JPAID Journal of Poverty Alleviation and International Development, 5(1)

Extending the Reach of Microcredit: A New Model for Poverty Alleviation through Livelihood Mapping in Bangladesh*

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Abstract: While microcredit has helped improve the living standards of many, it has failed to meet the needs of the poorest in society. This paper identifies the weakness of the microcredit model and suggests a new model to alleviate the poverty of those beyond the reach of traditional microcredit. This model matches beneficiaries with Income Generating Activities (IGAs), using a new form of livelihood mapping. The paper discusses how this new model has been applied to a project in the Bangladesh sub-district of Tala Upazila.

Keywords: Community Approach, Livelihood Mapping, Microcredit, Visible and Invisible Poverty, Grameen, Income Generating Activity (IGA)

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Manuscript received 4.3.2013; revised 9.5.2014; accepted 18.5.2014.

The use of so-called microcredit is considered one of the most significant innovations in the development field in the last thirty years (Hasan et al. 2009; Ahlin and Jiang 2008; Jha and Bawa 2007; Khandker 2005). Microcredit involves the extension of small, collateral-free institutional loans to jointly-liable group members for their self-employment and income-generating activities. These loans are typically extended to people, and especially women, living in poverty (UN 2004; Ahlin and Jiang 2008; Chowdhury et al. 2005; Rahman 1999). Microcredit as a model for poverty alleviation is under trial in almost 70 countries worldwide, including some developed countries such as the USA. However, there are significant limits to the success microcredit has had in reducing poverty in Bangladesh and elsewhere (Khandker and Zaman 2011; Rahman 1999). An important reason for this is that the microcredit model has not been sufficiently developed to address the wide variety of needs of those living in poverty. A fresh look into this model is therefore necessary.

This paper attempts to identify the weaknesses of the microcredit model. It finds that microcredit is not helping the nearly 10% of society that is the most disadvantaged. The paper, therefore, suggests an improved model to address the needs of the poorest in society that have remained beyond the reach of microcredit. This model uses an income generating activity (IGA) mapping method combined with microloans to enable these poorest of the poor to pursue a viable livelihood within the competitive context of their local economies. The paper concludes with a description of how this model is being put into practice in Tala Upazila, in Bangladesh's Satkhira District. The initial progress is promising, suggesting that this is a viable model for helping to alleviate severe poverty.

The Target Group and the Uses of Microcredit

In many countries, especially in Asia, Africa and Latin America, the poor have little or no access to credit from traditional banks because they have no assets that can be used as collateral. Instead, the poor have had to rely on high interest loans from moneylenders and other operators in the informal credit sector. Microcredit has emerged in those countries as a way to enable poor households to undertake productive economic activities, and therefore, provide an opportunity to escape the shackles of poverty.

In addition to being attractive to the poor, microcredit is also very popular with donors. Many microcredit organizations receive financial support in the form of grants or loans from international donors (Barboza and Trejos 2009). Donors have helped many NGOs to build a financially sustainable pool of independent working capital with which to extend credit to the ultra-poor of the society (Abed 2000). As a result, microcredit programs have expanded rapidly in low-income countries. The number of microcredit users continues to grow, and the Microcredit Summit Campaign has set a target of 175 million clients worldwide by 2015 (Reed 2011: 3).

The popularization of microcredit as a model for poverty alleviation began in Bangladesh, and it is useful to review the development of the sector there. Dr. Mohammad Yunus of Bangladesh established a pioneering microcredit institution, the Grameen Bank, in the late 1970s. Yunus (2010) described his motivation as follows:

> The more time you spend among the poor people, the more you become convinced that poverty is not the result of any incapacity on the part of the poor. Poverty is not created by poor people, it is created by the system we have built, the institutions we have designed, and the concepts we have formulated.... I strongly feel that credit should be given the status of a human right.... poor people are like bonsai trees. (p. xiii)

Yunus, therefore, established the bank to provide microcredit to impoverished portions of the economically active population that were unable to pursue their economic activities due to a small shortage of funds or capital. This included such economically marginal groups as the rural landless, disadvantaged women, farmers of marginal land and wage laborers (UN 2010; Yunus 2003).

From this beginning, the microcredit sector in Bangladesh has grown to be very significant. According to Bangladesh's Microcredit Regulatory Authority (MRA) (2013), the total value of outstanding microloans is around 248 billion Bangladeshi taka (BDT), or over US$3 billion. The value of savings amounted to BDT 168 billion. The total number of clients in the sector is around 35 million (including 8.4 million Grameen Bank clients).

The vast majority of these microcredit clients are women. The Grameen Bank initially provided microloans to both men and women. However, since the mid-1980s the focus has been primarily on women due to problems with recovering loans from men (Haque and Harbin 2009; Hossain and Knight 2008; Osmani 2007; Rahman 1999). Now, most microcredit programs in Bangladesh target women, including those run by NGOs, state-owned commercial banks, private commercial banks, and specialized programs of some ministries of the Bangladesh government. As with Grameen Bank, this is based on the view that women are more likely than men to be credit-constrained, have restricted access to the wage labor market, and have an inequitable share of power in household decision-making (MRA 2013; Uddin 2011).

The way these clients use microcredit is very diverse. The Microcredit Regulatory Authority (MRA 2013) classifies microcredit into six broad categories: i) general microcredit for small-scale self employment based activities, ii) micro-enterprise loans, iii) loans for the ultra poor, iv) agricultural loans, v) seasonal loans, and vi) loans for disaster management. Loans above BDT 50,000 are generally considered as microenterprise loans rather than microcredit. Studies have identified that microcredit and microenterprise loans are used for a wide variety of purposes, including poultry rearing, sericulture, aquaculture and fishing, livestock rearing, homestead cultivation, small scale agriculture, small food processing businesses, home-based cottage industries, and expenses such as education, health, house repairs, and buying boats and transport vehicles (Uddin 2011; Hossain and Knight 2008; Ahmed 2007;

Anderson et al. 2002; Rahman 1999; Hashemi et al. 1996; Goetz and Gupta 1996).

Microcredit in Poverty Reduction and Socio-Economic Development: What Does the Literature Say?

Despite the widespread adoption of microcredit around the world and within Bangladesh, the evidence concerning the impact of micro-credit on poverty is not clear-cut. Several studies suggest that access to microcredit is playing a significant role in socio-economic development through alleviating poverty, empowering women, improving living standards, facilitating self-employment, and providing for better education and healthcare outcomes (Hasan et al. 2009; Haque and Harbin 2009; Hossain and Knight 2008; Ahlin and Jiang 2008; Jha and Bawa 2007; Ahmed 2007; Osmani 2007; Pitt et al. 2006; Coleman 2006; Chowdhury et al. 2005; Khandker 2005; Morduch and Haley 2002; Rutherford 2001; Rahman 1999; Hashemi et al. 1996; Hulme and Mosley 1996). Most studies of microcredit in Bangladesh have shown that access to microcredit sees women taking a greater role in household decision-making, having greater access to financial, economic and social resources, and contributing to greater mobility (see for example Kotir and Obeng-Odoom 2009; Hossain and Knight 2008; Osmani 2007; Omorodion 2007; Chowdhury et al. 2005; Kabeer 2001; Rahman 1999; Mayoux 1998; Pitt and Khandker 1998; Hashemi et al. 1996).

On the other hand, there is also research implying that microcredit has little impact on poverty (Armendariz de Aghion & Morduch 2010; Odell 2010; Barboza and Trejos 2009; Goldberg 2005; Morduch 2002; Rahman 1999; Zaman 1999; Sebstad and Chen 1996; Gaile and Foster 1996). As Duvendack and Palmer-Jones (2011: 5) note, two important recent studies (Banerjee et al. 2009; Karlan and Zinman 2009) have intensified the debate and further raised doubts about the causal link between microfinance participation and poverty alleviation. Several studies have also found that microcredit does little to change gender inequalities due to limited female control over loans (Goetz and Gupta 1996; Montgomery et al. 1996; Ackerly 1995; Alam 1995).

There is also a problem with microcredit loan holders becoming trapped in debt. Lending organization staff and peer group members apply intense pressure on borrowers to make timely repayments. Many borrowers repay their installments by recycling their existing loan and getting new loans from wherever they can in order to manage loan repayments and household expenses. This debt burden increases anxiety and tension among household members, and greatly reduces the time available to provide for household food security.

One way to understand this competing evidence for and against the effectiveness of microcredit is that some types of borrowers may be benefiting more from microcredit than others. Some argue that the extent to which borrowers benefit depends on their local economic environment, their entrepreneurial ability and the extent their income sources are diversified. Other studies have suggested that moderately poor microcredit borrowers benefit more than extremely poor borrowers. The basic premise is that the poorest have a number of constraints such as fewer income sources, and worse health and education, which prevents them from investing in high-return activities (Zaman 2004; Farashuddin and Amin 1998; Wood and Sharif 1997). In other words, microcredit may not be effective at alleviating poverty for the poorest segment of society.

Limitations of the Microcredit Approach

Microcredit, then, has proven to be most successful for the economically active population—or those who are considered as "bankable" or "creditworthy." From this perspective, Dr. Yunus contributed to widening the circle of those considered "bankable." Previously, only the non-poor could seek financial support from the traditional banks. In the face of considerable skepticism, Yunus showed that those who need financial support the most, the poor, could also be extended credit on a sustainable basis.

Of course, the poor have always had access to small loans through the informal lending sector, but at very high interest rates. What Dr. Yunus brought was the concept that microcredit institutions could provide small loans to the poor at rates of interest comparable to those extended by the traditional banks to the non-poor.

Microcredit institutions are able to do this because they are non-profit NGOs. Grameen Bank is not a bank in the traditional sense of the term. Rather it operates like an NGO and most people in Bangladesh perceive it to be an NGO rather than a bank. Its mode of operation is almost the same as that of an NGO and the institutional arrangement is only slightly different. Rather than using the word "bank," the Bangladesh-based BRAC, said to be the largest NGO in the world, engages in microcredit financing using the banner of an NGO working to promote IGAs.

However, the extension of creditworthiness that Dr. Yunus and others have brought about has significant limits. The bottom 10% of Bangladeshi poor people are unable to get credit from Grameen, BRAC or other NGOs. This most vulnerable group includes the poorest of the poor who for many reasons—sickness, disability, old-age, no adult breadwinners in the family—are disqualified from accessing microcredit as they have no capacity to pay weekly installments. Microfinance institutions, therefore, are banks *for the poor*, *not of the poor*, because not all poor have access. Only that section of the poor who are considered "bankable" or able to pay loan installments on a weekly basis are considered for financing. In this sense, microcredit is not so far away from the concept of traditional banking. Of course, providing banking support to the poor is undoubtedly a social good. But much more is required if poverty is to be reduced significantly beyond existing levels (Matin 1993).

As a result, the Grameen model is a useful approach but is in no way sufficient to address poverty in a country like Bangladesh (e.g. Khandker and Zaman 2011). In particular, microcredit has had little impact on many of the visible manifestations of poverty in Bangladesh, or what could be termed "visible poverty," such as begging, pavement dwellings, and prostitution, as opposed to "invisible poverty" measured in national income statistics. Nevertheless, it is likely that visible poverty is less than it would be if it were not for the role of microfinance in reducing the number of people sliding into abject poverty.

Time for a New Approach

After almost three decades of implementation of his microcredit model, Dr. Yunus has begun to consider those that microcredit has left out. He has started an IGA program for what he termed the "struggling members" of society. To at least some extent, through this program Yunus has returned to the age old concept of charity as this program provides credit without interest or service charges. He additionally promotes his concept of the "social business" that depends on the spirit of charity or good will of the rich. This approach is similar to the concept of Corporate Social Responsibility (CSR) and zakat in Islamic countries. This approach presents many social and institutional difficulties, as Yunus himself has pointed out. For example, there is an institutional arrangement for the extension of microcredit, but is it possible to create any institution which will ensure a social business is looked after like a bank? Indeed, Yunus acknowledges that, "Our legal and regulatory system do not currently provide a place for social business" (Yunus 2010: 117).

Rather than adopt a charity approach, it would have been more beneficial if Yunus had worked to overcome the weaknesses of the microcredit model. A review of Yunus' published papers shows that he has not paid adequate attention to experimenting with his microcredit model to make it more successful. Rather, he has continued to promote microcredit as a response to the poverty of those capable of making loan repayments (what could be called a "credit approach") while promoting a different "business approach," which is actually a form of charity, to tackle the needs of the very poorest in society. Both of these approaches—credit and business—address the supply side. But a social approach addressing the demand side through covering the different income and occupational groups is lacking.

Moreover, Dr. Yunus has not worked out any formula for deciding what portion of the needs of the very poorest in society that are unable to make use of microcredit should be addressed in relation to the needs of those capable of making loan repayments. The Grameen experience suggests that the needs of the relatively better off must be addressed first followed by a focus on the neediest. However, there is reason to believe that the needs of both groups can be addressed simultaneously provided that a proper model targeting visible poverty is adopted.

A New Model for Microcredit-and-IGA-based Poverty Reduction

Banks foster IGAs through providing reasonably low rates of interest to the non-poor. Microcredit institutions expanded the circle of people that have access to affordable credit to include those poor yet economically active people that did not have sufficient collateral to loan money from the traditional banks or that required smaller loan amounts than the banks were willing to provide. But this process and approach left out those that microcredit institutions considered to be ineligible because they had no way to engage in economic activities that would generate revenue to make loan repayments, or because they were male or otherwise considered unlikely to repay loans. It also trapped some people in debt because they received loans but could not generate enough money to repay them. The present model expands the circle of those that can benefit from credit still further through providing the means and skills for more people to become economically active—what can be described as further vertical integration downward in the social structure. Of course, a few poor may remain outside of what this model can accommodate. In that case, a social safety net approach will still be necessary.

Two broad challenges stand in the way of making microcredit available to a significantly larger portion of the needy. The first is that there are so many poor people that require viable income generating activities within a limited locality. The new model presented here overcomes this problem through a three step-process which matches a beneficiary household to an IGA that will be viable in that specific location, taking into account competition from other economic actors in the area. This process is discussed in the following section.

The other challenge is that there are those who are not able to handle funds independently. This includes the many vulnerable members in society who have limited physical capacity or even depend on others for their Activities of Daily Living (ADL). This is addressed through grouping people together to provide mutual support and through providing help in identify IGAs that particularly needy beneficiaries can feasibly engage in. For example, in the case of those with serious physical incapacities, the NGO or institution may opt for group rather than individual economic activities. Non-physically demanding IGAs such as selling tea, cigarettes, or pre-paid mobile phone cards can also be appropriate.

Putting the Model into Practice

The author implemented a project based on this new model following a review of a UK Department for International Development (DFID) Shiree project, and in conjunction with Uttaran, a leading NGO involved in *khas* land (government-owned land) distribution to the landless in the Khulna area of Bangladesh. While reviewing the poverty alleviation program, the team found that *khas* land transfers alone were not sufficient to remove poverty as most recipients, for one reason or another, lost that land within a short period of time if they did not receive IGA development support.

Preparation of a Comprehensive List of Potential IGAs

A comprehensive list of potential IGAs was prepared to provide the field staff of Uttaran a ready reference. The list included 300 diverse types of IGAs with high market potential in the area. This wide range of options was developed so as to reduce the risk of market saturation and competition. Three important criteria were considered to identify an IGA for inclusion in the list:

- Market demand: A market needs to exist in the locality for the goods or services to be produced or provided by the IGA.
- Low operating budget: The IGA must be able to operate profitably within the BDT 14,000–16,000 (US$175–180) budget allocated by the project.
- User friendly technology: Carrying out the IGA should be relatively simple, and require cheap, user-friendly tools and machines only.

A sample of the 300 IGAs prepared according to these criteria is shown in the appendix.

Mapping the IGAs

An important component of this new model is the drawing up of a new type of livelihood map. Previously, livelihood mapping has been employed to identify potential land uses in a particular area/region, or as a kind of intensive production map, particularly in African countries. In Bangladesh, the Ministry of Land has implemented a land zoning project mainly focused on mapping land type and potential land use. In contrast, the present model connects different income generating activities in a particular sub-district or even in a part of a sub-district with resources available from NGOs or any other welfare institutions operating in that area.

In order to match a specific beneficiary to a narrow list of viable IGAs in his or her locality, and to avoid demand constraints or market saturation, project staff were trained to prepare a new type of livelihood map for the entire Upazila (sub-district). The analysis was conducted for each Union (lowest level of administrative unit), using a Participatory Rural Appraisal (PRA) mapping technique. Dots were placed on the map indicating the type of IGA that was considered suitable at a particular location. Sustainability risk factors for each location were also considered. These included flooding, water logging, river erosion, cyclones, drought, and pests.

A similar approach was applied for IGAs involving commodity hawking/vendoring and service providing such as cobblering. Under the commodity marketing approach, the main consideration was to identify locations suitable for selling specific types of goods. Locations included local markets, village shops, approach roads to the markets, intersections of local roads, school and college gates, Union Parishad office gates, other office building gates, local assembly places, gathering places, bus and truck stands, railway stations, river jetties, land offices and so on. Commodities considered were fruits, vegetables, fish, toys, children's clothes, ladies items, books, hot foods, crackers, prepaid cell phone cards, and so on. Likewise, service selling IGAs included repairing shoes, umbrellas, vans and rickshaws, bicycles, and school bags, etc. These various hawking and service IGAs were paired with a location based on identifying the potential demand or existing demand of a commodity or service in consultation with the local people. For example, the repairing of cell phones was found to be a feasible IGA only in large local markets. The selling of fruits is only viable at road intersections or at other locations such as in front of hospitals or government offices where the assembly of people is a must. Thus, NGO workers had a map displaying possible types of hawking activities and services considered feasible for each locality.

The process was somewhat different for IGAs involving production. A list of locations was prepared where land, water, and forest-based IGAs were possible. There were many land-based IGAs. Water-based IGAs were limited to fish production, fish fry catching, crab production, duck rearing, etc. Forest-based IGAs included production activities based on the collection of different raw materials from the forest like honey, plants, leaves, straw, firewood, and so on. These IGAs were matched to localities accordingly. For example, the home-based production of mats from coconut fiber was linked to localities with many coconut groves. The production of mats, roofing and wall building from a type of soft vegetation called golpata (Nypa fruiticans) was listed as feasible in locations where it could be collected from the Sundarbans mangrove forest.

The information linking IGAs to localities was used to produce two different types of maps. The first kind showed the localities where a particular IGA was feasible. The other type approached it from the opposite direction, showing the different types of IGAs possible at any particular location. This made it possible to present beneficiaries with a significantly larger range of possible IGAs. When the NGO Uttaran workers attempted to prepare an initial list of IGAs they could only come up with about 60–70. However, with the assistance of the author and these two types of maps, they could list as many as 300 IGAs. This was the significant advantage of the present livelihood spot mapping approach. Following this approach, millions of poor people can find viable livelihood niches in a populous country like Bangladesh. New IGAs can constantly be added to the specific list appropriate in a specific locality in consultation with the local people, including the poor people of the area who are from the target group. An example of an IGA map is presented in Figure 1.

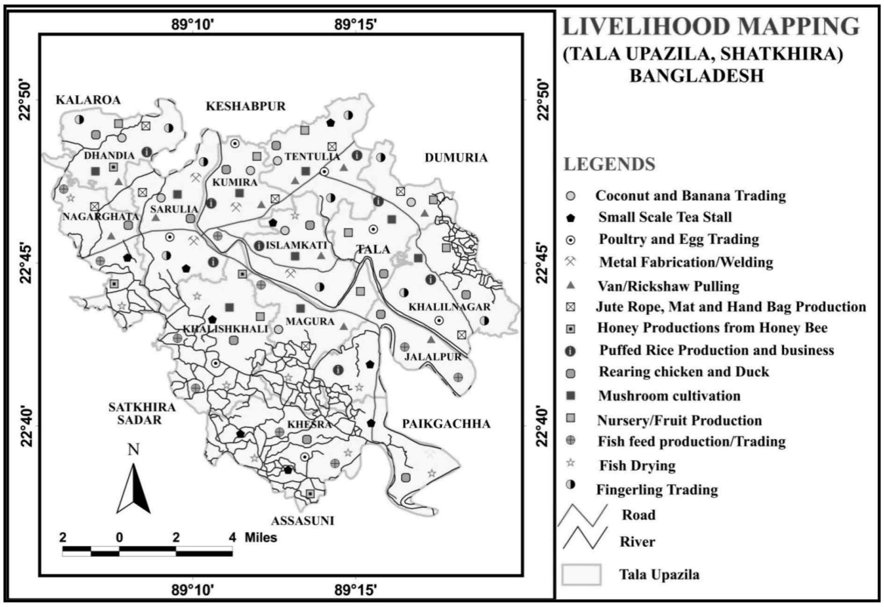

Figure 1. An example of a livelihood map for Tala Upazila of Satkhira District, Bangladesh.

Matching IGAs to Beneficiaries

The final crucial step involved is to match a specific beneficiary to a specific IGA from the list of location-specific IGAs shown on the livelihood map. IGAs were assigned to particular beneficiaries according to the following criteria:

- Daily income in excess of daily needs: If the income from an IGA is scanty, none would adhere to it and there is no justification for recommending that IGA to a household. Therefore, for each of the IGAs potentially feasible in the locality of the beneficiary household, the NGO worker and household calculate the projected per day income and the opportunity cost for the household. If daily income does not exceed daily needs, it is struck off the list. These calculations are also used to rank the potential of IGAs for the household in order to facilitate the best possible choice.

- A guaranteed market: The IGA in question must have a ready market in the beneficiary household's locality. Seasonal fluctuations in the market need to be taken into account, and more than one IGA may be required.
- Physical ability: Not all IGAs are suitable for all as some require more physical strength, such as van or rickshaw pulling.
- Resources: Certain IGAs require land, space within the home, an existing cash reserve and so on. Households must have the requisite resources to carry out an IGA.
- Exposure to IGAs and its technology: IGAs must be matched to a specific beneficiary's knowledge, skills and abilities.

Following these criteria was crucial; otherwise, whatever seed money given would quickly be lost. For example, a woman in a village included in the study who was previously given a sewing machine could earn only BDT 400 (roughly US$5) in a month, which was much less than necessary for her family's survival. Although on paper this was household aided by an NGO, family members were frequently malnourished. On the day of our visit, the eldest daughter of the household was suffering from a severe fever, and her mother had no money with which to buy medicine. In a similar case, another household was given six egg laying ducks, with the possibility to earn BDT 6 from the sale of one egg per day and therefore, could earn only BDT 36 (roughly US$0.40 or one kilogram of rice) in a day. Our study revealed that most of the households that had received IGA support from the DFID project could not earn their basic livelihood and therefore, had no faith in that program. Uttaran NGO workers were, therefore, trained to develop the business plan for each IGA following a standard format as outlined above. Without that training and support, they would not have been able to understand or implement the new model presented here.

Microcredit Support

Once a household was matched with an appropriate IGA or IGAs, continued technical and institutional support is needed. Credit is also extended in order to implement the business plan as a sustainable, viable IGA. The stages, target, timing, loan amounts and interest rates/service charges are provided in Table 1 below. It shows that the poverty of the most disadvantaged people cannot be removed overnight. Rather, a multi-staged progressive approach is needed as shown here. The project implementing NGO needs to assist the household in progressing through the stages delineated below:

- Ordering stage: This initial stage focuses on bringing about economic discipline and to create hope for a better living. Initially, most participants do not see any real future ahead for them, and believe they are born to die unattended, unrecognized and uncared for. In order to move out of this situation, they require both social and psychological stimulus to see the benefit of joining the program.
- Enabling stage: The focus of this stage is enabling participants to regularly participate in the IGA. If needed, training in the IGA is conducted.
- Consolidation stage: This is a very crucial stage when the households may again be derailed and thereby go back to their previous condition unless they are closely monitored and supported and inspired to adhere to the program.
- Sustaining stage: Once the consolidation stage has been crossed, the program needs to continue the support to enable the IGA to develop into a sustainable enterprise. Thus, a process of sustainability of the program will be achieved.

Before reaching the consolidation and sustaining stage, some staff from the program may leave, some participants may die due to health reasons, some new participants may need to join the program because of some natural calamities or other crises, etc. New staff will need to be trained, new participants will need orientation, old members will need re-orientation, some may require re-skill training due to changes in market demand due to technological changes or other reasons. Therefore, the nature of the support to the target population will need redefining from time to time. Thus, the program implementing agency requires further periodic reviewing of their role in context of the program. Finally, if any exceptional household is found to be beyond poverty management through microcredit, the same may be referred to the social safety net program of the government or other relevant agency considering the context and conditions.

Table 1.
Stages of credit support

Stage	Target	Timing	Loan amount	Interest rate/ service charge
Ordering	To bring economic discipline and to create hope for a better living	4-6 months	US$10- 20	0-2% (in order to provide a sense of dignity)
Enabling	To enable regular participation in the IGA	6-12 months	US$30- 40	5%
Consolidating	To enable consolidation of the IGA	13-24 months	US$50-100	10%
Sustaining	To enable the IGA to be develop into a sustainable enterprise	24+ months	US$50-200	16%

Conclusion

The use of microcredit has been an effective tool for poverty alleviation in certain circumstances. In particular, it has benefited the section of the population that lacks sufficient collateral or income to access traditional bank finance, yet nevertheless has the wherewithal to engage in profitable activities if they are able to access credit. This microcredit model has significant benefits over a traditional charity model. However, microcredit has failed to alleviate the poverty of the bottom 10% of society that microcredit institutions consider non-creditworthy. Some organizations have fallen back on the charity model in order to address this need.

In contrast, the present model extends the use of microcredit and IGA promotion to the poorest section of the population previously not served by the traditional microcredit models used by Grameen or other NGOs in Bangladesh. It does this by developing a new all-inclusive IGA approach that combines IGA livelihood mapping and other support with the extension of microcredit for IGA development. Although the implementation of this model is still at an early stage, its approaches extreme poverty with a clear rational, and provides a promising model with which to extend the benefits of microcredit to more of the hard to reach poorest 10% of the population.

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Appendix

Example IGA List for Aquaculture-Related IGAs

Potential IGA	DDaily Income	Name of the Unions of Tala Upazila (Sub-district) for which it is suitable (Put Tick Mark)												
		Dhandia	Islamkati	Jalalpur	Khalilnagar	Khaliskhali	Khesra	Kumira	Magura	Nagarghata	Sarulia	Tala	Tentulia	**Priority**
Bagda (shrimp) Cultivation														
Galda (shrimp) Cultivation														
Local Carp/Rui/ Katla/Mrigel /Grass Carp, Telapia, Pangus, Thai Koi and other local fish cultivation														
Local and hybrid variety fish cultivation in cage (cage fishery)														
Local variety fish cultivation in flood and water logging area during rainy season														