Department for
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ApproTEC, Kenya: Developing Technology-Based Business Opportunities

A Case Study on
Business Development Services for SMEs

by

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1. INTRODUCTION

ApproTEC "Appropriate Technologies for Enterprise Creation" was established as a Kenyan NGO in 1991. Its mission is:

"To promote sustainable economic growth and employment creation by developing and promoting technologies which can be used by dynamic entrepreneurs to establish and run profitable and growing small scale enterprises."

Underpinning this mission, ApproTEC believes that:

- Self-motivated entrepreneurs managing dynamic small-scale businesses are the most effective agents for developing emergent economies.
- They can raise small amounts of capital ($100-1000) to start a new enterprise and can manage the day-to-day affairs of a growing business.
- However, it is hard for them to identify viable business opportunities, to access the required technologies and to widely market new products.

ApproTEC's approach is set in a context of the weak performance of small enterprises in Kenya. The 1993 Gemini study of small businesses in Kenya (1) found that: only 38% of small and micro enterprises (SMEs[1]) had grown since being started and that 47% were single person operations; and one-third of the 325,000 SMEs started in 1993 had failed or closed in that year, as well as another 90,000 failures or closures of SMEs started in previous years. ApproTEC believe that a major factor behind these poor growth and survival figures is the homogeneous nature of products manufactured and sold by Kenyan SMEs and this they ascribe to lack of skills in: market research, engineering design and marketing amongst actual and potential entrepreneurs.

ApproTEC's response to these problems is to help entrepreneurs in the identified vital areas of business opportunity identification, technology choice and marketing. As such, it has been involved in the development and promotion of a range of technologies including block making, tile making and latrine covers. This study gives particular emphasis to their work on two specific technologies: the ApproTEC oilseed press and the "Moneymaker" pedal irrigation pump.

This case study examines ApproTEC against the preliminary framework of good practice principles agreed by the Committee of Donor Agencies for Small Enterprise Development (2). It provides detail on ApproTEC's organisation and services and on the issues emerging from its experience which are of wider interest. Its main objective is to identify key lessons and principles of good practice in business development services (BDS) and, where possible, benchmark performance indicators. The case is structured in nine parts, addressing respectively in Section 2-8, services, clients, the market, financial viability, the institution, funding and impact. Finally Section 9 outlines some conclusions and the implications for BDS more widely. Appendix I contains background information on the current economic context for ApproTEC's work.

[1] There is a wealth of definitions and abbreviations in the small enterprise field. Rather than add to these, the term "SME" is used here, to include all business in the micro to medium range. Most of ApproTEC's clients are at a micro level and in this case SME usually refers to them.

2. THE SERVICES

Responding to these identified weaknesses, ApproTEC's service to SMEs falls into five parts:

I. Identify high potential small scale business opportunities.
ApproTEC use market and subsector studies to identify profitable MSEs which can be established by local entrepreneurs with limited capital investments.

II. Design and develop new technologies and business packages.
ApproTEC designs and develops the tools, equipment, manuals and business plans required to establish the identified enterprise.

III. Select, train and equip private sector manufacturers to produce and sell the technology and train private retailers to market and sell it.
Having identified suitable manufacturers, ApproTEC trains them in how to make the technology and equips them with the tooling to do it. It also trains both manufacturers and dealers in how to sell the technology to entrepreneurs.

IV. Develop a marketing strategy and establish marketing and selling mechanisms.
ApproTEC uses private sector marketing methods such as radio and newspaper advertisements, mobile truck demonstrations and trade fairs to develop the market for the technology.

V. Monitor the impact.
ApproTEC put a good deal of effort into monitoring the impact of their work, not only as a vital activity for securing continued donor support, but also as a means of doing market research and hence feeding into future product development.

Box 1. ApproTEC's MoneyMaker Irrigation Pump

The incomes of Kenya's many small farmers could be hugely increased by irrigating their land, with as many as four crops per year possible instead of the usual one or two. Electric and petrol-driven pumps are available, but unfortunately few farmers have access to electricity while the smallest petrol pump costs over $400. ApproTEC examined this situation and realised that the introduction of a low cost manually operated irrigation pump could have a huge impact.

Starting with a pump which had been successfully promoted in India, ApproTEC substantially redesigned it to make it more suitable for Kenyan conditions. They developed a full set of mass production tooling and trained four local engineering workshop businesses to manufacture and sell it. With support from DFID, ApproTEC went on to establish a dealership network of over 25 private sector retailers. Priced at $70 each, over 2500 pumps were sold during the first eighteen months of promotion.

One of the key principles underlying ApproTEC's approach is the belief that efficient, durable and cost-effective technologies cannot be developed on a "do-it-yourself" basis. High quality engineering design (for example, a recent evaluation of the oil press project estimated that ApproTEC's press was 40% more efficient than comparable products) is a vital input for which there is no substitute. This design process can be very time-consuming (it may easily take 12-18 months), but it is not something that SMEs with relatively low levels of engineering education can do for themselves. Indeed, it is said that manufacturers of machinery and tools for use by SMEs in Kenya rarely identify new high potential markets and products to exploit them. Those manufacturers who do design new machines generally produce poor

quality items in response to a single order or for their own use. Mass production of such new designs is very rare.

ApproTEC's response to this problem is a classic example of what the Donor Committee terms the "corporate" approach to technology development and transfer. This approach is based on externally developed technology (by "experts") and emphasises the importance of professional technical expertise in technology development, its application in a demand-driven process and the need for strong marketing skills and systems to ensure the widest possible use. This view is "corporate" in the sense that it mirrors precisely the approach that a commercial organisation would take to developing and delivering its product. The overall thrust here is towards delivery of relevant, useful technologies for the benefit of end consumers with SMEs being a means to this end.

The other main view is based on an "indigenous" approach to technology development and emphasises the importance of SMEs themselves in developing technologies on the basis of their own capacity. Efforts by BDS organisations focus on enhancing SMEs' ability to learn from the environment (especially customers) and on providing access to information on technology and product designs. The overall thrust here is towards the incremental and sustainable development of SME capacities. While ApproTEC's core approach is undoubtedly "corporate" in nature, they are experimenting with the indigenous approach through their AKILI project, which is not described in this case.

3. THE CLIENT BASE

3.1 Poverty focus?

A further key principle of ApproTEC's approach is that technology interventions need to be aimed at those who are most capable of using technologies effectively. They believe that in practice this means people from above the poorest level, with sufficient skills, capital, confidence and networks to take advantage of opportunities. ApproTEC therefore do not work directly with the very poor. In justifying this approach, they point to the failure of projects that have attempted to provide technology to community groups, the poorest of the poor or school leavers. Lacking the organisation, skills, experience and social standing to start and manage viable businesses, most people in these more disadvantaged target groups will move out of poverty faster if they start as employees, gaining the income, training and experience that employment offers. Thus, the poorest will benefit from ApproTEC's work mainly as employees, as customers and from linkages (e.g. oil press users' demand for sunflower seeds leading to increased incomes for small farmers).

3.2 The manufacturers

ApproTEC's first line clients are the small and medium engineering workshop businesses who manufacture their technologies. In selecting these manufacturers, ApproTEC seek out businesses which seem to have potential for development, although they probably have less than six employees when they start their relationship with ApproTEC. The manufacturers are predominantly Kenyan Africans, although a few are now Kenyan Asians. While there are some variations, the manufacturers are a broadly homogeneous group in terms of their size and skills base.

3.3 The user enterprises

ApproTEC's ultimate clients are however a much more mixed group. The MoneyMaker pedal irrigation pump (see Box 1) is used primarily by small farmers with perhaps two acres of land, but it is also used in urban settings by people establishing an SME to supply water to their neighbourhood. Likewise, the oilseed press is used in a wide variety of contexts: sometimes by farmers to press their own seeds; sometimes in towns by retailers who want to control their own production; and even by people raising livestock and poultry who want a secure and reliable source of the seedcake which is a by-product of the oil production process.

ApproTEC believes that what unites this very varied ultimate client group is their willingness and ability to make business investments, even if it means leaving their formal sector or government job. In normal circumstances that willingness and ability would not be converted into action due to their lack of: access to technology; skills in selecting a technology; and skills in market analysis. It is ApproTEC's input which enables them to make that leap into starting a small business.

3.4 Gender

ApproTEC aim to design gender-neutral technologies. Although most pedal pumps and oil presses are actually purchased by men, ApproTEC's experience is that day-to-day operation is generally managed by women who *may* then be in a position to control and benefit from the additional income which is generated. Experience also suggests that the majority of physical work on the pumps and presses is done by young men as waged employment, generally casual. ApproTEC believe that the majority of indirect beneficiaries (such as farmers supplying oilseeds to oil press owners) are women. Although gender-related data are beginning to be collected through the monitoring system, it should be noted that no detailed gender research at the enterprise level has been carried out.

4. THE MARKET

4.1 Business development services

The SME sector in Kenya is served by a range of BDS. In addition to the array of formal and informal private sector providers, there are a variety of primarily aid-funded services ranging from the counselling and training services offered by organisations such as K-MAP and SAMED, through the combined training and financing package of the Informal Sector Programme, to the strongly poverty-focused approaches of NGOs such as Gender Sensitive Initiatives and Undugu Society.

4.2 Technology-focused providers

There are only two organisations with a specific technology focus: ApproTEC and IT Kenya, part of the Intermediate Technology Development Group (ITDG). However, ITDG spreads much wider in its outlook than ApproTEC, has a broader interpretation of "technology", seeks a direct and immediate impact on poverty through its work and does not have the clear business focus which characterises ApproTEC. As a result, it does not seek to identify opportunities and package a response which will be commercially viable (and hence employment-creating) for small businesses. Rather it

has the somewhat broader objective of enabling poor people to manage the process of technical change for themselves.

It is thus apparent that as a technology-based BDS provider, ApproTEC does not appear to face significant competition in the Kenyan market. Of course, some "appropriate technologies" have become sufficiently widespread in Kenya that they do not need continuing external input of any kind. The most well-known of these is probably the maize mills which are now sold and operated entirely in the mainstream commercial market. But even having recognised that, it is safe to say that there is no other organisation in Kenya which seeks to develop technologies in the comprehensive and integrated manner used by ApproTEC. Certainly, the manufacturers' package of jigs and fixtures, training and marketing support is unique.

4.3 Relationship with the private sector

Indeed, ApproTEC place great emphasis on the nature of their interaction with the private sector. Their underlying principle is that they should not compete with the private sector, but rather that they should work with and through the private sector to transfer technologies which they have developed. As will be seen in the next section, the pricing structure throughout the supply chain is carefully designed to ensure that there are appropriate financial incentives for each link in the chain to play their commercial role to the best of their abilities, but still ensuring that the final outcome is a good quality product at an affordable price which will enable the ultimate user SMEs to make a significant profit from its operation.

5. FINANCIAL VIABILITY

5.1 A response to market failure

ApproTEC do not seek to achieve financial sustainability through charges to SMEs. On the contrary, they believe that the design and development of technologies for SMEs and (to a lesser extent) the information and marketing costs associated with the launching of those new technologies should be viewed as a public investment in response to market failure. In industrialised countries - argue ApproTEC - the design and development process would be primarily funded by government and big business. But Kenya does not have this type of activity; without external intervention there would be no significant technology development for SMEs. This view of technology development, SMEs and the market is certainly open to challenge (see Section 9) but it is articulated strongly by ApproTEC and forms the foundation of their approach. ApproTEC therefore attempt to fill the void left by market failure, and charge a fee (currently to donors) in order to cover the costs of doing that.

5.2 Fees to manufacturers

ApproTEC does in fact charge some modest fees to the manufacturers it supports, but these are for training on how to actually make the technology, for the jigs and fixtures which are required in order to make it, and for the quality control inspection and consequent ApproTEC branding. No fee is charged for the idea or for the costs incurred by ApproTEC in developing the technology, although there is a detailed contractual agreement with the manufacturers which lays down the rights and obligations on each side. The aim of making the limited charges which are levied is to:

- cover the direct costs involved in training and tooling production;
- cement the contractual relationship; and
- build the commitment of the manufacturer.

It should be noted that the manufacturers' investment in the new technologies is actually far greater than the fees which they pay to ApproTEC. For example, manufacturers often have to buy new machine tools or welding sets in order to be able to produce the ApproTEC products. ApproTEC provide no financial support for such expenditure.

Despite their view that SMEs cannot pay the cost of technology development, ApproTEC do aim to increase the percentage of their core costs which they recover from fees to SME clients from 0.5% to 2.5% during the current DFID project, although these are hardly startling figures!

5.3 Cost recovery of services

Using the five parts of the ApproTEC service which were discussed in Section 2, ApproTEC's cost recovery on the oil press is shown in Figure 1. The figures for the pedal pump are very similar.

Figure 1: Cost recovery in each part of ApproTEC's service for the oil press

ACTIVITY	Cost ($)	Recovery ($)	Donors (%)	Recovery (%)
Business Opportunity Identification/ Market Research	n/a	n/a	n/a	n/a
Technology Design and Development	94,882	0	100%	0%
Selection, Training and Equipping of Manufacturers	7,548	4,000	47%	53%
Marketing and Promotion (p.a.)	142,744	14,667	90%	10%
Impact Monitoring (p.a.)	6,191	0	100%	0%

5.4 A sustainable supply chain

ApproTEC's steadfast and well-argued refusal to seek financial sustainability for itself and for its services means that greater attention needs to be given to achieving a commercially viable and hence sustainable supply chain for its technology products. As the Donor Committee points out, this must be done on the basis of the following principles:

- final users have to be regarded, first and foremost, as customers (and not as the recipients of charity);
- incentives have to be understood and built into the value-added chain extending from manufacturer through distributor to sales agent;

- pursuing marketing techniques which educate potential customers about the product and raise an awareness of the product's brand name;
- recruiting people who have a feel for business as much as a commitment to poverty alleviation.

Reflecting these points, ApproTEC established a simple supply chain for the oil presses involving only a manufacturer selling to the retailer (known in Kenya as a dealer) who sells to the end-user, with costs and margins as follows:

Total manufacturing cost (materials and labour)	Ksh.15,500
Fee paid by manufacturer to ApproTEC	Ksh.4,000
Manufacturer's profit	Ksh.4,000
Retailer's margin	Ksh.3,000
	========
Final retail price to MSE end user	Ksh 26,500

Carefully examining the costs and profit requirements of each participant, ApproTEC set the prices throughout this chain and vary them from time to time to reflect costs and market conditions. They are able to do this through the position which they retain as quality inspectors of the presses before they leave the manufacturer at which point they affix an ApproTEC quality plate to the press. This quality plate (and the inspection which underpins it) has considerable value to the manufacturers as a result of the marketing efforts which ApproTEC undertake and which (like the quality inspection) is partly paid for by the Ksh.4000 ($67) fee ApproTEC receive from the manufacturers for each press produced. In principle, there is nothing to stop the manufacturer making presses without the ApproTEC inspection and plate, but they would lose the benefit of the brand. Notwithstanding all this, it should be emphasised that ApproTEC are not a direct link in the oil press supply chain and that this could function on its own without ApproTEC.

5.5 ApproTEC in the supply chain

Despite their commitment to stimulating rather than replacing the private sector, the imperative to maximise the potential for income gains and job creation through steep growth in sales has recently led ApproTEC to adopt a new approach to marketing and to the supply chain for the pedal pump. Having established the oilseed press supply chain as a free-standing entity in which they at no time act as principal and in which manufacturers sell direct to dealers, ApproTEC have fundamentally changed their approach for the pedal pump. Here they have inserted themselves <u>in</u> the supply chain as an intermediary link between manufacturers and dealers, in some cases supplying pumps to dealers on a credit basis.

ApproTEC have taken this radically-different approach essentially because they regard existing rural marketing mechanisms as too weak to succeed in achieving high sales volumes. By taking a relatively large mark-up on the pump ApproTEC hope to be able to experiment with and set up effective marketing methods and systems of retailers, distributors and commissioned sales people. The costs and margins in the pedal pump supply chain are thus as follows:

Raw material cost for manufacturer	Ksh.900
Manufacturer's labour cost and profit	Ksh.1500
Margin taken by ApproTEC (for promotion/marketing)	Ksh.1000
Retailer's or Commission Sales Person's margin	Ksh.590
	========
Final retail price to MSE end user	Ksh 3990

5.6 The new approach - results so far

With over 2500 pedal pumps now sold (and over 1500 in the last 12 months), the large scale marketing project does appear to be succeeding. However, the new approach, considered by ApproTEC to be vital if it is to achieve significant and sustainable increase in scale, does involve it in the kind of private sector intervention which has so often led development agencies into difficulties (and which formerly it did not favour). Clearly, the risks need to be recognised and active steps taken to avoid them.

Once the new marketing organisation is effectively established as a viable enterprise, then the theory is that it can be sold to a commercial company. Whether this privatisation plan will ultimately work remains to be seen.

6. FUNDING STRATEGIES

6.1 Donor history

Over the years, ApproTEC has been able to secure funding from a number of international donors including USAID, the Netherlands and the EU. However, their most significant donor has been DFID, initially through its UK-based Joint Funding Scheme (via ApT of the UK) and latterly from the bilateral programme. The current DFID budget which began during a serious funding break in 1996 and which supports ApproTEC core costs, is scheduled to run to 2001. A significant feature of the design of that project is that it requires ApproTEC to put in place a mechanism by which core central costs (see Section 7) will be charged out to the different projects which the organisation implements. This will not of course achieve true financial sustainability, but it will underpin ApproTEC's position as a developer of technologies under contract, since the full cost of developing those technologies will be made explicit.

6.2 The funding mix

ApproTEC has in fact always accessed funds from a variety of sources. Figure 2 shows that the mix of that income has fluctuated considerably over time.

6.3 Consultancy fees

The very significant fluctuations in the proportion of funds accounted for by donors are primarily due to a range of consulting and other fee-earning activities which the organisation has occasionally taken on, particularly to make up for earlier gaps in donor funding. Perhaps of more concern to an independent observer is the more recent decline in the proportion (if not the absolute amount) of non-donor fee income which

ApproTEC earns. This mainly reflects ApproTEC's view that while they can earn significant fees from consultancies and related activities, especially from donor agencies, this is actually a significant distraction from their core work. Of course, such consultancy work can contribute to increasing staff knowledge and expertise and to raising ApproTEC's institutional profile, but it does not contribute to the achievement of their programme goals and as such is not seen as an organisational priority.

Figure 2: ApproTEC funding, 1991-1997

Year	Total Income (Ksh.million)	Total Income (US$)	Percentage from Donors	Percentage from Others
1991-92	5.42	90,333	78%	22%
1992-93	8.58	143,000	11%	89%
1993-94	16.82	280,333	60%	40%
1994-95	27.33	455,500	79%	21%
1995-96	23.77	396,167	70%	30%
1996-97	59.37	989,500	87%	13%
Total	**141.29**	**2,354,833**	**75%**	**25%**

NOTES:

(1)These numbers do not include a large ($2.1 million) UNHCR contract producing latrine slabs in 1992-4

(2)They do include the 7.5% overhead/profit from that UNHCR contract

(3)Some funds relating to a grant for 1992-93 were actually released in 91-2 & 93-4

(4)The actual $ figures were higher than shown but a constant exchange rate of $1=Ksh60 is used

(5)Non-Donor Funds are from Cost Recoveries (see above), Consultancies, Training Fees, and Sale of Equipment

7. THE INSTITUTION

7.1 The organisation

Now an independent Kenyan NGO, ApproTEC spun out of the Appropriate Technology Unit of ActionAid Kenya, when that organisation decided to cease its direct involvement in technology development and promotion. ApproTEC is driven by a team of three executive directors, all of whom previously worked for ActionAid Kenya. These three comprise nearly half of the organisation's board of directors, with the four non-executives comprising senior figures from each of academia (who is also the chairman), microfinance, government and community development. ApproTEC has over 40 employees, most of whom are located at their head office, workshop and showroom in Nairobi, but with others at regional offices in Kisumu (Western Kenya) and Karatina (Central Kenya).

7.2 Structure

ApproTEC organises itself into a central "core" function and five project areas, all of which draw on the centre but also have their own staffing. The core function includes:

- market research and analysis;
- technology development and manufacturer training;
- information and public relations;
- administration and finance; and
- monitoring.

The five project areas are:

- Pedal Pump Project (marketing and promotion);
- Oil Press Project (marketing and promotion;
- MicroPED Project (marketing and promotion, training entrepreneurs);
- Akili Project (testing the "indigenous" approach to technology development); and
- Others (including initiatives in Tanzania and Uganda; long term irrigation; other projects under development).

7.3 The people

Pursuing ApproTEC's "corporate" approach requires a range of different types of expertise. In general, a strong business perspective is required in order to place technology coherently in a market context. More specifically, success comes from developing strong expertise in engineering design and development and in marketing. In both spheres, ApproTEC has developed recognised expertise, headed by senior, well-qualified people. Indeed, the major increase in technology sales over the last two years can be attributed directly to the arrival of a senior marketing person. While most of ApproTEC's staff are Kenyan, some of the main *drivers* of the organisation are expatriates, although long-term residents in Kenya.

7.4 Size and scaling-up

ApproTEC has grown significantly in size in the last years (more than doubling its budget). However, it considers that there is both a large unmet need (and a demand) for its services in Kenya and more widely in East Africa. In ApproTEC's view, the key challenge in scaling-up is not to increase the number of technologies they promote nor indeed the quality of those technologies (although they are doing both), but to strengthen the marketing and sales of the technologies. The challenges involved in doing this are discussed in more detail in Sections 2 and 5.

7.5 Staff salaries

The majority of ApproTEC staff are paid a fixed salary. However, those who are directly involved in the sale of technologies are paid on the basis of a fixed salary or wage plus commission, introducing an important market influence into reward systems. This applies both to professional programme officers and to sales people and demonstrators. In some cases, a demonstrator will receive a fixed daily wage from ApproTEC and commission on sales from the owner of the shop where the demonstration is taking place.

8. IMPACT

8.1 Importance of impact

While impact assessment is always important in BDS organisations, in ApproTEC's case it is of special significance In taking its stance on financial sustainability - namely that they do not seek to achieve financial sustainability in their own operations - ApproTEC have to justify their approach in terms of strong outreach and impact;
i.e. the *flipside* of <u>not</u> pursuing financial sustainability has to be an extensive impact assessment effort.

8.2 Impact by design

The first point to make on impact is that ApproTEC seeks to enhance impact from the outset, through their approach to technology design and development; it is an underlying ethos in the design process. It builds impact into all its work by only promoting technologies which:

- Have affordable start-up costs ($100-1000) and quick returns on investment.
- Target local markets and process locally available resources.
- Are easy to use and require little specialist training or skills.
- Are well engineered, to ensure durability, easy maintenance and interchangeable spare parts.
- Have equipment and tools which are locally mass produced to ensure low prices and local availability.

8.3 Impact performance

Overall, ApproTEC claim to have promoted the creation of 8000 new private sector jobs through the sale of 4100 pieces of equipment. Based on ApproTEC's total costs to date, this works out at a cost per job of $340. In outreach terms, cost per technology set sold is around $650, $500 of which comes from donors. However, ApproTEC's performance has improved significantly in the last two years, particularly through the success of the pedal pump and oilseed press, and more recent outreach costs will have improved markedly.

Looking in more detail at the oilseed press; over 700 have now been bought by entrepreneurs and groups and over 70% of them are believed to be in active use producing cooking oil and animal feed. ApproTEC's own in-depth impact studies show that each press has directly created 2.5 new jobs e.g. for press operators, seed cleaners and oil sellers.

Box 2. Helen Murangiri, Oilseed Press Owner

Helen Murangiri bought her first oil press in early 1995 and contracted 12 local farmers to grow sunflower for her. She now employs 2 men and 2 women in the business and sells oil to neighbours and local restaurants. She has used her profits to establish a pig rearing business and feeds them on seedcake. She recently bought a second press to further expand her enterprise.

The pedal pump has, if anything, been more successful, with more than 2500 Moneymakers sold throughout Kenya. A recent external evaluation of the pedal pump promotion project found that pump owners easily realise increases in their incomes of between 200 and 400%, and that with further practice this figure could increase to over 600%. Farmers who were previously irrigating by bucket or not at all have

Box 3. Rachel Odongo, Pedal Pump Owner

Rachel Odongo is a single mother with just two acres of land in Western Kenya. Until recently, she used bucket irrigation to grow and sell a small crop of vegetables, earning her about $300 a year. In late 1996 she spent $60 on a MoneyMaker pump and an additional $80 to dig three shallow wells and build some small terraces. She is now growing and selling produce worth over $1000 a year.

increased their agricultural production by between three and six times. In addition, most farmers who were interviewed reported that they had covered the cost of their pedal pump investment in one cropping season i.e. about two months.

Recent figures indicate that some 20% of people who have had a Moneymaker pump for six or more months have already purchased a second pump. Clearly, this figure

suggests very positive impact; small farmers do not make that kind of repeat investment decision unless they are very satisfied with the returns they have enjoyed on their initial purchase.

Box 4. Impact of the MoneyMaker Pedal Pump

A January 1998 evaluation of the pedal pump reported the following changes having taken place as a result of its introduction:

At the farm level:

- significant increase in irrigated land;
- reduced time spent per irrigation;
- irrigation frequency is reduced;
- irrigation is easier;
- numerous crops can be grown including short maturing horticultural crops.

At the social level:

- irrigation work is now enjoyable;
- health has been improved due to increased access to nutritious food;
- it provides exercise;
- the spouse and community like it.

At the economic level:

- improved income per season per capita;
- crop income pays a significant part of school fees.

Nor are the benefits confined to the end users of ApproTEC's technologies. Other beneficiaries include:

- Their employees, with 2.5 jobs created per technology set.
- Local farmers, who have been able to significantly increase their earnings by growing crops which are inputs for the technologies, such as oilseeds.
- The manufacturers, who typically seem to derive between a half and three-quarters of all their sales from ApproTEC products, for example making profits of about Ksh 1500 ($25) on each pedal pump and Ksh 4000 ($67) on each oil press that they produce.

8.4 Quality of impact assessment

Understanding the importance of accurate and detailed impact assessment, ApproTEC have further strengthened their capacity with the appointment of a full-time monitoring officer who devotes a good deal of his efforts to in-depth impact assessments of technology owners. ApproTEC have also established a control group of 40 SMEs in Nairobi, against whom they intend to compare the performance of ApproTEC-supported SMEs on a continuing basis. This is a bold step, indicates a strong (and, in relation to impact assessment in BDS, rare) seriousness of purpose and should generate useful comparative data. In addition, ApproTEC have recently established a standard set of indicators which will be applied across all their projects, to both manufacturers and MSEs buying the technologies. These will focus on sales, jobs created and a number of more qualitative social indicators. Again, this new rigour in monitoring impact should generate higher quality data.

In the light of these efforts to raise the quality of impact assessment and monitoring and evaluation capacity, to what extent can the figures given above on impact be regarded as reliable? The following comments can be made:

- ApproTEC's advertising materials for the oil press and the pedal pump claim that the former can generate a return of Ksh 20,000 ($333) a month and the latter a return of Ksh.144,000 ($2400) a year. While a few very competent (and fortunate)

purchasers may achieve these kind of returns, these claims should be treated with the kind of healthy scepticism which ought to be applied to the claims of all salespeople.

- Despite this slight inclination to hyperbole in its marketing operations, ApproTEC has sought to separate its impact assessment approach from sales materials. Indeed, external evaluations of ApproTEC projects have generally confirmed their own claims for employment and income creation.

- Additionality and displacement effects are likely to be *comparatively* limited for enterprises of the kind supported by ApproTEC. In most cases these are new productive enterprises - for example allowing more value to be added to crops - where competition is not discernible or not local.

In conclusion, it is certainly clear that ApproTEC's work is creating higher incomes and more jobs. However, some figures should be interpreted with some caution, especially the cost per job analysis which is a notoriously difficult indicator to verify[2].. More detailed information is required on the type of jobs being created, the nature of the markets in which enterprises exist and the identity of the people finding employment before cost per job figures may be quoted with more confidence. Steps being taken by ApproTEC should allow tighter analysis in the future.

9. CONCLUSIONS AND IMPLICATIONS

Since their formation in 1991, ApproTEC has developed into a major provider of specialised technology-based business opportunities in East Africa. They have grown markedly both in the scale of their work, especially in the last two years, and in their approach, with evidence of continuous learning on *how to* perform better. There are now also clear signs that ApproTEC's work is delivering substantial benefits in terms of jobs and incomes. From this experience, a number of specific achievements and lessons can be highlighted as well as fundamental issues relating more broadly to BDS.

9.1 Achievements

ApproTEC's achievements can be seen at three related levels:

1. <u>The development of substantial positive impacts:</u> while there may be some question over the exact scale and nature of ApproTEC's impact, the sheer volume of the technology sets sold (4,100), their characteristic labour intensity and the qualitative feedback from clients make it very clear that ApproTEC is achieving widespread significant impacts through its work.

2. <u>The development of effective supply chains in the private sector:</u> ApproTEC have pursued different approaches to working with supply chains (and the relative effectiveness of these is still open to question) but has clearly had success in

[2] While recent external valuations have been positive in their findings, some previous external analyses have disputed cost per job and cost-benefit data.

developing practical means of getting technologies to final users and scaling-up its overall outreach. Their most recent dramatic increases in sales appears to be due to major investment in their marketing and promotion.

3. The development of practical technologies which people want: ApproTEC have been successful in developing technologies aimed at business opportunities and feeding these into the whole supply chain. Consciously and successfully, they have placed technology development within a market context.

9.2 Lessons

Four main lessons emerge from ApproTEC's experience which are of wider relevance to BDS organisations. These generally re-affirm key principles from the Donor Committee guidelines.

1. Following a corporate approach to technology development: ApproTEC's successful performance has been based on the key aspects of a corporate approach to technology development and transfer, namely:
   - putting technology in the market place;
   - making the whole process from identification of a market niche to setting up sales and distribution systems demand-led;
   - following a strong business orientation in relation to final users, incentives, marketing and branding and recruitment; and
   - seeking to be self-financing after initial development costs.

   Whatever the doubts over the longer-term sustainability of a corporate approach, with appropriate capacity and properly implemented, it can deliver large outreach and real impacts

2. Sticking to specific core services: ApproTEC understands its distinctive advantage and role and, notwithstanding more active role in the supply chain, it has stuck to its area of core competence.

3. A strong commitment to measurement: ApproTEC as an organisation clearly understands the importance of measurement both for its own direct purposes and those of its donor stakeholders. This commitment manifests itself in significant steps being taken to measure the process of work, key outputs and final impacts.

4. Encouraging social entrepreneurship: ApproTEC was born out of a larger NGO's decision to cease its involvement in the appropriate technology field. While it was undoubtedly an uncomfortable experience for ApproTEC's principals to lose their secure jobs, it did give them the impetus to start a new organisation with a strategic focus on technology issues. Large NGOs and the people who work in them should be more aware of the potential for "spinning out" capable and entrepreneurial sub-units who are not contributing to the organisation's core strategy, but who could well blossom and make a significant development contribution elsewhere. Donors, for their part, need to be prepared to follow a similarly entrepreneurial approach to investment. As with ApproTEC, the so-called "social venture capital approach" recognises the paramount importance of the people/team driving a project.

9.3 Issues
Two underlying issues remain unanswered from ApproTEC's experience.

Can an approach which does not seek to become financially sustainable be justified?
Perhaps the most striking feature of ApproTEC's approach is their argument that financial sustainability is not a relevant issue either for themselves as an institution or for the services which they provide. They argue that the market has failed and that without specific intervention, the design, development and promotion of appropriate technologies will simply not take place. Since there are wider public benefits (such as employment creation) to be derived from these technologies, then - just as in high-income industrialised economies - it is a valid use of "public" money such as donor funds to invest in their development.

This market failure argument which justifies ApproTEC's corporate approach has many merits; indeed, it is difficult to identify genuine examples of significant technology development taking place in Africa when it is left to the market. However, many facets of this rationale can still be challenged. The comparison with government's role in high-income economies is not necessarily valid; clearly with more resources governments can support more activities. Perhaps a more relevant comparison would be with such economies at a less developed stage when government had a much more limited role in technology development and the burden fell more clearly on business - of various sizes. Moreover, in successful economies it is clear that the SME sector is a major source of technological innovation, development and growth. This does not mean that public funds have no role; they do, but more likely to be in the form of good quality education service provision which can equip people with skills in, for example, engineering design. Indeed, it could be argued that the real problems which ApproTEC are seeking to address are caused by state failure to provide appropriate education rather than market failure *per se*.

Certainly, in the longer-term, for technology development in developing countries to gain sustainable momentum, it is essential that local SME equipment manufacturers are prepared to take risks in investing in technology development and have the capacity (or access to it) to undertake this process. The corporate approach to technology development and transfer clearly can generate many benefits, notably delivering technological business opportunities and packages (its main objective). However, the extent to which the corporate approach actually encourages SMEs to address the sustainability challenge of technology development investment and capacity-building remains unclear.

Should BDS organisations seek to develop new commercial entities?
ApproTEC's role in the development of the supply chain for technologies has evolved from a hands-off - quality protection, promotional, almost franchising - role to one more akin to a hands-on market "player", buying and selling pumps, sometimes on a credit basis. By using their considerable resources and achieving economies of scale in promotion and marketing, it is argued that ApproTEC can deliver much higher annual sales which can still be sustained on a commercial basis. In due course, the ApproTEC role would be sufficiently profitable for this operation to be sold as a commercial enterprise.

Can BDS organisations play the entrepreneurial role of identifying opportunities, creating a business to take advantage of these and then selling/moving on? Can BDS organisations be direct creators of businesses? Certainly, the history of aid-funded development is littered with well-intentioned but unsuccessful attempts to become a direct participant in product markets. Furthermore, if an opportunity exists, one must ask why haven't other business people acted upon it? Against this, many developing economies are not efficient and opportunities potentially do exist for business-like BDS operators. Indeed, this may be a logical extension of the "business-like" ethos which underpins successful BDS organisations. The extent to which they have the capacity to do so successfully without losing sight of their main mission and without displacing "real" businesses will clearly vary from one situation to another.

References

1) GEMINI (March 1994); *Micro and Small Enterprises in Kenya: Results of the 1993 National Baseline Survey*.

2) Committee of Donor Agencies for Small Enterprise Development (1998); *Business Development Services for SMEs: Preliminary Guidelines for Donor-Funded Interventions*

APPENDIX I: The Kenyan Economic Context

Over the past five years Kenya has experienced growth of around 5%, modest inflation of 15% and relative exchange rate stability (at the time of writing US$ 1: KSh 60). Significantly this consistent economic growth has failed to address one of Kenya's biggest challenges, unemployment, which is currently running at around 45%. More recently the outlook for continuing economic growth has been less positive. The government has been forced to make drastic budget cuts in all areas, notably in education and physical infrastructure. For example the road from the port of Mombasa to Nairobi, a vital link for Kenya and a key trade route to landlocked countries such as Uganda is in an appalling condition. (A journey that formerly took six hours now takes fourteen hours). Deteriorating infrastructure and facilities place a heavy burden on business of all sizes. Furthermore the coastal region has been troubled by recent ethnic and factional violence that has damaged confidence, with deleterious effects on the tourism industry – previously one of Kenya's primary sources of foreign exchange.

The SME context

A 1993 GEMINI survey estimates that there are approximately 910,000 micro and small enterprises (less than 50 employees) in Kenya, employing more than 2m individuals or about 16% of the labour force and accounting for 12 – 14% of Kenya's GDP. Trading and manufacturing are the most important non-agricultural activities in terms of contribution to GDP. In rural areas manufacturing is proportionately more significant than in urban areas as a source of employment (especially using non-metallic minerals e.g. pottery and brick making). The 1993 survey found that only 38% of micro and small enterprises had grown since being started and that 47% were single person operations. Equally, it found that one third of the 325,000 SMEs started in 1993 had failed or closed in that year, as well as another 90,000 failures or closures of businesses started in previous years. This lack of dynamism and growth is a common phenomenon in Africa, resulting in a paucity of indigenous, small- and medium-scale enterprises: the so-called 'missing middle'.

The need to promote and support small-scale and informal enterprise has been recognised in Kenya for over two decades as employment in the formal sector has consistently failed to keep up with an expanding labour force. The government of Kenya has made explicit commitments to SME development in a series of Sessional Papers (Nos. 1 (1986), 2 (1992), 2 (1996)) and in National Development plans. However the perception among small business owners is that the climate for small enterprise is becoming increasingly difficult. Ironically the contraction of government spending, combined with low levels of civil service pay is forcing more and more public sector employees to seek supplementary sources of income in the form of 'side-line' businesses.