

The Adoption of Micro Irrigation Technologies (Private Sector Participation in Irrigation Development)

The KickStart Experience

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Abstract

The paper covers the threat to human survival as water becomes scarce and the need to food and other basic requirements becomes a priority for the smallholder farmers who constitute about 75% of the population of many African countries.

The Africa people though seen as poor in reference to their capital base are potential investors seeking for opportunities that would assist them create a sustainable business enterprise to generate wealth and job creation. The farmers have access to land, water and adequate skills. What they lack is the right business choice and the right appropriate affordable technology.

The paper address how KickStart, an International Social Enterprise not-for profit organization which was established in 1991 in Kenya has transformed the lives of more than 200,000 people in Africa get out of poverty and how they have started their own business enterprises. The mission of the organization is to promote sustainable economic growth and employment creation by developing and promoting technologies that can be used by dynamic entrepreneurs to establish and run profitable small-scale business enterprises. The different technologies are discussed and how they operate to benefit the smallholder farmers.

The paper discusses the strategy on how the organization operates and its current impacts in Africa. A case study that tells the beneficiaries' story has been given to highlight how the micro irrigation technologies have changed peoples' lives. The paper discusses how the technologies are made accessible to the end users and how they are maintained.

The paper also discusses the private sector business model and the financial implication on how to set up such a Promotion Program in Ethiopia or any other African Country for Micro irrigation technologies. In conclusion the paper will indicate the parameters for a successful promotion program in any new country and the sustainability of the Private Sector business model.

1. Background

Kenya is predominantly agricultural country. It occupies a total area of 569,000 sq km, with an estimated population of 32 million of which 80% of the population stays in the rural areas where it is engaged in agricultural production.

The Agricultural sector is the backbone of the economy contributing over 50% to the GDP. Majority of the rural households (70%) rely directly on the agriculture sector for their livelihoods. About 18% of the total area is classified as medium and high potential area for agriculture production with an annual rainfall of between 750 and 2000mm. The rest of the country, about 80% is classified as arid and semi arid land with limited potential for agricultural production without some form of irrigation.

Due to the growing population pressure, agricultural activities are been pushed into the arid and semi arid regions where farming with out supplementing natural rain is not profitable.

Poverty in Kenya continues to be a big challenge to the Government with about 50% of the population classified as poor (living below a dollar a day). Currently, about 10 million Kenyans are considered to be chronically food insecure. It is also estimated that about 2 million people require food relief annually though the number fluctuate to be 4 million in times of drought. These occur mostly in the arid and semi arid areas where rainfall is mostly unreliable.

Achieving food security has been hampered by several factors; the major one being over-reliance on rain fed agriculture. Agricultural production in the country is predominantly rainfall dependent. It is estimated that about 16% of the total land area can support rain fed agriculture. Population pressure has also pushed people to the arid and semi arid areas, which receive erratic rainfall. Productivity in the high and medium potential areas has also declined.

Irrigated Agriculture will continue to contribute significantly to the development of agricultural production especially in the arid and semi arid areas of the country and can contribute towards attainment of food security. The government should strive to create a conducive environment for investment in irrigation especially by the smallholder farmers.

The Kenya Government has prioritized irrigation development as the key strategy to revitalize agriculture. Smallholder farmers are not such poor people, as many outsiders would want to be believed, they have land, water, time and adequate skills. If only they have access to the right technology and support for their investment they would be self reliant in food production, with sufficient surplus for local and international market to meet their basic daily needs like better health services, education, shelter and other social amenities.

In the dry areas of the country the threat to human survival is evident as water becomes scarce and the need to food and other basic requirements becomes a priority for the smallholder farmers who constitute about 75-80% of the population of many African countries.

In Kenya the government has not invested adequately in water storage facilities hence arid and semi arid areas are adversely affected by drought that affects their survival. In end of 2005 and early 2006, about 3-4 million people were affected by drought and hundreds of livestock died.

Africans though seen as poor in reference to their capital base, are potential investors seeking for opportunities that would assist them create a sustainable business enterprise to generate wealth and job creation. The farmers have access to land, water and adequate skills. What they lack is the right business choice and the right appropriate affordable technology.

It is in this background that KickStart programs operate in Kenya, Tanzania and Mali.

2. Introduction

KickStart is a Not-for-Profit International Social Enterprise founded in Kenya in 1991. In 2000 the Tanzanian program was started while Mali was opened in 2004. Since 1996 KickStart started promoting the Money Maker series of treadle pumps. Although the three aforementioned countries actively run social marketing programs, KickStart technologies especially the Money Maker pumps have been supplied to 16 African countries.

2.1. Mission

KickStart's mission is to eradicate poverty by fostering sustainable economic growth and employment in developing countries. Operating more like a business than a nonprofit organization, we accomplish this mission by designing, manufacturing, and marketing equipment that is purchased and used by poor people to establish profitable small-scale enterprises.

Our most successful product line is a series of foot-operated manual irrigation pumps. Because 80% of the poverty in sub-Saharan Africa is in rural, agrarian areas, irrigation is a particularly effective way to increase incomes. With a \$33 to \$95 KickStart pump, an African farmer can grow and sell produce, earning enough additional income to move from poverty

towards middle class. Our irrigation pumps illustrate that economic and social sustainability are achieved when people have the means to provide for themselves.

2.2. Our Beliefs

KickStart believes that:

- Self-motivated entrepreneurs are the most effective agents of change in economies in transition
- Such entrepreneurs are able to raise small amounts of capital (\$50-\$1000) required to start new micro-enterprises
- These entrepreneurs have the capacity and skills to manage the day to day affairs of a small business

But that they face two challenges:

1. Business Choice: It is difficult for them to identify viable new enterprise opportunities.
2. Access to Technology: They cannot easily access or develop the technologies needed for these enterprises to function

KickStart sees poor people as potential entrepreneurs who have:

- The drive and desire to get ahead,
- Land, time and labor to invest,
- The ability to borrow or save a small amount of money to start a business.

KickStart also believes that the millions of people who live at the so-called 'Base of the Pyramid' in Africa should not be considered as a problem waiting to be solved. We see them as an opportunity waiting to happen. These people comprise a massive reserve of human and social capital, of energy and intellect, and of skills and knowledge, with millions of hectares of under-utilized land at their disposal. Although cash-poor at this point in the economic development of their countries and regions, they are ready to invest their wealth of non-financial assets into any endeavor that promises a worthwhile economic and social return. They simply need practical ways of using these qualities. For a very large proportion of this huge rural population the answer is irrigation.

However, the appropriate, low-cost capital equipment required to start such a business is unavailable. Private sector companies have difficulty making money in rural areas of the developing world because of the excessive marketing costs to reach poor rural buyers. While marketing low-cost consumer products such as soda and shampoo is difficult in these markets, selling high-cost capital goods is simply cost prohibitive for private companies.

2.3. Strategy

KickStart addresses this need using a six-step methodology:

1. Research markets to identify highly profitable new small business opportunities that greatly enhance the productivity of rural Africans' primary assets – land, labor and entrepreneurial drive
2. Design the required low-cost capital equipment
3. Train private manufacturers to mass produce the designed product
4. Develop a private sector supply chain to deliver the equipment whereby every partner in the chain is profitable
5. Mass-market the equipment to rural Africans. We subsidize the development and promotion of new products until they are as well known as other income generating products in Africa, such as bicycles and sewing machines
6. Carry out continuous sales and impact monitoring to evaluate progress toward set goals. Our state-of-the-art Impact Monitoring Unit measures the impacts of our program and continually searches for improvements.

After creating a "critical mass" of sales and awareness, we cease our marketing subsidies and leave in place a fully sustainable supply chain and growing demand.

This strategic process ensures:

- The highest impact is achieved in the shortest time possible
- A cost effective program is achieved
- A self sustainable income generating process and
- A scaleable or replicable process to other areas

2.4. The Choice of Technologies

KickStart recognizes that the sort of impact achieved to date depends intimately on getting the right product at the right quality in the right place at the right price through promotional awareness. Equally it recognizes that there are a number of useful products that it cannot promote because they do not have mass market potential. The criteria for selecting a technology to promote are based, ideally, on the following:

- It must be a very profitable business model that allows entrepreneurs/investors to recover their costs in 3 – 6 months
- The technology must be affordable to very poor investors (our guideline is that its price be less than 3 month's gross disposable income)
- The technology must have mass production and mass market potential (i.e. tens of thousands of potential investor MSEs)
- The technology must be inherently capable of distribution through existing private-sector market channels
- The technology must be capable of increasing target-group family income by at least 100%
- The technology must be sufficiently durable to last at least two years without major maintenance
- The technology must use the local available raw materials
- The technology must operate efficiently enough to be competitive with other alternatives
- Operation of the technology must be simple
- The technology must be environmental friendly

KickStart places great value on these criteria because experience has shown that without being affordable, capable of widespread use and capable of radically increasing family income, even the best technology will not be bought by very many people. KickStart also recognizes that a number of promising technologies may be excluded by this process, but believes that its concern to offer a high benefit-cost payoff requires fairly close adherence.

KickStart has developed a number of technologies beside the MoneyMaker pumps.

- An Action-Pack Block Press compresses a mixture of soil with small quantities of cement (usually at a ratio of 18:1) to produce blocks that are stronger than concrete blocks. A 50kg bag of cement can produce between 90-110 stabilized soil blocks.
- The "Mafuta Mali" Oil Press is a manual press that press oilseeds like sunflower and simsim to make nutritious cold pressed cholesterol-free cooking oil.
- The MoneyMaker Hay baler makes it possible to run a bailing business and ensure an abundant supply of livestock fodder.
- The Super MoneyMaker pump is the fast moving irrigation pump in the market today. We also expect the new MoneyMaker Hip pump to revolutionize the irrigation sector especially for the very poor small-scale farmers due to its affordability.

2.5. Impacts.

Smallholder irrigation in Africa is highly valued by its users. The average holding size varies between 0.2ha to 1.0ha. Studies carried out by International Program for Technology and Research in Irrigation and Drainage (IPTRID) indicated that irrigated agriculture contributes about 25-80% of total family income annually

KickStart impact studies have found that the net annual income from irrigation per family using the Money Maker pumps ranges from \$800 to \$1,000. In December 2005 there were 55,080 irrigation pumps that had been purchased in Kenya, Tanzania and Mali. These irrigation

pumps have contributed into the development of 37,535 enterprises and created household income of \$37.9 million annually with an employment of 44,343 jobs (both family and waged jobs). This new wealth has helped nearly 200,000 people out of poverty. An additional 600 to 800 pumps are being purchased every month, adding further investment into irrigated agriculture in these countries.

A further indication of benefits from irrigation is the establishment of small-scale businesses within the vicinity of nearby village markets, thus creating employment. This has led to improved access to better education, health, housing and welfare services to the farming communities. This is all achieved through individual farmer's initiatives to accelerate their own socio-economic growth. Figure 1 show the trend for the adoption of the irrigation technology in the three countries where KickStart has marketing programs.

Nationally, irrigation development brings about economic growth by generating export crops, reducing imports, increasing food security and saving the country the much-needed foreign exchange. Additionally in each country pump

dealers are opened all over the country to sell the products. In Kenya alone over 260

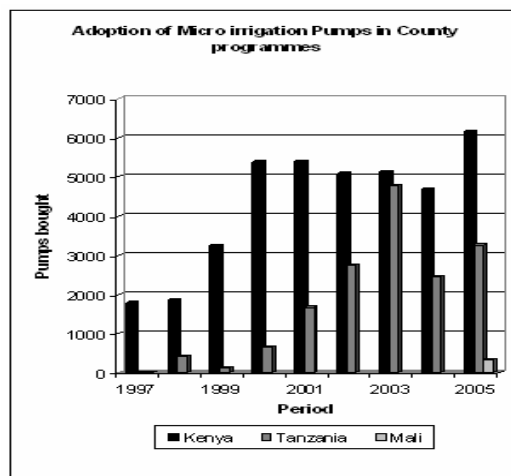


Figure 1. Adoption trend of irrigation technologies

retailers/dealers have been opened, making the irrigation pumps accessible to the rural farmers. Tanzania had 100 dealers while Mali had 44 dealers by December 2005.

Table 1- Characteristics of MoneyMaker pumps

Specification	Super MoneyMaker	MoneyMaker Plus	MoneyMaker Hip Pump
Max. Suction Depth	23ft (7m)	23ft (7m)	20ft (6m)
Max. Pumping height	46ft (14m)	46ft (14m)	43ft (13m)
Push water on flat distance	656ft (200m)	656ft (200m)	656ft (200m)
Irrigation Capacity	2 acres	1 acre	¾ acre
No. of sprinklers powered	5	3	2
Weight	21kgs	11kgs	4.5kgs
Guarantee	1yr	1yr	6 months
Cost (March 2006)	\$95	\$54	\$33

2.5.1. The Micro Picture- Samuel Ndungu's Testimony

Samuel Mburu Ndungu from Kamahuha Location of Maragua district in Central Kenya lives with his wife and 6 boys and 1 girl. They live in a plot of less than 1 acre. Initially Samuel used to be a hawker in Nairobi where he was selling fruits and roasted maize. Although he was making a substantial amount of money, he realized he was spending all of it buying food for his family back at home after meeting his needs at the city. He made no savings and was living from hand to mouth. He decided to try irrigation farming by growing vegetables for household use and for sale as the family farm was near a stream. He became an out grower for Frigoken (a French beans exporting & processing co.) by planting 1kg seeds of French beans and later increased to 2Kgs. He started making Ksh 10,000 (\$ 135) in one crop cycle. After a few crop cycles he started selling through a middleman, but things were not any better. That is when I started selling to another out grower company, the Everest. By this time, I had bought a cow and a goat. In 2003 he approached Everest, a fresh produce exporting firm to whom he was selling his produce for a credit facility to buy the Money Maker pumps which he had heard about from the local radio and had seen various demonstrations. He had identified the pump as a toll that would transform his irrigation business. Although he never got a credit facility he did not give up but approached the KickStart Promotion Assistant at the local retail shop who introduces him to the Dealer. The dealer to lend him the pump after he paid a deposit of Ksh.2,000 (\$27) and made a written commitment to repay the balance.

In the last two years Samuel has:

- Increased the area under irrigation by renting land from other people.
- He grows French beans throughout the year
- He plant a new crop after every 2 weeks
- His income is never less than Ksh 100,000/- (\$1,350) a year.
- He has built a house for his three older boys.
- He had added another cow, and in total now have 7 goats.
- He has been able to pay school fees for his children one in local polytechnic and pays

an annual fee of Ksh 9,600/- (\$130), the second one in local secondary school paying a fee of Ksh 11,000/- (\$150) and the third child who is pursuing an electrical wiring course at a cost of Ksh 10,000/- (\$135).

- He has bought the three children each a bicycle to ease their traveling. The rest of the children are in primary school, while one is still at home.
- He recently bought a motorized pump, which cost him Ksh 28,000/-(\$378) to enable him irrigate his increased 5 acre farm which he now plants 16kgs of French beans.
- He has already paid a deposit of Ksh 40,000 (\$540) for the purchase of an acre of land at a cost of Ksh.80,000 (\$1,080) in the neighborhood.

“I am very happy with KickStart work. It has made it possible for me to make a major difference to my family. I pray for them and their supporters to always get some more to help many more who are suffering the way I used to. I am sending out an appeal to KickStart supporters and would be supporters to extend their support to this organization since the MoneyMaker pump has made a major difference to my life”

The pump can irrigate up to 2 acres. In practice we have found the average area actually irrigated is 0.3 hectare (0.7acres).

2.5.2 Export to other countries.

KickStart's micro irrigation pumps are now being used in 17 African countries besides countries like Haiti and Philippines, USA, and Yemen. Figure 2 shows the exportation of pumps to some countries who imported about 100 pumps.

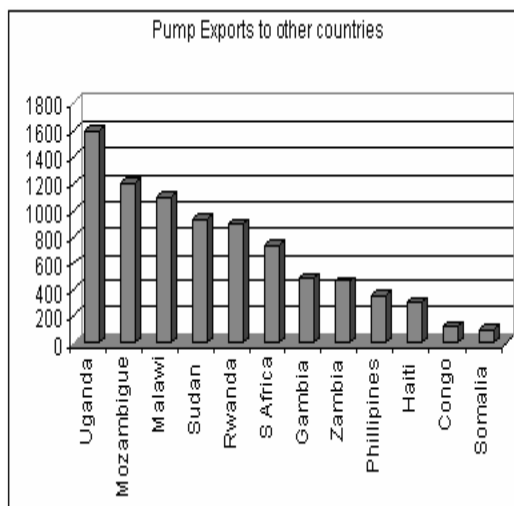


Figure 2. Countries with importation of about 100 pumps

3. The Business Private Sector Value Chain

KickStart’s operation follows the classic private sector business chain approach in which every player in the commercial chain between raw material supplier and final investor/consumer of the finished product profits from their activity.

KickStart introduces the product to the manufacturers and to the market. The principal goal is to create increased confidence amongst the manufacturers, Retailers and Buyers. In the introduction of any new product neither manufacturers nor retailers are ready to invest in making or selling the technology because it is an unproven product. KickStart’s interventions are, then, principally designed to reduce perceived levels of risk without distorting the pricing structure that is needed for long-term sustainability. KickStart works directly with manufacturers and retailers and indirectly with end-users, who benefit from the KickStart-backed guarantees and are made aware of the technology through public media and below the line promotion activities. KickStart offers consignment credit to the retailers or wholesalers initially and after the product has penetrated the market, sales are made on agreed terms of credit while KickStart pays the manufacturer all its suppliers. Figures 3 and 4

shows the private sector distribution value chain.

The business chain is important as a brand new product will not sell in the market for the simple reason that people cannot be interested in something they do not know about. So the development of a new market for a new product requires a major and expensive effort to launch the product, and sustain a spirited marketing campaign for as long as it takes for the product to find a place in the market. This is where a big challenge lies.

In the business chain, KickStart’s principal intervention is in the area of research & development (or product development) and in creating awareness/developing the market for the product. For this to happen, financial support is needed to carry out these two vital intervention areas. This is where donor financing is spent. All the private players in the business chain make profits from the outset, thus ensuring a sustainable delivery system in future as demand and sales rise. Figure 4, describes the KickStart private sector business value chain showing the areas of donor subsidy to KickStart to develop and mass market the technologies.

3.1. Marketing Development and Costs

Market development describes the strategy for accelerating product uptake in the market, which is considered from a national (and sometimes international) perspective. This involves mass media, storefront and marketplace demonstrations, billboards, Leaflets etc. The rationale for this investment is that once there is a critical mass of users - a process which can take years - it becomes unnecessary to maintain as the technologies create their own demonstration effect

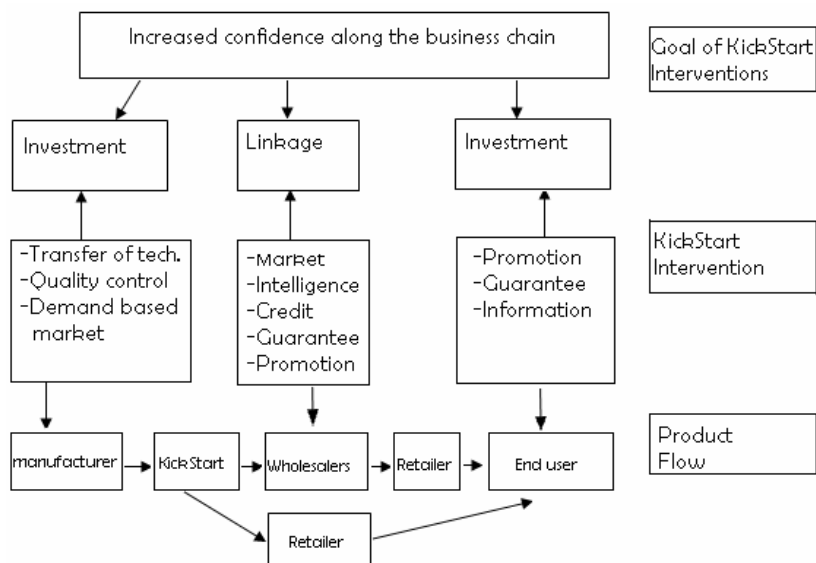


Figure 3. Product introduction to the private sector business chain from manufacturers to wholesalers and retailers.

No new technology will establish itself in the market without mass-market development and a well distribution chain from the manufacturer to the end users. Marketing and promotion of a technology to rural areas is a very costly exercise and needs to be sustained over a long period of time in order to reach a critical mass of people, and achieve a tipping point, where the need to maintain such an intensive demand creation and marketing program diminishes. Our tipping point is defined as the point where twenty percent of the potential market acquires the technology. KickStart is approaching this Tipping Point in Kenya, (perhaps 3 to 5 years

away) but is only half way there in Tanzania, while still at the very beginning in Mali.

To market pumps in East Africa, KickStart has had to spend the following “Marketing Cost per Pump”

- In 2000 \$242 per pump
- In 2002 \$206 per pump
- In 2005 \$125 per pump

So the trend is clear. As awareness builds and demand and sales rise, the ‘per-unit’ cost of sales diminishes.

3.2. Reliability/Quality Guarantee

A crucial element of KickStart’s marketing is to ensure that the pump is absolutely reliable, durable, easy to operate, and requires almost zero maintenance. Every KickStart pump carries a 12-month, no-questions-asked guarantee of free repair or complete replacement in the event that the user has any trouble with it. This is a vitally important part of the product offer. When introducing a new technology for the first time, people will set their standards and expectations by the first examples they see. Unhappily in many parts of Africa, substandard, poorly made and troublesome treadle pumps have been distributed and promoted. This has negatively affected public perceptions of treadle pumps, as

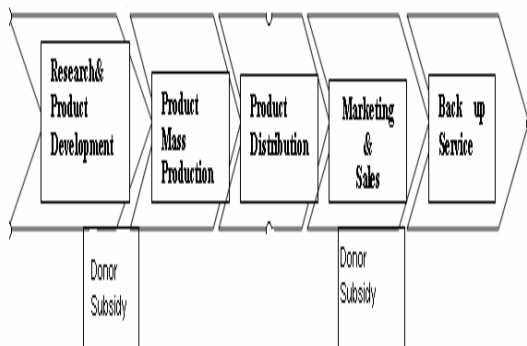


Figure 4. Private Sector Business Value Chain

affected public perceptions of treadle pumps, as many farmers have been disappointed by these badly made pumps. And bad news travels faster than good news.

4. Proposal for Financial Marketing Program to Government (S) and Development Partners

The role of the governments is to create an enabling environment that would encourage investment to create:

- New business enterprises to increase incomes
- New employment
- Improved food security
- Better nutrition leading to better health
- Gender equity
- Industrial development
- Increased exports among others

KickStart has over the years developed irrigation technologies that are currently being used in many African countries. These are proven technologies that are transforming the lives of thousand of people. KickStart offers its experience and specialized expertise in setting up a marketing and promotion program that benefits the farmers through the private sector business chain that is sustainable and cost effective in the long run.

Let us assume that a farmer invests \$120 in a pump and its accessories and KickStart spends about \$150 to set up the private sector distribution chain as well as promote and market the pump. From KickStart findings, one Super MoneyMaker pump practically irrigates on average 0.3ha. The investment cost for irrigating one hectare would be \$900. This is a very reasonable cost compared to many planned irrigation schemes. We have the track record, capacity and core competencies needed to virtually guarantee that with \$1.5 to 2.0 million funding support, we can achieve the following in two years:

- By ensuring 10,000 pumps are put into productive use, 10,000 Base of the Pyramid (BOP) Investors will mobilize at least \$ 1.2m from their own resources to purchase and use manual micro irrigation technologies

- Over 50% of these MSEs will be run by women
- At least 3,000 additional hectares will be put under irrigation
- Over \$8million in new profits will be generated by these small farms, annually boosting local economies assuming an average income of \$800 per user. In three years period the farmers would generate \$24m.
- At least 10,000 new waged jobs will be created
- An entire national industry comprising a private sector supply chain of local distribution, marketing and sale of these technologies will be in place and growing fast as the demand rises.
- With continued support for KickStart's technology and market development program these figures can grow year on year by 15% - 25%

The total cost of the program for the two years would be \$2.7million incurred by both KickStart to get the program running and by farmers in purchasing the pumps while the accrued income benefits to the farmers would be \$16m or \$24m in 3 years, the expected life span of the pump. The farmers would continue to reap more benefits for another 2-3 years as experience has shown that these pumps can last for 5 years before replacement.

5. CONCLUSION

It is evident that micro irrigation has helped thousands of farmers from poverty. The smallholder irrigation farmers are potential investors seeking opportunities to:

- Attain Food Security
- Create Wealth
- Generate Employment Opportunities

Although our rural farmers may be lacking in financial resources they have non-financial resources they can utilize to improve their livelihood. They have:

- Land
- Water
- Time
- Adequate Skills

What the farmers need is an enabling environment in which they are given opportunities in which they can operate to create their own sustainable economic development rather than relying on handouts and relief food. Smallholder irrigation is the key to this investment that creates food security, increased household income and employment.

To ensure a successful promotion and marketing program in any country the following parameters are important:

- IMPACTS-The highest impact is achieved in the shortest time possible
- COST EFFECTIVE-A cost effective program is achieved
- SUSTAINABILITY- A self sustainable income generating process and
- REPLICABILITY- A scaleable or replicable process to other areas is achieved.