thermal insulation standards, local architecture and construction habits, the equipment of local construction workers and the local availability of raw materials. It may be convenient to invite an external consultant who analyzes the above mentioned aspects, gives recommendations for the standardization of the products and the production process, and develops a training module (see appendix 4.2.).

The microfinance organization should select construction workers based in the respective region or district. They should have a broad background (e.g. not only in bricklaying, but also in wood processing), be reliable and open for new approaches. In order to make qualified and motivated construction workers cooperate with the microfinance organization, it is important to point out to them the opportunities for income generation through thermal insulation. In the framework of the cooperation, they will find clients very easily and have a calculable income. Moreover, thanks to the training they will get additional qualifications, which they can use even beyond the cooperation with the microfinance organization in order to offer innovative services and to find new clients.

The selected construction workers should get a training, which sensitizes them for quality and thermal insulation issues in general and enables them to implement standardized thermal insulation measures (e.g. installation of a new window, clay insulation of the chimney). Ideally, the training takes place in the field (i.e. in a house to be insulated) and give the participants the opportunity to try out the new knowledge in practice. A promising approach might also be to insulate the house of a construction worker or of a micro loan field officer in order to show the effects of thermal insulation, to sensitize them for quality issues and to give additional incentives.

During the following cooperation, the communication with the construction workers should be as transparent as possible with regard to orders, requirements and payment. In return, the contracted construction workers should give a warranty, i.e. some guarantee to redo the work free of charge if the quality proves to be insufficient. Moreover, the microfinance organization should introduce a system of quality certification for construction workers, possibly together with partners.

10. Conclusion

Obviously, the described micro loan product for thermal insulation is special as it not only comprises a micro loan, but also the provision of intensive technical consulting. In addition to the usual costs connected to micro loans, the microfinance organization has the following expenses in the framework of the thermal insulation loan:

- The salary of the employees of the energy efficiency department.
- Travel expenses of the employees of the energy efficiency department (transport costs and per diems).
- Additional work load for the accountancy (due to the complexity of the accounting for the in kind loan).

All the other expenses (e.g. for the transport of the materials and products) are taken over by the clients. When analyzing the profitability of the product, the following key parameters should be kept in mind:

1. Distance of target villages: The further away the target villages are from the headquarters of the microfinance organization, the higher the travel expenses of the energy efficiency department will be.
2. Average loan amount: The expenses for the technical consulting only little depend on the loan amount. It doesn't matter if the client only wants to install a new window or plans a total renovation of his house – the technical analysis and the final monitoring have to be done anyway. On the contrary, the net income from the interest highly depends on the loan amount. The higher the average loan amount is, the easier the expenses for the technical consulting can be covered by the net income.
3. Density of clients: The more clients live close to each other, the more efficiently the field trips of the representatives of the energy efficiency department, the delivery of materials and products and the implementation of thermal insulation works can be organized, reducing the average expenses of the microfinance organization.

Taking all this into consideration, the question needs to be asked: Is this micro loan product actually feasible for the microfinance organization? There is a clear answer: This micro loan product is less profitable than more conventional products like business loans. But it does not necessarily bring losses, and it can provide important strategic benefits which easily compensate for the lower profitability:

- An innovative micro loan product for thermal insulation distinguishes a microfinance organization from its competitors in the eyes of potential clients. It can highly increase the image of the microfinance organization and help in gaining new clients and in securing the market share when the competition for conventional micro loan products (e.g. business and consumer loans) gets intense.
- Offering an innovative micro loan product for thermal insulation also helps in catching the attention of funding organizations and in increasing the portfolio.

Model calculation

In a model calculation, MADINA has analyzed the additional expenses for the technical consulting. It is based on the assumption that the average loan amount is 500 US-Dollars and that the monthly interest rate is 2.5 percent. If there are some 20 clients in a target region 30 kilometers away from the headquarters, the expenses for the technical consulting services make up about 30 percent of the net income. If the target region is 200 kilometers away and the other parameters remain the same, the expenses for the technical consultancy exceed 50 percent of the net income.

Initial investment

In the initial phase, MADINA has been supported by the GTZ project “Support for microfinance services in rural regions“ in the implementation of the individual loan technology and by the GTZ/DED project “Sustainable Management of Natural Resources in Gorno-Badakhshan” in the development and adaptation of thermal insulation technologies. International consultants were invited to bring technical know-how to the region, and under the difficult conditions in the region (e.g. problems with material supply, lack of business sense among craftsmen) hard work had to be done until local carpenters finally were able to produce well-insulated doors and windows. Without these initial investments from the GTZ/DED projects, MADINA would not have been able to successfully establish the micro loan product. But framework conditions are not everywhere as challenging as in Gorno-Badakhshan...



Zafar Mamadzhanov, GTZ microfinance consultant (Dushanbe, Tajikistan):

„For MADINA, the development of the micro loan product “Warm comfort“ was of high strategic importance. The management used the opportunity to diversify the portfolio of micro loan products and thereby to increase the number of potential clients. With the micro loan product “Warm comfort”, it could also enlarge the volume of the loan portfolio. Thanks to the introduction of the individual loan technology and the development of innovative products, MADINA has become one of the leading and most respected microfinance organizations in Gorno-Badakhshan.“

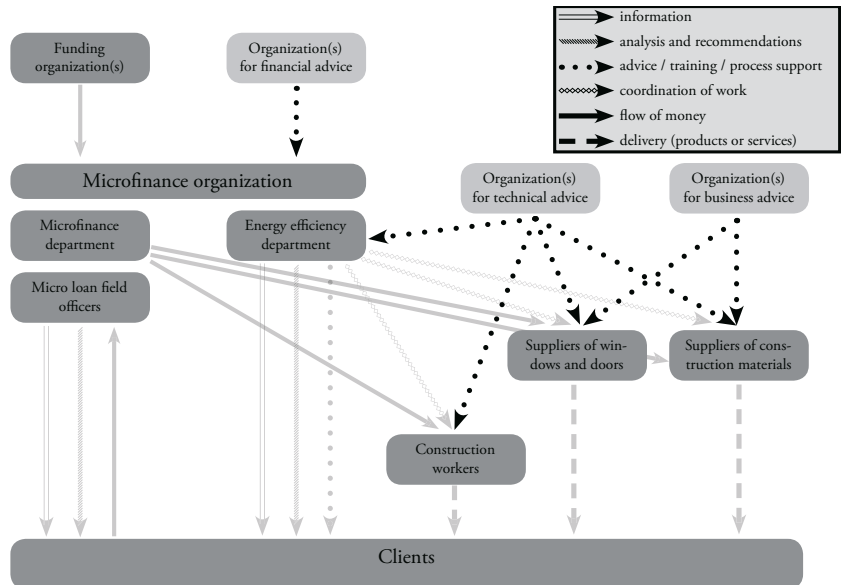


André Fabian, project manager GTZ (Khorog, Tajikistan):

„Disseminating thermal insulation via micro loans has been a surprisingly successful experiment. We have therefore decided to set up a cooperation with MADINA in the dissemination of other energy efficiency products as well - solar water heaters, energy efficient stoves, pumps, etc. MADINA has the chance to develop further unique micro loan products and to combine marketing channels and consulting efforts. For example, in information events they can present the whole range of products, and during the technical analysis a new stove may be recommended in addition to thermal insulation measures - for the benefit of the microfinance organization, the client and natural resources. Like with the micro loan product „Warm comfort“, the financial resources from funding organizations are invested into energy efficiency measures again and again, therefore they have a much higher effect than if specific measures were supported directly.“



It depends on the circumstances and on strategic priorities if the establishment of a micro loan product for thermal insulation makes sense. In any case, it should be kept in mind that it requires the elaboration of complex internal procedures and the development of adapted thermal insulation products. Depending on the framework conditions, external support may be necessary for these initial investments, i.e. for the technical and business training of stakeholders and for financial advice for the microfinance organization.



In some cases, external financial or technical support may be necessary to establish the micro loan product for thermal insulation.

Finally, thermal insulation is not the only energy efficiency product which can be financed and disseminated via micro loans. Similar micro loan products can be developed for other energy efficiency products and renewable energies, for solar water heaters as well as for wind turbines and micro hydro-power stations. Such micro loan products are less complex than the product „Warm comfort“ for thermal insulation, but make an important contribution to the saving of natural resources as well.

11. Appendix

The following documents can be found on the CD-Rom which is attached to this documentation. They can be freely used and adapted.

1. Appendix 1 - Micro loan procedures
 - 1.1. General questionnaire for financial analysis (Russian)
 - 1.2. Manual on microfinance procedures GTZ (Russian)
 - 1.3. Questionnaire for technical analysis (Russian)
 - 1.4. Questionnaire for impact monitoring (Russian)

2. Appendix 2 - Marketing
 - 2.1. Description of information event (English)
 - 2.2. Flyer about micro loan product (English)
 - 2.3. Flyer about thermal insulation and micro loan product (Russian)
 - 2.4. Poster about thermal insulation (Russian)
 - 2.5. Handouts about wooden products (Russian)

3. Appendix 3 - Doors and windows
 - 3.1. Checklist for quality check of wooden products (Russian)
 - 3.2. Manual for the production of well-insulated doors and windows (Russian)
 - 3.3. Overview over training for carpenters (English / Russian)

4. Appendix 4 - Construction works
Manual for thermal insulation construction works (Russian)

12. Notes





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