Systems Interventions for Agricultural Development

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ABSTRACT

Agriculture system interventions in a region generally should support the actions of the local population, but which of those actions to support is a difficult question to answer. Interventions must be planned within a systems context, taking into account the people, crops, livestock, natural resource base, government policies, accessibility, market factors, cultural norms, nutrition shortfalls, infrastructure, and the interrelationships among all of these factors. Blanket distribution of seeds and tools assumes that availability of seeds is a problem within the region of intervention and that transport of seeds into the area by local vendors is either not possible or unlikely. Access may also be a problem, but the primary cause of seed insecurity is the lack of seed available for purchase. In these cases, the intervening agency will purchase seed from another location, and transport it to the area of need for a wide scale distribution to farmers. The implementing agency will decide what kinds of seed to distribute, what varieties to distribute, and how much to give to each farmer. In decision making process communities may be involved. Extension agencies will also play an important role for the capacity building of farming community. The help of extension agency must be taken for introduction of new crop varieties. Diversification of assets can be an important intervention in areas that are chronically vulnerable to disasters. To come out from these situations involvement of women's and other community groups in planning and complementation. Moreover, all planned interventions must be community – based and should take into account the needs and priorities of local groups. Farmers can shift from long-cycle crops to short-cycle crops for more rapid recovery following a food and/or feed deficit. In this case, short duration sorghum varietiescan be used both as a grain for humans and fodder for animals. Locally suitable crops are more important in rain-fed areas must be adapted by the farmers for sustainability and systems intervention through various delivery outlets of Government and other agencies should meticulously plan to make farmers reap maximum benefit in order to improve their livelihoods.

Key words: *Interventions; Accessibility; Blanket distribution; Diversification; Early Warning;*

Population at risk of food security often experience heightened vulnerability for as long as they remain dependent on outside interventions for survival. In rural areas self-sufficiency usually relies on the ability of farmers to produce sufficient food for themselves and their families. In order for this to occur, farmers must have some measure of seed security, or economic and physical access to adequate quantities of good quality seed prior to the planting season. As with food security, the three variables that are central to the attainment of seed security are availability, access and utilisation

Seed access refers to the ability of farmers to acquire the seed or planting material that is available. In some cases, seed may be readily available on local markets, but subsistence farmers are either unable to purchase the needed seed, or may not be physically able to reach the area where seed can be obtained. In many crisis situations, access will be limited to only certain portion of the population. As seed prices rise, purchasing power will be reduced for many people in the country and they will no longer, will be able to purchase what they need for the season.

Assessing options for seed interventions requires an understanding of how the seed system normally

functions in given region, as well as the coping strategies available to vulnerable farmers. Knowledge about the severity, duration and distribution of the emergency is important to identify target regions. Monitoring the climate and other conditions is helpful because the situation may change rapidly.

Regardless of the nature of the problem faced by farmers, the ecological impact of any potential interventions should be carefully examined before deciding on an appropriate action, since many problems will only be exacerbated by inappropriate responses. Potential for conflict, particularly related to land access issues, should also be considered and mitigated against as much as possible

Numerous early warning systems are in place throughout the developing world to warn of imminent or upcoming drought, floods, and other disasters. Response planning to follow early warning is critical in order to intervene appropriately when these systems sound a warning. Response planning mechanisms and interventions should exist within each community and should allow for rapid response on the part of those districts. All planned interventions must be community – based and should take into account the needs and priorities of local groups. The interventions must take all local context and capacities into account.

INTERVENTIONS

Provision of Seeds and tolls (blanket distribution): Blanket distribution of seeds and tools assumes that availability of seeds is a problem within the region of intervention and that transport of seeds into the area by local vendors is either not possible or unlikely. Access may also be a problem, but the primary cause of seed insecurity is the lack of seed available for purchase. In these cases, the intervening agency will purchase seed from another location, and transport it to the area of need for a wide scale distribution to farmers. The implementing agency will decide what kinds of seed to distribute, what varieties to distribute, and how much to give to each farmer. Community input may be included in the decision making process, but seed packages will not be tailored to individual farmers. The advantages to blanket seed distribution programs include:

- Less lead time needed prior to distribution.
- Seeds get out more rapidly which can be helpful when rains are imminent.
- When seeds are not readily available on local markets, the seeds can be purchased in other regions or even neighbouring countries assuming climatic, cultural, and agricultural conditions are compatible.
- Quality of seed can be more rigorously monitored through pre-distribution lot testing.

The disadvantages to blanket seed distribution programs include: Lack of farmer choice or input resulting in seeds that may not meet local varietal or taste preferences.

- Lack of collaboration with local farmer groups, since distribution is not usually used as extension opportunity.
- If not closely aligned with real seed needs, distributions can distort the local markets.

Other consideration when undertaking a blanket seed distribution program:

- Seed quality issues: For blanket distribution where seeds are purchased from a certified vendor, seed grower certificates are required by USAID. If these certificates cannot be obtained by the grantee, the grantee is required to document their files to indicate what quality assurance practices were followed in lieu of the certification. These files should be available for inspection if requested by USAID/OFDA.
- Effects on markets and vendors can be extremely negative if a proper assessment is not done prior to distribution and access is actually the issue.
- Blanker seed distribution should never be used to test a new variety of seed. Farmers should be familiar with the varieties provided, and families must be accepting of the variety, including taste and performance.
- Timing is critical. If seeds cannot be provided in time for planting at the start6 of the rainy season, it may ultimately do more harm than good to distribute seeds late, and the seeds may actually become an expensive form of food aid.

Provision of seeds and tools (seed fair and voucher distribution)

Provision of seeds through a seed voucher program assumes that access to seeds is a problem, but that appropriate seeds are available for purchase in region of intervention. Vulnerable farmers are issued vouchers worth a certain amount of cash value, and are free to use those vouchers to purchase whatever kind of seed

they prefer. In some cases, seed fairs may be organized, allowing all vendors to assemble at a given time and place for voucher recipients to spend their vouchers. In other cases, access to the local market may be sufficient. Following the speed purchase, vendors receive the cash value of the vouchers from the implementing agency.

The *advantages* to voucher distribution programs:

- Farmers are able to choose what they would like to grow, and this can be more closely mirror what they want to consume, what they know their land will produce, or what they have experience cultivating.
- Farmers are able to choose who to purchase seed from, allowing a local mechanism of quality control.
- Farmers are generally risk averse with limited resources. With this mechanism, they can get the seeds that they need at affair price but may also be more likely to try a small amount of a new variety or new crop. This is an excellent method for introducing improved seeds to farmers, since they can choose to try planting a small amount of seed. When linked to demonstration plots, which allows farmers to see the advantages of the improved seed, this is particularly effective.
- Both national and international agriculture research centres can use seed fairs and vouchers as a means to get their seeds into the local market. This works best when demonstration plots or other farmers have already showcased the research centre's crops.

The *disadvantages* to voucher distribution program :

- It may be more difficult to confirm seed quality through traditional testing methods prior to purchase. Since USAID's requirements for seed certification remain unchanged, regardless of distribution method, it is imperative for grantee to document to document their files to indicate what quality assurance practices were followed.
- The reimbursement of vendors requires cash transfer, and this may be difficult or dangerous in insecure areas
- Planning the seed fairs takes time; this may not be the most appropriate distribution method to use when seeds must get out within a very short period of time.

Multiplication and distribution of improved seed

In some cases, the quality of local varieties of seed may degrade over time, a disease or pest may become more prevalent, or regional droughts may become more frequent. Once local varieties are no longer high yielding in an area, the introduction of improved seeds may become critical to the long-term food security of vulnerable households. These improved seeds may either be new varieties produced by traditional breeding methods for increased yield of pest resistance, or they may be varieties that farmers are accustomed to, but with higher quality and purity levels than the stock they were using.

When considering the introduction of new seeds to a region. It is always a good idea to involve farmers to the greatest extent possible. The use of demonstration plots to showcase the new varieties is a particularly good way of either getting farmers interested in a variety, or determining why such varieties will not be accepted. In some cases, extension training may help to move farmers beyond certain unrealistic expectations.

Once the demand for improved seed exists, multiplication (preferably is irrigated plots) can be undertaken to increase the availability of seeds. Multiplication can be done through farmer cooperatives, commercial seed enterprises, agricultural research stations, or through the U.N. Food and Agriculture Organization (FAO). Distribution of small sample packets or through seed fairs is the preferable means of disseminating these multiplied seeds.

Provision of traction : In some cases, the lack of traction (animal or mechanical) may be a significant impediment to planting, particularly if time is short (e.g., end of conflict immediately prior to start of rainy season). In these cases, the provision of traction through tractor subsidies or provision of draft animals may be even more important than seed distributions. It should be noted that provision of subsidies is not a sustainable intervention and should only be considered as a one-time actively if circumstances warrant. Provision of animal traction should only rarely be considered since animal restocking comes with its own sets of issues.

Seed banks or seed storage programs: Because of the poor sustainability of community seed banks, it is advisable encourages partners to look at seed storage programs at the household or farmer group leave rather than at the community level. Improvements to traditional seed storage systems are likely to be the most effective means of reducing post-harvest losses. If community seed banks are considered, the following issues should be carefully addressed:

- Sustainability once the NGO leaves that area. Since most NGOs fumigate the seed storage areas at fairly great expense, it is critical to consider how pest and disease control will be handled once the seed bank is turned over to the community.
- Long term maintenance. Who will be responsible for the normal maintenance of the seed storage area? Who has access to the contents, and under what conditions? Ho will seed bank committee function, and how will oversight of these committees occur over the long term?
- Crop failure. If drought hits the region, how will the bank compensate? How many years of contingency are built into the seed bank's systems, and what happens if the bank runs out of seed? Will the doors close, or does the community have a way to rebuild the mechanisms without further NGO intervention?

Kitchen gardens : Kitchen gardens are increasingly being considered by implementing organizations to strengthen the link between nutrition and agriculture, and to allow production of high-quality crop close to the home. Kitchen gardens have also been used successfully where the amount land available for planting is limited, either due to land tenure, conflict, pressure unavailable land resources, or displaced populations residing in host communities without claims to land to farm in. Kitchen gardens are often vegetable-based, which has the advantage of providing short cycle crops that can be hand watered if necessary. Vegetables such as peppers, tomatoes, garlic, onions, and okra can allow for the diversification of nutrient-poor diets, and may yield enough for households to sell some of their production on the local market.

Urban horticulture also getting momentum in meeting the daily need of urban dwellers where some of the governments like Telangana supporting THOUGH A FLAGSHIP PROGRAMME" MANA INTI PANTA" (Crop from our Home) and is practiced in terrace gardening. It has its important in terms of Nutrition Sensitive agriculture that definitely meet the nutrition requirements of urban population.

Training, extension, and education : Training and education programs, including agricultural extension, may be important to improve productivity in agricultural systems or to increase lack understanding of land management. In these situations, extension services may improve productivity, and training may increase overall sustainability of the systems. Programs to fund advanced training can all increase local capacity, improving sustainability and having a long-term impact on the local communities.

Training and extension can also be used to introduce farmers to new varieties of crops that might be better suited to a region, either on the basis of improved yield, disease resistance, pest tolerance or improved nutritional characteristics. Use of demonstration plots, as discussed above, can be an important part of farmer training. In all cases, programs which understand farmer knowledge in a local community and seek to respect, enhance, and build upon that knowledge are often the most successful.

Irrigation systems : While seeds should be promoted that best fir a realistic view of the climate situation in an area, there are numerous examples of small scale irrigation projects that have maximized production of small plots of vegetables crops. These include:

- Drip kits. These consist of large plastic drums for collecting water (either catching rain, pumping into or hand filling the containers), with perforated tubing delivering water to individual plants.
- Treadle pumps. Used near streams, rivers, or ponds, these pumps function by foot action on the part of the farmer. The farmer can pump large volumes of water to fairly large plots of land in a relatively short time.
- Hand watering with watering cans and rain harvesting.

As with all other interventions, it is essential to follow the "Do no harm" philosophy. In the case of any water usage scheme, use by one farmer should not harm water supplies for others by drawing too much from the system. Consideration of all community members is key, not only the project beneficiaries. Equity in programming and us of natural resources helps mitigate conflict.

Diversification of assets : Diversification of assets can be an important intervention in areas that are chronically vulnerable to disasters. These programs may involve women's groups and other community groups in planning and complementation and may be particularly important in territories where women have some degree of autonomy. Retraining farmers to use other trades and skills can also help them to provide income for their families during times of hardship.

One of the most promising means of diversifying assets is through the use of livelihood fairs. Much like seed fairs, these livelihood fairs bring vendors together on a specific date, and provide vouchers for vulnerable farmers to access a variety of livelihood options. Depending on region and culture, the fairs may include small livestock, tools, seeds, mosquito nets, plant cuttings, packages of fertilizer larger animals for groups of farmers to purchase, crafting materials, looms, beekeeping materials, fishnet and fishing equipment, and numerous other options. Voucher holders can then choose what to spend their vouchers on, often leaving the fair with more than one livelihood input.

Additionally, programs encouraging transformation of agricultural products into value added products are the key in transitioning from relief to development. For example, the farmer that is able to dry tomatoes and store them to sell on the market when prices are high will be less vulnerable than the farmer who is forced to sell his/her crop immediately after harvest, when the markets are flooded and prices are low.

Early warning systems linked to early response: Numerous early warning systems are in place throughout the developing world to warn of imminent or upcoming drought, floods, and other disasters. Response planning to follow early warning is critical in order to intervene appropriately when these systems sound a warning. Response planning mechanisms and interventions should exist within each community and should allow for rapid response on the part of those districts. All planned interventions must be community – based and should take into account the needs and priorities of local groups. The interventions must take all local context and capacities into account.

Systemic changes to agricultural systems: In many cases, a switch from long-cycle crops to short-cycle crops can help to provide a more rapid recovery following a food and/or feed deficit. While short-cycle crops often don't yield as much as their long-cycle relatives, they can cut a month or more off the growing cycle, allowing yield to be harvested and available to consumers fairly quickly following a disaster. In agro pastoral systems, animals may rely on stalks and residues of crops harvested for grain. For example, some sorghum varieties are short season, and can be used both as a grain for humans and as an animal feed. In other areas, root crops may be more appropriate than fertilizers that they are willing to go debt each year to purchase them or delay planting until they can access fertilizers.

Improper and/or excessive use of fertilizers can lead to environmental problems such as eutrophication of water sources, Stalinization of soils, and fertilizer burn.

Other considerations: The proper choice of legume will add nitrogen to the soil, and the crops have the added benefit of providing a good source of dietary protein. Care must be taken, however, when introducing legumes to a region since these plants require the correct soil bacteria to allow nitrogen production, and since farmer acceptance is critical for the successful introduction of any new crop.

Use of Pesticides: Pesticides are considered to be a restricted commodity, and must comply with specific regulations. Special permission for pesticide purchase must be granted before as per the new Pesticide control order regulations of Govt of India.

CONCLUSION

Interventions used to strengthen seed system in the country will be determined by the initial need assessment; if farmers are seed insecure, it is important to understand which variable (availability, access, utilisation) are responsible for the insecurity, since addressing the wrong component may actually cause further problems over the long term. Practitioners of seed interventions must understand the roles that each of these components play in agriculture recovery following a crisis and must use this understanding to target interventions.

Before any intervention is implemented in a region, it is important to determine the origins of seed supply, and how these factors affecting the seed security and how these factors can be dealt with in a sustainable fashion. Perhaps the most important part of this assessment is to distinguish between the problems of availability and problems of access before designing a program to address the seed issue. In many cases, the crisis will affect both of these components, but some cases only one will be affected.

Regardless of the nature of problem faced by the farmers, the ecological impact of any potential interventions should be carefully examined before deciding on an appropriate action, since many problems will only be exacerbated responses.

Any relief preparedness interventions undertaken in a region should tie directly in to ongoing development programmes or should set the stage for further development work.

Systems intervention through various delivery outlets of Government and other agencies should meticulously plan to make farmers reap maximum benefit in order to improve their livelihoods.

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