

Study of Livelihoods Options with Market Mapping and Value Chain Analysis of Rural on-farm and off-farm enterprises for target communities at *Baradrone Social Welfare Institution (BSWI)* Project area in Gazole, Malda, West Bengal assisted by THE TATA TRUSTS.

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Background of BSWI

Baradrone Social Welfare Institution (BSWI) is a pioneer organization in West Bengal that originated in the year of 1961 as a village level textbook library and free coaching centre. BSWI received financial, material and technical support for carrying out village development initiatives. The opportunities and the association over the years helped create learning/lessons for BSWI and gain organizational experience. BSWI catalyses change in thousands of lives by implementing innovative efforts. We work in four focused areas:

- Education, with an emphasis on the universal elementary and secondary education;

- Livelihoods, with an emphasis on the economic empowerment of women;
- Preventive & Promotional Health, for arresting CMRs, UFMRs & MMRs and promotion of good reproductive health practices;
- Women's Empowerment, for improving the status of poor women and advocating for protecting their rights.

Background of the BSWI Malda Project

The project area has a high concentration of tribals who are isolated from the mainstream. The families having an average land holding of approximately 0.5 ha and hardly they are able to produce crops in the occupied land. As there is no provision of selling out, the lands are mostly leased or mortgaged to the non-tribal families. As there is no job assurance, families migrate to the distant places in search of employment. Consumption of liquor mostly by males and violence against women are prevalent in the villages. Women lack any platform to raise their voices against social evils; neither are they traditionally permitted to take part in the household or village level decision-making.

BSWI is utilizing the local resources (programmatic and human) and trying to bring the target groups in the frontline of rural change. Right now, BSWI is hovering around the first stage, i.e. creating associations of people at the grassroots. We feel that adequate time and inputs and efforts are to be given in this stage, on which the sustainability of the programs would rest. The SHGs formed by BSWI in the project area were found to be aware and curious on collectivity and their attitude for working together has gradually increased. The need of group formation amongst the target community has now been realized as important by the community in order to initiate local level development planning-implementation-monitoring. This is being carried forward to the right earnest by the community and the BSWI team in Gazole. Group Organization is a new rural mechanism, as witnessed by the community that is showing the target community how to realize their full potential in improving their livelihoods through collectivity and cohesion. The zeal of BSWI to bring those into new groups (who had no such collectives earlier) has given the area a nudge from where the members are optimistic to move forward. The group orientation methodologies of BSWI encouraged the mainstream institutions as well. The ignorant decision-making attitude is found to be gradually fading amongst the group members. Ownership senses have developed amongst the stakeholders of the project in the area of local contribution, care and maintenance of the assets created, self-help and seeking legitimate claims from the system. Attitude has developed in some members in allowing their private assets for community use (pond, water etc.). Care and ownership feeling is found to be improved in the spheres of groups' revolving fund, selection of trades, selection of participants, and above all ensuring the fund flows.

The livelihood activities already taken up by the organization at Gazole include

- Goat rearing
- SRI promotion
- Improved vegetable farming
- Improving water resources
- Utilizing community ponds for improved fishery
- SHG savings & credit
- Setting up village level petty shops
- Releasing mortgaged lands for marginal farmers to reduce seasonal migration through Rabi vegetable cultivation and SRI
- Setting up outlets at local haats for collective marketing of produce

Of these, savings and credit covers the largest number of clients. The activity with the next highest coverage is the cultivation of paddy using the SRI methodology. The remaining activities have much less coverage in terms of the number of beneficiaries. Some activities that are very relevant locally are improvement of water resources (through pond deepening and seepage tanks) and the release of mortgaged lands. In both cases, the investment requirement is quite high. The former activity was substantially co-funded by the NREGA programme which at present is not functioning in the area. The collective marketing efforts for fish and vegetables through the acquiring of outlet space at the village haats have just been initiated.

Assigned task

The organization aims to help the target group families to increase their income to Rs 36000 per year over a three-year period. The current average income level is estimated at Rs 18000 per year and hence the aim is to double the family income.

Constraints expressed by the organization

The organization would like to focus as much as possible on maximizing the use of local resources and skills and would like to stress on feeding local or close-by markets. This has been done keeping in mind the difficulties of finding and retaining high-profile staff at the salary levels acceptable to the team and the donors in the Gazole area.

Strategic considerations for outcome of study

The task given was to propose strategies such that a large percentage of the population could increase their net incomes substantially through a set of cost-effective interventions. Thus too much focus on activities which could definitely lead to considerable income increases for a relatively smaller group would not suffice as

the cornerstone of any proposition. The main elements of any strategy proposed would need to address the maximum possible number of the target group population.

In the project area, barring a small group, the families live off agriculture. Almost all of the population own mango trees. Thus a high-coverage proposition would naturally focus on the potential to optimise earnings on these two fronts. The other common activity is homestead animal husbandry, but this in itself has a number of sub-divisions and each has its own technicalities. A relatively smaller number of people are involved in fishery on a commercial scale. The numbers actually involved in trading and in manufacture of any kind are quite small. A much larger chunk of the male population earns cash income for the house through seasonal migration --- the bulk of these jobs are in infrastructure projects in Kerala and in the erection of mobile telephony towers all over India. In fact an intervention to try and get a larger share of the amount actually paid to these labourers could also help raise the economic condition of the target group. This intervention is proposed as an afterthought simply because it violates the constraints put forward by the BSWI team at the onset of the study.

Methodology used:

- One meeting with senior staff
- Meetings with the field worker team.
- Focus Group Discussions with selected SHGs.
- Focus Group Discussion and interviews with Panchayat leaders and opinion makers.
- Interviews with traders and consumers.
- Interviews with men and women in the community.
- Visits to major and minor markets in the area.
- Value chain analysis of major products produced by the target group.
- Sharing of proposed recommendation with senior staff and field staff for feedback.

While it was easier to talk to groups in the villages, the men folk were not usually available because they were busy in the fields. At the marketplace focus group discussions were impossible because during the weekly haat both consumers and traders were very busy and did not wish to spend time for meetings. So individual interviews had to suffice. The list of places and markets is as follows:

The villages where groups of target group participants were interviewed are:

- Panchpara village
- Chhilimpur village
- Sorakandor village
- Banial village
- Malancha village
- Fatepur village
- Hatimari village
- Shyampur village
- Ghaksol village
- Ranipur village
- Kharnuna village
- Matoi village

The markets where traders and consumers were interviewed were:

- Gazole market
- Panchpara market
- Hatimari market
- Two markets in Malda town

Problems identified during the study

In all the discussions, the most common problem that came up was the need for water for irrigation. This was perceived as the key intervention that would support the farming community in increasing their livelihood options and their incomes.

There was interest in enterprises such as tailoring, making of woollen garments etc especially among the younger population. However, when these were discussed with the panchayat members, they were not so enthusiastic because there had been interventions of this nature in the past which never took off because the beneficiary groups broke up and there was no structured support in place for maintaining the needed backward linkages such as the procurement of raw materials and the

forward linkages such as accessing and servicing markets on a regular basis. Mere training and access to credit would not suffice.

There was considerable interest in the possibility of upgrading of the animal husbandry activities. Almost all of the target group members met were open to exploring rabbit farming and mushroom farming since they had or still consumed these whenever available.

A major source of worry was the low current price of potatoes since many farmers had invested large amounts in this activity encouraged by the high returns in the past two years. The start-of-season prices were already too low and people feared a crash was in the offing.

Value chains studied and results

- Major cereals:

The major cereals grown in the area are paddy and wheat. Part of the output is retained for consumption. The farmer has two choices in marketing the surplus. The preferred option is to sell this at the local weekly/biweekly haat. However, if the family is in dire need of money and cannot wait till the haat day, the farmer may choose to sell this to the local trader (for which the produce sale price reduces by Rs 50-100 per quintal as compared to the estimated haat price at the time of sale). The local trader too sells whatever is procured in this manner at the haat, but often he has the capacity to hold on to the grain for a period so as to get better prices. The wholesale buyer at the haat has tie-ups with rice millers who pay Rs 30-50 more than the procurement price at the haat and pay the transport cost from the haat to the rice mill. Millers stock the raw grain and convert these to a retailable form depending on their financial and milling capacity and then sell to wholesalers who in turn sell to retailers. The money is made on volumes, since the margins at each transaction level are quite low compared to say consumer goods.

- Potato:

Potato is a major cash crop in the area. This is a highly volatile commodity since the prices depend on the output available from other regions and the quantity produced locally as compared to the cold storage capacity available locally. Sale prices at the farmer level vary from Rs 2-3 per kilo (and even at those prices, as at present, there are no buyers) up to a high of Rs 12-14 per kilo (as happened in last two years) against a production cost of Rs 3-4 per kilo.

Producers in the project area can sell the produce either at the local haat or at the adat (wholesale buyer's shop) at Gazole. Those who take the produce to the adat get 10% more money, but they have to bear their own transport cost. The

local buyer at the haat retails part of the stock and makes a 100% margin on the sale: on the rest, a 10% margin is made by supplying to the adati but paying less for transport because of larger quantities. The adati sells the potato to wholesalers at a 10% margin but get transport costs from the buyers. Wholesalers in turn sell to retailers at 10% margin plus transport cost. The retailer sells the potato at a 100% margin to the final consumer. At any point in the chain, sellers have the option of stocking the produce in cold store facilities; however, these have to be booked in advance. Speculation in this crop needs deep pockets, long experience in trading or good knowledge of both buying sources and markets, unlike cereals, which have lesser profit margins but are less prone to high degree of fluctuation.

- Mustard:

Mustard is a common oilseed grown in this area. There are three varieties – local, high-yielding and “boulder”. The boulder is a very hardy variety but sells for the lowest price because its oil has a bitter aftertaste and hence fetches the lowest price. The local variety has less oil but is a hardy variety, while the high-yielding variety has the highest oil content but is the least hardy of the three. This variety fetches the highest price, approximately 20% more than the boulder variety.

The output is sold to buyers at the haat who then sell this to local millers with a 10% margin. Millers mix all three varieties to reduce costs; this is then converted to oil and oilcake, both of which are sold locally. Typically, a miller makes between 20 and 30% margin over the purchase price but incurs storage (and therefore financial) costs to be able to sell round the year.

- Vegetables:

Vegetables are sold by the farmer to buyers at local haats (Weekly markets) who then retail these at 100% margin. The farmers have an alternate channel---- they can also sell vegetables to the adati (wholesale marketplaces) in Gazole town where they get 10% extra but have to pay the transport costs from their village to Gazole. The adati then trades this to wholesalers in the region, gaining 10% more plus the transport costs. The wholesalers sell these to retailers at a margin of 10%, and the retailers in turn sell these to the end consumer at a 100% margin.

- Fish:

Fish is brought to the local haat and sold usually to the local wholesale buyer via auction. The adati weighs the fish and for every 5.5 Kg (one palla), he pays the price for 5 Kg. He then deducts 10% of the auction price as his commission. In effect, the farmer gets 80% of the auction price. The local wholesaler then retails

the fish at a 100% margin at other haats. Some of the beneficiaries have been persuaded to retail their catch directly by offering the consumers a discounted price, around 10% less than local market rates. The farmers make more money but this cannot be done all the time, because during the fish harvest time, the quantities of fish reaching the haat are above the local demand.

- Pigs:

Pigs are sold by the farmers to buyers from the local haat on estimated meat yield basis, which is usually underestimated by around 20-30%. These are then slaughtered and retailed at the local haat with a minimum 100% margin. Pig meat demand goes down during the summer months – the usual demand period is from August to March. Sometimes, when there is no ready market, farmers also slaughter the pigs themselves and sell the meat on credit to their neighbours at reduced rates. This happens when the family is unable to feed the animal any more or when the pen has to be emptied because a sow is due to give birth.

- Country chicken: Country chicken is usually sold live by farmers from their houses. Agents roam around the villages to collect these. The agents then sell these to traders at the haats at a 40% margin, who in turn sell these to retailers at a 30% margin. The retailers then make another 30% margin while selling these to the end consumer.

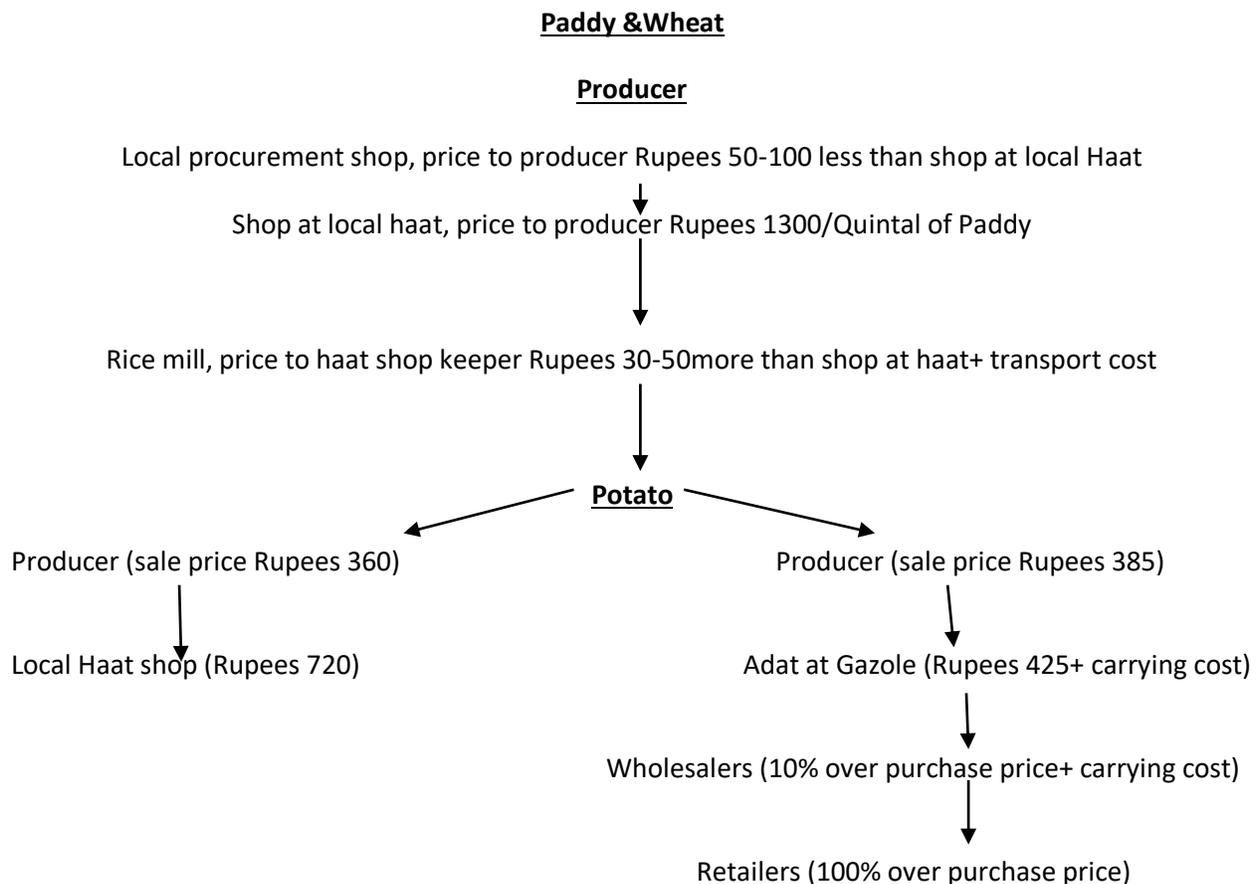
- Mango: Malda district is well-known for its mango produce. It is the home of the famous Langda variety. Every homestead has at least one mango tree and the project area is dotted with small and large mango plantations. The main varieties grown besides the Langda are the Himsagar and the Amrapali. Mango yields well in alternate years; however, the Amrapali, a new introduction, yields well every year. Mangoes at the homestead are mainly kept for consumption by the family.

The Mango crop has an interesting and long value chain. An entire plantation is leased out by the owners to a particular trader for periods ranging from three to seven years at leaf stage (when the tree does not even have any buds). The trader then sprays medicines and growth promoters to ensure that the buds form properly and do not wither away. Once these buds form, the trader often “resells” the tree at a 25% margin on the annual value of the lease. The tree can be then “resold” another three times at various stages: at the small fruit stage with a 20% margin over the bud stage, at medium-sized fruit stage with a 33% margin over the small fruit stage and then at ready fruit stage with 12% margin over the medium fruit stage. Each of these “re-sales” is only for the current season. In between the bud stage and the ready fruit stage, the trees are sprayed at least two more times.

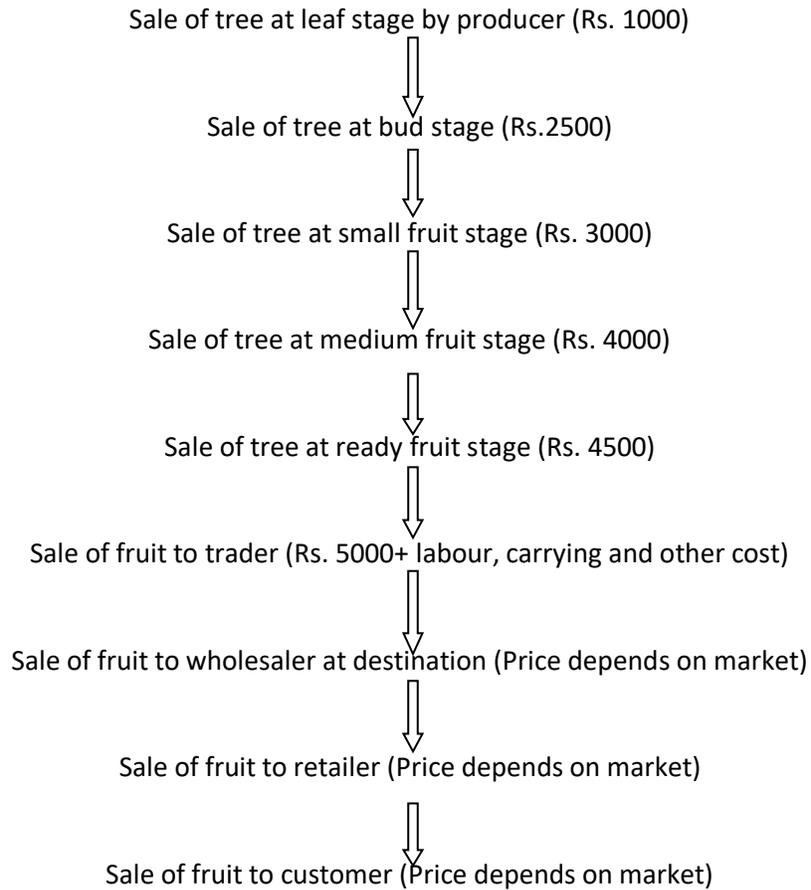
The last “buyer” of the tree sells the fruit to traders who keep a margin of 10% but adding the costs of plucking, packing, ripening and transportation. They sell the fruit to wholesalers at various destinations across the country and abroad. Wholesalers sell these to retailers who sell these to end consumers.

In a nutshell, the net margin on lease of a tree in a single year is of the order of 450%, even if one were to avoid the more difficult part of plucking, ripening, packing and transport of the fruit itself. The trade is all done locally in the villages. It is relatively low in risk since the traders who lease the trees lease all the three varieties. Traders say any one of the three could fail in a season; however, all three have not been known to fail in the same season. They also say that the full value of a seven-year lease can be recovered fully in two years. The skills and knowledge needed to nurture a tree till the ready fruit stage are locally available and can be acquired either by hiring of local experts or by learning it oneself. It is also possible to improve the productivity of the mango trees kept for home consumption so that a marketable surplus is created to add to the household income.

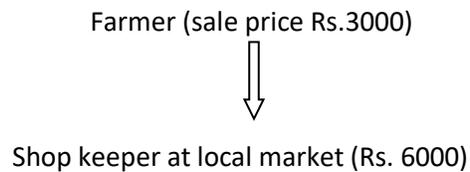
Pictorially, one could present the various value chains as below:



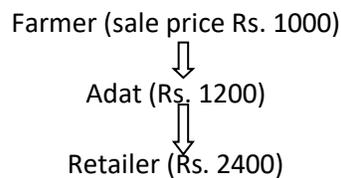
Mango

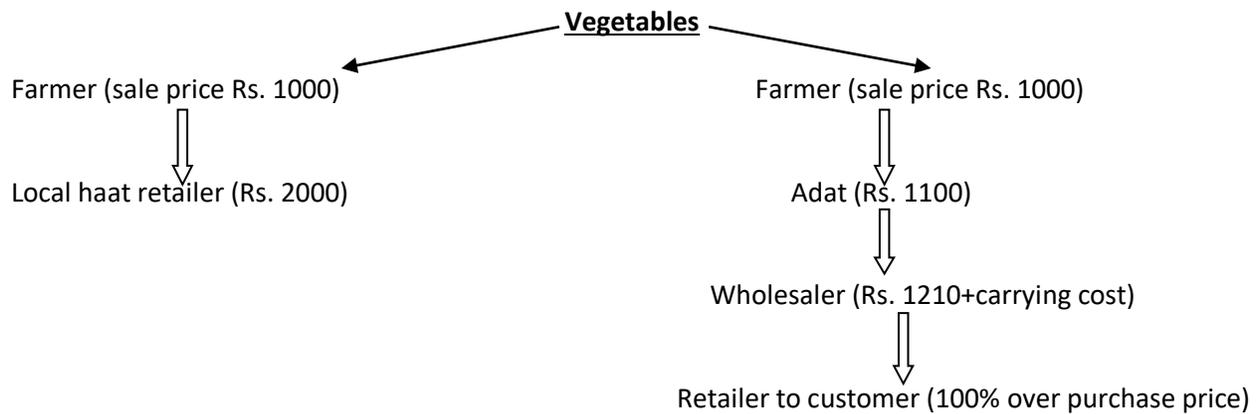


Pig



Fish





Country chicken



Conclusions from value chain analysis

The value chain analysis indicates that except in the case of mangoes, where localized intervention could lead to tree owners benefiting substantially, there seems to be little scope for any large-scale intervention without high risk-taking ability and very good knowledge of external markets. Some individual level action can be taken if farmers choose to sell directly at haats instead of selling to wholesalers but the scope for this is limited both by size of market and ability of producers to go from marketplace to marketplace till a crop is sold; the profit from this would perhaps just cover the opportunity costs and expenses involved in the activity.

Market Study:

BSWI had already conducted a study on the markets for a number of commodities such as goat meat, chicken, fish, eggs and pork in local markets and in Gazole town. The other commodities produced are cereals, mangoes, potatoes and vegetables. These are easily sold; the market price fluctuates on demand-supply factors. No specific market study is needed for these, provided these are produced on homestead scales.

The new items proposed here are mushrooms, rabbits and quail. These are first to be considered for home consumption and sale in the village itself before any scaling-up. Scaling up will depend upon acceptability within the communities; hence these need to be tried out at tiny scales initially.

The off-farm livelihoods proposed are essentially enterprises in which BSWI has good experience on the production front and on the issues related to marketing.

These include woolen garments and low-cost soft luggage items (school bags etc). There is market demand for these goods locally but BSWI will have to study the viability of setting up production centres in Gazole area and find its markets locally. Similarly, there is a market for basic items of clothing such as blouses, children's wear and petticoats, but again there has to be a viability assessment. There is no dearth of market for the relatively small production capacity of the envisaged units since Malda town is hardly an hour's run from the project area, even if the Gazole market and the local haats are found to be too small(which seems improbable).

Recommendations:

12.1 AGRICULTURAL ACTIVITIES

The agriculture programme at BSWI Malda has the following components:

- Promotion of SRI
- Promotion of improved vegetable farming
- Improvement of water resources

The existing SRI programme has been successful in terms of raising the crop yield by about 50-60%. Improved vegetable farming has been carried out around the small ponds that has existed or were renovated/ created by BSWI as a part of this project.

While SRI has indeed had a positive effect, the coverage of this activity needs to be extended to include all possible participants who farm paddy. Also the yield achieved through SRI is quite low compared to the reported rain fed yields from Bihar. A major factor for this is the complete lack of use of any form of compost for years on end compounded with a complete reliance on ever-increasing doses of chemical fertilizers and chemical pesticides, significantly affecting the microbial activity in the soil as well as the porosity and water holding capacity of the soil. This is true not only for SRI Paddy; it holds true for all agriculture.

Hence a key recommendation is that with all families practicing any form of agriculture, the component of creating compost and applying this in the fields should be introduced.

Next, an effective intervention for all agriculture practiced in the project area should be the promotion of bio-fertilisers and integrated pest management (IPM). It is a proven fact that over a three to four year period, the use of chemical fertilisers can be reduced substantially or even eliminated provided it is substituted by bio fertilisers. It is also well-known that for most farmers, the person recommending “medicines” in agriculture is the local agri-input dealer. This has resulted in rampant overdoses and even wrong types of chemicals being injected into the eco-system, resulting in the destruction of the microorganisms which would have naturally converted available soil nutrients into food for the crops and of the beneficial life forms in the crop ecosystem such as earthworms and those insects that would have been the natural predators of the harmful pests. The use of the appropriate pesticide in correct doses, if at all necessary, can reduce cost as well as reduce the harmful effects not only for future crops but also to the edibles being produced. For introducing both bio fertilizers and IPM, the following steps have to be followed

- Soil testing for proper understanding of what is needed to be done
- At an initial stage, the supply of a minimal amount of compost (60-75 kilos per acre) and of the required bio fertilisers
- Training for resource farmers in Integrated Nutrition Management(INM) and IPM
- Using resource farmers to train other farmers
- Creating a dedicated well-trained field monitoring system with quick response time at times of need led by a person having expertise
- Maintaining strong and regular links with local resource institutions such as agricultural universities, the Government Agriculture Department, Kristi Vigyan Kendras and available retired professionals.

Such an intervention will cut costs in agriculture irrespective of crop and will ultimately result in crop yield increases as soil health improves, leading to agriculture becoming more remunerative. Also, possibly, the IPM recommendation

would include some extent of bund cropping with leguminous plants to add biodiversity and this will also result in some more income.

Hence the second recommendation is to aim at the decrease of dependence on chemical fertilisers and pesticides and to go in for IPM and INM practices for all crops.

These could best be introduced among the best of the farmers who are already involved with the SRI programme. These farmers have seen that the BSWI team has indeed helped them get better yields and hence would be more open to listen, try out and help improve the above methods with their local knowledge and traditional wisdom.

The specific interventions in the SRI programme at BSWI should firstly aim to **increasing the coverage of the programme to all the targeted beneficiaries and to other farmers in the project area**, and at least those who have adjacent fields. The next intervention would be **to ensure that as much as possible, all the six components of the SRI programme are followed**. This needs strong on-the-ground monitoring and the creation of rating systems of target group farmers based on the extent to which each of the six components are followed. Farmers should be shown the ratings and results (not just in terms of final yields but in terms of indicators of better yields) of higher rated farmers and encouraged to increase their rating after each crop cycle. There could be exchange visits by which farmers having better standing crops during the season (more panicles than others, for instance) are visited by other farmers --- the final yield depends on nature but farmers recognize a more promising standing crop when they see it. And at the start of each crop cycle, a small SRI training refresher should be given to all farmers to reinforce the necessity of enforcing all six components. The logic for inclusion of all farmers is that there could be farmers in the non-target group category who may be better resource farmers and who could be used as examples and maybe as village-level trainers. Also some aspects such as water management need to be done for entire fields and not for small plots on larger fields – hence if over time, SRI has to become the norm, this could be done more easily.

Changing agricultural practices is a time-taking activity and one must be prepared to work with communities for seven to eight years till a good set of agricultural practices becomes a part of the DNA of the farmer.

The principles of SRI have been tried out in other crops as well with good success. In fact, it is standardized at least for wheat and sugarcane. Of these, there is considerable wheat cultivation in the project area. The two alternatives for more remunerative wheat farming are zero-tillage agriculture and SRI-based wheat farming. In the former case, yields go up by around 10% while labour costs come down sharply. However, there is a need for rather expensive and not so easily available farm machinery, which may be difficult in both availability and financial terms for the target group. In the latter case, the yield increases are similar to the paddy experiences. The additional equipment needed is the conoweeder, which is already present. Given these factors, the preferable option would be the latter.

Similarly, mustard is a common crop in the area and studies indicate that the application of the SRI principles has led to huge increases in yield. There are also indications that the yields of vegetable crops such as chilly, tomato and brinjal could be increased if SRI principles are adopted. The donor for this project is well aware about this and should be able to guide BSWI to the organizations that have gained experience and expertise in these so that BSWI can choose whether or not to take these up. Alternately, BSWI can choose to persuade a few local farmers, known for their commitment to farming and willingness to experiment, to try these adaptations at the field level at a tiny scale and see for themselves the results as compared to their own control plots. This is another reason why simply restricting agricultural interventions to target group farmers may not be the best idea. The poorest farmers are not the ones who can take such risks since a failure could also mean considerable income loss.

Hence another recommendation is to **expand the scope of the SRI intervention from paddy to wheat and to try out or explore the possibility of expanding to mustard and vegetables.**

The core idea in the above recommendations, which deal with agriculture as practiced in fields, is to improve agriculture margins sustainably using a combination of yield increase methods and cost reduction methods with reducing dependence on external inputs over a period of time.

There is a further area of intervention that can be encouraged easily. The self-help group members are women and all of them have some space in their homestead. This can be used for kitchen gardening using, if required, bags or damaged earthen pots or even modified larger damaged plastic containers and low-cost drip irrigation systems. This will result in reduced costs as well as a habit of composting at home which will have beneficial effects for their main agriculture. In fact, given the amount of land, many would even be able to sell some vegetables produced.

So an additional recommendation is to **promote kitchen gardening with the self help group members.**

Irrespective of the crop, there is also a need for some **basic awareness raising with farmers on hedging of risks** through planting a diverse set of crops on their lands rather than betting on just one cash crop, as in the case of potatoes in the current year.

Besides this, the project could **try and introduce mushroom farming** in the project area. The findings of the focus group discussions indicated that all the target group families, whether from SC or ST communities, consumed mushrooms whenever these were available. The way this could be done would preferably be to bring in an expert to determine different possible types of mushrooms that could be produced locally. Next the final product samples should be bought and provided to various groups of potential farmers to see if the taste and texture are acceptable. A study should also be done in Malda to explore the different outlets available there and the varieties sold --- mushrooms are used by roadside chowmein sellers regularly. Once the acceptability for local consumption and in local markets is reasonably established, a test production unit could be set up using externally sourced spawn. Depending on its acceptability, the number of such units could then be expanded. At a viable stage, a central spawn production unit could be set up.

Mushroom Development Foundation, Guwahati, could be a good resource centre to contact for this since they have expertise and long experience on the different kinds of mushrooms that can be farmed under various conditions and on the market possibilities in different kinds of areas.

Water will continue to be a major constraint as far as agricultural activity is concerned. Hence the project should **continue its effort to augment water resources by deepening and re-excavation of water bodies**, which provide livelihood opportunities in terms of safer agriculture and in some cases, more crops plus in terms of pisciculture. This is a high-cost activity and requires a great deal of financial support from State and Panchayat funds, which had been established quite successfully before the drying up of fund flow from the NREGA project. Alternatives for this should be explored.

Another area that needs to be explored is the possibility of lining the ponds so that seepage loss of water that is stored in these water bodies could be minimized, given the soil texture in the region.

(The State has been promoting the use of groundwater as an alternative for quite some time and there is a proposal to provide each village with around six deep tube wells. This could address the issue but in such a case BSWI should consider a strategy to replenish this resource by a project for **recharging of the aquifers** from which the water is drawn, preferably in collaboration with the State.)

Finally, since many target group families have already mortgaged their lands and taken loans, a programme **to provide credit for releasing mortgaged lands** and thus

reducing seasonal migration is being explored. If this is feasible and a suitable source of credit is identified, then this could indeed be a very good initiative for BSWI to take up.

12.2 COMMUNITY BASED AGRI-ENTERPRISE

Malda district is well-known as the country of mangoes. It is famous as the land of the famous Langda variety of mangoes. Other popular varieties that are grown here are the Himsagar and the Amrapali. All three are well-accepted in markets and are popular among consumers all over Eastern India.

Almost every household in the project area has at least one mango tree. The area is dotted with mango orchards. The BSWI program has also helped a large number of beneficiaries to create mango orchards in their land holdings. The household level mango trees are almost 100% used for consumption while the orchards based mango farming is for market purposes.

The value chain analysis of the mango crop clearly indicates that individual tree or orchard owners do not sell mangoes. They lease out the trees to middlemen usually for periods between three and seven years. These middlemen “sell” each tree each year to other middlemen at various stages of the fruiting cycle. In fact a tree is “sold” three to five times before the fruit is harvested.

Thus, the mango crop has the following characteristics:

- It is a perishable commodity
- There is a huge marketable surplus in the production area
- There is good demand for the product in other places
- The owners of the tree get a very small percentage of the sale value of the produce

These are the exact conditions under which the Anand pattern producer’s societies have flourished. Hence, it is recommended that the possibility of organizing mango producers’ organizations is explored thoroughly. This would cover at least 85% of the beneficiaries of the BSWI Gazole project. Further, it would be possible to include even those who own mango trees for self consumption because such trees are rarely looked after in terms of increasing the productivity unlike the trees in orchards.

The following action steps could be taken:

- The idea of forming such a collective is explored with the community and with the local panchayats.

- Survey of the number of mango trees owned by the beneficiaries including information on whether the trees are already leased or not and whether the tree is used for home consumption or for the market.
- A rough estimate of the lease value of each tree is made.
- The potential sale value of the produce on the tree is made.
- The expenses for various productivity enhancing operations including the cost of sprays is estimated.
- The indicative cost-benefit through forming a collective for individual farmers is calculated.
- The estimated capital requirement for such a collective of around 850 farmers is calculated.
- The possibility to access capital and working cost requirements till such time as the collective is able to self-finance itself is explored with banks, venture capitalists, charitable foundations and other such organizations.
- A list of resource institutions in terms of technology is created and suitable consultants identified.
- The availability of local experts and the cost to be incurred in creating a technical support team is explored and estimated.

If the project clears all the above steps and is considered a viable business proposition, a project proposal document along with a business plan could be prepared and submitted to various sources of financial assistance.

If the project is indeed viable, the value chain analysis indicates that each tree owner would increase his/her income by 200-300%.

It is not recommended to go beyond selling the fruit bearing tree at its final stage and to venture into actual harvesting, ripening and sale of fruit. While this will certainly add to the income of the farmers, the steps involved in these operations are quite complex and require a good knowledge and linkages with external markets. If the collective is indeed viable and develops a body of experience over a period of 3-5 years, then this part of increased value addition can be looked at. At the final stage of the value addition process on fresh fruit, the possibility of branding the mangoes and sale through supermarkets and high-end stores can also be explored.

12.3 ANIMAL HUSBANDRY AND PISCICULTURE BASED ACTIVITIES

The major livestock reared by the target group are pigs, country chicken, goats and ducks. These are all done at homestead scales.

Pig farming is very popular here. All three varieties – desi, hybrids and crossbreeds of imported stock --- can be found. While the desi and hybrids are fed partly on farm wastes and kitchen wastes supplemented by foraging, the crossbreeds have to be fed either using commercial feed and/or wastes from markets, mainly the offal from fish and chicken shops. In this category, most farmers do only the rearing of livestock but there are a few who have gone into breeding and sale of piglets. There is some scope to extend the number of the breeding units since there is a good demand for piglets. However, this would mean rather high unit capital costs as well as running costs because proper feeding is critical for the unit to be able to produce good healthy piglets in good numbers.

In terms of intervention possibilities with **backyard poultries** in the area, it could be possible to increase the number of eggs laid by each hen by one of two strategies – by introducing cocks of Rhode Island Red breed after removing the desi males or by actually introducing breeds developed in other states. In both cases, it is important to remember that the progeny will over time lose their instinct to brood; hence it is critical to ensure that all desi males are not removed! The developed breeds that could be tried out include:

VANARAJA/ GIRIRAJA

- Suitable bird for backyard farming in rural and tribal areas, developed by the Project Directorate on Poultry (ICAR), Hyderabad.
- It is a multi-coloured dual purpose bird with attractive plumage.
- It has better immune status against common poultry diseases and is adaptable to the free range rearing.
- Vanaraja males attain moderate body weight at 8 weeks of age under regular feeding system
- The hen lays 160-180 eggs in a laying cycle
- Due to their relatively light weight and long shanks, these birds are capable to protect themselves from predators which are otherwise a major problem observed in birds reared in backyards

SWARNADHARA

- This breed yields 15-20 eggs in a year more than Giriraja chicken breed and was released by the Karnataka Veterinary Animal Fishery Sciences University, Bangalore in 2005. Swarnadhara chickens have a high egg production potential along with better growth compared to other local varieties and are suited for mixed and backyard farming
- Compared to Giriraja breed, Swarnadhara breed are smaller in size with a lighter body weight, which makes them easier to escape attacks from predators such as jungle cats and foxes
- The bird can be reared for its eggs and meat.
- It attains maturity from the 22-23rd week after hatching.
- Hens attain a body weight of about 3 kg and the cocks about 4 kg.
- Swarnadhara hens lay about 180-190 eggs in a year.

The resource centres from where fertilized eggs of these breeds are:

- Directorate of Poultry Research, Rajendranagar, Hyderabad 500 030, Telengana. Ph : +91-40-24015651, 24017000
- Prof and Head, Department of Avian Production and Management, Karnataka Veterinary Animal Fishery Sciences University, Hebbal, Bangalore 560024, Karnataka.

Phone: (080) 23414384 or 23411483 (ext. 201).

It is cheaper to bring in fertilized eggs and get these hatched through local broody hens or ducks rather than to bring day-old chicks.

The project is already conducting a **goatery project** with the Black Bengal breed and this work should be expanded and continued. It has already conducted training programmes with local animal husbandry department officers to ensure good management practices among the participants of this programme.

Some participants also rear **ducks**. An attempt could be made to introduce the Khaki Campbell breed of ducks which are free-range birds but prolific egg layers. Care should be taken to ensure that at all times, the ducks have enough water to wet their heads and that every time they are fed, drinking water is provided to them. This actually does not mean a high requirement of water. Individual egg production of almost an egg a day in this breed for well over twelve months has been recorded and flock averages in excess of 300 eggs per duck per year are not uncommon. Khaki

Campbell ducks weigh about 2 to 2.2 Kgs, and drakes 2.2 to 2.4 Kgs. Egg size varies from 65 to 75 gms.

There are some other possibilities in animal husbandry that could be explored. However these are new to the area and the preferable route for introduction would be to get the end products (Rabbits ready for culling and quail eggs and ready birds) and offer these to sample groups of target beneficiaries to check whether these are acceptable. If so then these could be introduced on a small scale to start off with. Both these activities require less space and working capital compared to other forms of animal husbandry.

Through **rabbit rearing**, a woman can produce quality protein rich meat for her family. Rabbits can be fed with easily available leaves, waste vegetables, and grains available in the home as well as surplus vegetables from the market, tree leaves or cattle grass. Hence, it is very easy and affordable to feed a rabbit. Growth rate in broiler rabbits is very high. They attain 3 kgs at the age of three months. Litter size (number of young ones born/ kindling) in rabbits is high (around 8-12). When compared to the other meats rabbit meat contains high protein (21%) and less fat (8%). So this meat is suitable for all age groups from adults to children

Rabbit farming business requires less space and it can be done anywhere at farm, backyard, on terrace or even at home. The capital investment for this is very less. No skilled labour is required for this. Training can be easily arranged. The reproduction capacity of rabbits is very high. One female rabbit delivers almost every 30 days and in the first year she delivers 7 to 12 babies per delivery and in the second year she will deliver 10 to 15 baby rabbits per delivery. The pregnancy and lactation period is just 30 days and one keeps the baby rabbits with the mother for 15 days. That means a female can deliver babies every 45 days, which is very fast growth of reproduction. In five years a mother rabbit will deliver 40 times. Within 3 months a baby rabbit gains weight of 3Kgs to 4Kgs.

Possible resource centres for rabbit farming include:

- Haringhata Farm, Dept. of Animal Resources, Govt. of West Bengal
- Kapoor Rabbit Farming
Amoli (Lalburra),
Dist. Balaghat,
Madhya Pradesh (M.P)
Contact person: Mr. Rahul Bramhe
Mobile No. +91-96855-68580
Email id: kapoorrabbitfarming@gmail.com

Similarly, **Japanese quails** could be considered for income generation among the target population. They produce both eggs and meat and the working capital

requirements as well as the space requirements are much less than in the case of traditional commercial broiler or layer farming.

Japanese quail has created a big impact in recent years and many quails farms have been established throughout the country both for egg and meat production.

The following factors make quail farming economically viable and technically feasible.

- Very short generation interval
- Quails are very robust and resistant to diseases
- No vaccination is required
- Low space requirement
- Easy to handle
- Early maturity
- Very high laying intensity- female starts laying at an age of 42 days and lays over 250 eggs per year
- Very low feed requirement

The project is already working in the area of **pisciculture**. It has supported groups of villagers to take on lease available community ponds and has provided them with training and quality inputs such as lime, fingerlings and feed. The project works in close collaboration with the local fisheries department. This work should be continued and expanded wherever possible.

While the project has worked on improved fisheries practices in large ponds, it has not been possible to cultivate fish in the very small water-bodies owned by many beneficiaries in a viable way. The project should explore the exploitation of these water resources with the fisheries department experts.

Given the number of mango orchards and the considerable amounts of farmlands used for mustard farming, the project could also introduce **bee keeping** as a subsidiary livelihood activity for interested participants.

12.4 OFF-FARM LIVELIHOODS ACTIVITIES

The institution is familiar with several enterprise based activities already. It should introduce these in the Malda project area. These include **tailoring, making school bags and soft luggage, and manufacture of woollen garments**. For this it will be essential to set up a skills training centre. A viability study including sourcing and

marketing aspects would be needed before deciding to take up any of these activities.

The project should expand the scope of **support to small trades and business** that would be taken up by beneficiaries on individual basis. Loans from the SHGs could be used for this purpose.

The project could study the possibility of **production of jaggery from palm juice** which is locally available. The skills for the production part of this activity are locally available. What needs to be checked is the availability of labour to actually tap the local palm trees on a regular basis since doubts were expressed about finding people with this ability.

Given that it highly unlikely to meet the full financial needs of many families in the area who are currently doing so by migrating and working under agents in distant states, the project could explore linkages with organizations in those locations so that **migration** can yield better remuneration with less exploitation.

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