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Income Is Development

KickStart's Pumps Help Kenyan Farmers Transition to a Cash Economy

Within less than a generation, poor families in Africa have been thrown from essentially a subsistence lifestyle into a primarily cash-based economy. Ability to earn an income is suddenly a paramount skill. Yet approaches to encouraging development continue to be based on the assumption that the primary need of people in poor places is something other than a way to make money—better healthcare, education, water, housing, and so forth. This is misguided. Providing these will not end poverty. In a cash economy, money is the primary means to securing other vital resources. Except in a few very remote areas of the world, if you ask a person in a poor place what they need most, they will tell you that it is a way to make more money. The way to address the challenge of persistent poverty is to create sustainable income-earning opportunities for millions of people. Income is development.

I am the co-founder of KickStart, a nonprofit social enterprise that has for the past fifteen years employed design principles to address the poverty challenge in Kenya and Tanzania. KickStart designs and markets low-cost pumps and other capital equipment that have been used by thousands of farmers to establish highly profitable commercial enterprises. This market-based approach to development “kick-starts” a sustainable cycle of wealth creation, brings poor people into the middle class, and eradicates the effects of poverty from the ground up.

KickStart's best-selling tools are foot-powered irrigation pumps that enable poor farmers to switch from subsistence to commercial irrigated farming. With irrigation, entrepreneurial farmers can grow three or four crops of high-value crops per year, greatly increase their yields, and harvest the crops in the off-season, when the prices are highest. The average net farm income of farmers who use our pumps increases by a factor of ten—from \$110 to \$1,100 per year. In Africa this is a lot of money. For the first time they can afford to properly feed and educate their children, pay for healthcare and plan for their futures. To date, over 40,000 small-scale farmers and entrepreneurs in Africa are using KickStart's pumps and other technologies to run profitable small businesses. Between them they generate over \$40 million per year in new profits and wages, and total revenues equivalent to over 0.5% of the GDP in Kenya, and 0.2% of the GDP in Tanzania.

Martin Fisher is the co-founder and CEO of KickStart (formerly ApproTEC), an organization whose mission is to promote sustainable economic growth and employment creation in Kenya and other countries by developing and promoting technologies that can be used by dynamic entrepreneurs to establish and run profitable small-scale enterprises.

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THE UNFULFILLED PROMISE OF “APPROPRIATE TECHNOLOGY”

As a doctoral student in mechanical engineering in the early 1980s reading E.F. Schumacher’s 1973 classic, *Small is Beautiful*, I came to believe—as many others elsewhere had—that the widespread introduction of small-scale, locally made, labor-intensive technologies in poor rural villages was going to save the world. In 1985 I applied for, and was awarded, a Fulbright Scholarship to travel to Kenya with the objective of studying the “appropriate technology” movement, as it was termed, in action. Much to my dismay, my first finding was that the appropriate technology movement was essentially dead. Time and again I was told, “We spent a lot of money on that and it didn’t work.” As an engineer I had a hard time believing that there was no place for technology in development. But clearly I still had a lot to learn.

A few months after I arrived I found a small group who were working at the British charity ActionAid to develop low-cost building materials and train local artisans to use them to build high-quality local schools. There, I met Nick Moon, a skilled carpenter and entrepreneur and my future business partner and co-founder of KickStart. Nick and I worked together at ActionAid for the next five years.

ActionAid believed in “integrated rural development.” They poured millions of dollars of assistance into limited geographic areas in the poorest parts of Kenya, and our efforts were a part of this approach. Among many other projects, we established a large rural water scheme that built community-owned wells, dams, and other innovative water sources in poor villages. We built and ran a rural workshop to manufacture low-cost ploughs and carts that we donated to poor farmers. I designed new machines for making low-cost building materials and we donated them to youth groups to establish small businesses. And we trained dozens of local carpenters to manufacture their own wooden carpentry tools.

However, Nick and I became increasingly disillusioned about the lack of sustainable impacts that we and other development agencies were having on poverty. We were spending large amounts of resources on poor communities, donating infrastructure, tools and equipment, providing training and education and using state-of-the-art community organizing and planning methods. Nonetheless, the water sources we built would fall into disrepair after a few years of use; youth groups we trained to start productive enterprises would fall apart because they were not cohesive or entrepreneurial; our manufacturing workshop competed unfairly with local businesses, and when the project ended, our improved farm equipment was no longer available. The carpenters didn’t use the tools we trained them to make because they preferred modern-day equipment. While we built dozens of school classrooms using new low-cost building materials, the new materials were no longer locally available after we left town. No doubt we were teaching the local communities how to manage a large amount of development aid, but it was much less clear if we were having any lasting impacts on poverty—or if we were simply making the local people less self-sufficient and more dependent on our aid.

After five years of learning by doing, learning from our own mistakes, and learning from the successes and failures of others, Nick and I decided we were ready to try to do things differently.

*Income Is Development*RE-THINKING THE CHALLENGE OF PERSISTENT POVERTY:
FROM ONE MEANING OF “APPROPRIATE” TO ANOTHER

Finding an alternate way forward meant rethinking the poverty problem from its fundamentals. First, we would not focus on the urban poor. Why? Of the 1.1 billion people who live on less than \$1 per day worldwide, fully 70% are small-scale rural farmers who are trying to scrape out an existence on an acre or so of unproductive land. In sub-Saharan Africa—despite the more visible shocking conditions in the urban slums—over 80% of the poor are rural farmers.

Five years in Kenya had been long enough to make us aware also of the extraordinary physical isolation of these rural farmers. The few roads that exist are pot-holed dirt tracks that often become un navigable after a heavy rain. The average poor farmer does not own a bicycle (much less a motorbike or a car) and lives miles from the nearest road. Farmers and their families have no addresses, no electricity, and no telephones. They often only come to their closest marketplace—a small village with a couple of almost-bare-shelved shops and an empty plot where farmers can sit on the ground and hawk their produce—a few times a month and to a bigger town only a few times a year.

Their primary contact with the outside world comes when they see a newspaper or listen to a radio—most often owned by a better-off neighbor. They have limited access to markets or information and very few distribution and marketing channels can be used to reach them.

Sickness is a constant fact of life. Education is a route out of poverty. So families that get beyond subsistence typically seek to educate their children and gain access to curative health-care. Wealthier families can purchase basic furniture, lighting at night (from a candle or kerosene lamp), soap to wash with, chickens or a cow to improve their diet, basic cosmetics, and better clothes to wear. The relatively rich in rural areas of East Africa will have access to transport and communication, a lead acid battery for lights, a radio for information and entertainment, and potentially a small black and white TV.

All of these things cost money. Farmers can no longer grow enough food for their family on their small plots of land, and no longer hunt for food and skins, or gather building materials from a local forest. And despite attempts by governments to provide education and health-care, the poor must still pay for school uniforms, books, and even teachers, and for drugs and advice at local pharmacies or clinics. Many must buy cooking fuel and all have to pay for clothing, soap, lighting, cosmetics, transport, and communication. In fact—like other people in poor rural regions elsewhere in the world—they are being compelled to make the transition from subsistence to a cash economy.

This is a major change—one at least as profound as the fall of the Berlin Wall. Indeed, the two transitions are related. During the Cold War, African governments received enough aid to

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provide free education and healthcare and to highly subsidize the cost of basic commodities such as maize and cooking oil. Farms were bigger—populations have grown rapidly and farms have been divided with every new generation—and poor families could grow enough to eat, collect building materials and fuel in the forest, sell a small portion of their grain to buy subsidized cooking oil and school uniforms for their children, and survive to live another year. But with the end of the Cold War aid to Africa has decreased ten-fold and subsistence lifestyles have become virtually impossible. Governments no longer provide free health care and education, and the prices of essential commodities have been decontrolled; in Kenya, for example, cooking oil doubled in price when it was decontrolled in 1992.

In this context we undertook to evaluate the appropriate technology movement, in which millions of dollars had been invested with few notable successes.

The mantra of “give it away” creates completely inappropriate incentives, leading to patronage and dependency, instead of self-sufficiency and entrepreneurship.

In the course of drafting a detailed plan for our new venture, Nick and I came to the conclusion that, to begin with, the appropriate technology movement placed too great an emphasis on time- and labor-saving technologies. These are inappropriate for the rural poor, who typically have a surplus of both time and labor and have a very low opportuni-

ty cost for their time. They are also unlikely to spend much money on “money saving” devices such as fuel-efficient charcoal stoves and solar lighting because they lack the spare cash. As a rule of thumb, unless credit can be offered, money-saving products for the very poor should cost less than the local price of a chicken—a luxury that even a very poor family can usually afford to eat once a year.

We noted that in many cases the appropriate technology movement had promoted to the poor, products designed to address global problems rather than ones designed to create individual opportunities. Solar cookers are an example. For the many years these have been promoted in Africa the arguments have always been the same: we want to save the forests from being cut down by families collecting firewood or making charcoal, solve global warming, and save poor women from spending many hours collecting firewood. Instead, we want poor families to buy an expensive new cooker that does not cook food in the way they like eating it, and they will have to do all their cooking in the middle of the day, when the sun is shining, instead of in the evening, when they traditionally eat their biggest meal. It is not very hard to understand why solar cookers don’t sell. (After all, even wealthy Americans won’t spend money on fuel-efficient technologies just to save the world.) Nonetheless millions of dollars continue to be spent on promoting solar cookers with almost no sustainable impacts.¹

We observed that the appropriate technology movement had been imbued with a socialist philosophy in favor of community ownership and against personal property, money, and business. Group ownership—devoid of accountability for those who don’t contribute and reward for those who do—fails. And when economics is ignored people promote technologies that make no economic sense—such as making cooking oil from peanuts when the peanuts are

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worth much more as a food source than they are as cooking oil. Selling things, middlemen, and profit motives were considered crass and inequitable so they were replaced by unsustainable calls to help each other and give things away for the common good. Women's and youth groups and other NGO favorites were targeted for technology training and dissemination. These groups are all too often externally imposed, artificially built, and not sustainable. While group formation is useful for some collective activities—such as fixing roads, or getting together to increase marketing power or access to credit—group ownership and management of a small-scale productive technology has generally not worked well. “Community ownership” is an even less likely model. The mantra of “give it away” creates completely inappropriate incentives, leading to patronage and dependency, instead of self-sufficiency and entrepreneurship.

The appropriate technology movement had erred in focusing on self-built technologies, such as mud stoves. This romantic notion is misplaced. Such an approach is highly inefficient and results in poor-quality, often worthless products. The readers of this journal are not asked to build their own computers, cars or watches; why, then, should we try to train poor people to design and build their own tools? Nor can high-quality machines and tools be produced in very small-scale, undercapitalized, under-skilled, local workshops. They must be mass-produced in medium-to large-scale production units, using well-designed production tooling (jigs and fixtures), efficient production methods, and skilled technicians. These production units must be highly motivated to keep the quality up and the prices down. Hence they must be private-sector factories and they have to make a good margin on manufacturing the new technologies. Sometimes NGO workshops and training schools were used to manufacture the new machines and tools but these are not set up to do high-quality, low-cost manufacturing—and they rarely ever did.

Finally, appropriate technology efforts followed the wrong dissemination strategies. At first, appropriate technology ideas were spread by running expensive training courses for people in the local communities and expecting them to manufacture and use the new technologies. When this didn't work well NGO and donor-run appropriate technology centers were established where local people could see the technologies and learn how to make or use them. When this failed to produce results the movement published hundreds of books and manuals on how to build and use appropriate technologies. Almost nobody used private-sector manufacturing, distribution and marketing channels to produce, market, and sell the technologies—so even if people saw the technologies at a demo center or in a book they had no way to actually get hold of them.

The challenge as we saw it was to embrace both meanings of “appropriate”: not only designing technologies “appropriate” to the poor, but also designing technologies that people in poor places could themselves appropriate and use to advance their own ends.

FINDING OPPORTUNITY IN LATRINE PITS: KICKSTART'S ORIGIN

In mid-1991 Nick and I left ActionAid to establish ApproTEC (Appropriate Technologies for Enterprise Creation), which later became KickStart. We teamed up with ApT, a British NGO, and were awarded a matching grant from DFID (the British Department for International Development) to establish ApproTEC as a Kenyan non profit. We left our jobs at ActionAid and initially worked without salaries and used our donated time as a match for the British

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money so that we could start our operations. But with no other incomes we could not yet claim the full match.

We decided to use a market-based model in which we would sell our new technologies directly to local entrepreneurs. We would identify profitable business models that thousands of people could start; design the tools and equipment needed to make these businesses possible; and most importantly, establish a private-sector supply chain to manufacture, distribute, and sell the new tools and equipment to the entrepreneurs. We would create awareness of the new business models and equipment with a mass-marketing campaign and sell them to poor entrepreneurs, who would use them to start thousands of profitable new businesses. Finally we would leave in place a fully profitable and sustainable supply chain that would continue to deliver the tools and equipment even after we left town. We quickly discovered that having a well-thought-out theory of change and business model was one thing; establishing a successful social enterprise was quite another challenge.

A distant crisis created an opportunity. In 1992-1993 the Somali civil war pushed 350,000 refugees over the border into North Eastern Kenya. The United Nations High Commission on Refugees (UNHCR) contacted us with a problem: Sanitation had become a crisis at the refugee camps because, for cultural reasons, the Somalis refused to use communal toilets. We developed a very low-cost pit latrine technology that could be mass-produced by unskilled refugees so that each refugee family would have their own latrine. These latrines had unreinforced domed concrete slabs with tight-fitting lids, which were more sanitary and much less costly than the commonly used reinforced concrete latrine slabs. KickStart became a UNHCR implementing partner and secured a multimillion-dollar contract to manufacture and install over 45,000 of these latrines over a two-year period. We later trained other relief agencies in the technology and today over 100,000 of our pit latrines have been installed in refugee camps and half a million refugees have better sanitation and health. But, we had done nothing to help them escape their poverty. So to continue working on our mission we used the 6.5% overhead on the UNHCR contract to match our DFID grant and continue to operate KickStart. We were now on our way.

At first we promoted the low-cost building technologies I had designed while at ActionAid. Our main products were a block press for making strong building blocks from soil with a small amount of cement, and a fiber concrete roofing tile machine for making lightweight and strong roofing tiles. While these two technologies were bought by local entrepreneurs and used to establish many profitable businesses, the machinery was fairly expensive and the businesses somewhat complicated. One successful entrepreneur was Mr. Ombati, a small-scale farmer who bought a block press in the early 1990s and started making blocks on his small plot in Western Kenya. He expanded his business, bought 3 more machines, employed over 40 workers, and today he owns a local shopping mall in Nairobi. The right technology in the hands of an entrepreneur is a powerful force.

We next turned our attention to a manually operated oilseed press and filter that extracts nutritious cooking oil and high-quality animal feed from locally available sunflower seeds. The design was based on an invention by Carl Bielenberg, an American engineer working in Tanzania. We made modifications to make the press easier to operate, and manufacture, and increase the yields of oil. After the Kenyan government decontrolled the price of cooking oil in 1992-3, the price of the imported palm oil shot up and this innovation became a viable and

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profitable business opportunity for local entrepreneurs. Jane Mathendu, for example, a single mother and school teacher, bought the press with her savings and a loan from her brother. She has now sent her two daughters to university and bought her own plot of land. She employs three workers, sells oil to a local school and hospital, and contracts with 20 local farmers to supply her with seeds.

While we were happy with these successes we soon realized that if we were going to have a major impact on poverty we had to focus on new business opportunities for poor rural farmers. For them, by far the best business to start was one that would move them from subsistence rain-fed farming to commercial irrigated farming.

Irrigation allows farmers to grow three or four crop cycles per year instead of the one or two possible with rain-fed agriculture. It enables them to grow high-value crops such as fruits and vegetables and get higher yields per acre. Best of all, with irrigation, farmers have crops in the off-season when the supply is low and the prices are high.

Of course in order to use irrigation a farmer needs access to water on his or her farm. Not surprisingly, throughout history people have settled most heavily in those areas where surface and ground water is most available. So many millions of farmers in Africa have access to water on their small plots. Unless they live next to a pond or river they have to dig a well to reach this water, but many can simply dig a hole in the ground and find water within the first 10 to 12 feet. Others have to dig a bit deeper, and they can hire local well diggers who can hand dig wells as deep as 60 or 70 feet. Even farmers who don't have water directly on their plots can often lease close-by land that does, or create catchments to catch rainwater.

Wealthy, large-scale farmers know about the benefits of irrigation, and in Kenya they use fancy irrigation equipment to make as much as \$3,000 profit per season per acre. But until recently no affordable or practical technologies were available for poor subsistence farmers. Petrol pumps are too expensive, and the petrol is unavailable in the rural areas. Electric pumps are cheaper, but less than 10% of the population in Africa has access to grid electricity, and solar electricity is still far too costly. For poor farmers, the only remaining option was to tie a bucket to a rope and use it to draw water from a stream or shallow well, the most primitive form of manual irrigation. This is backbreaking work, and two people can only irrigate about 1/8 of an acre per day. Clearly a new technology was required.

In 1985 American engineer Gunnar Barnes invented a treadle-operated micro-irrigation pump in Bangladesh. Two metal cylinders are fixed above a shallow tube well and the farmer builds a bamboo structure and attaches a piston to each of two bamboo treadles. The operator steps back and forth between the treadles, pulling water from the well and dumping it into an irrigation channel that distributes it to the crops. Bangladeshis, who live on a flat flood plain and have used channel irrigation for generations, could now get a second harvest of rice or wheat in the dry season. International Development Enterprises (IDE), a U.S. non profit, followed a market-based approach to manufacture and sell treadle pumps in Bangladesh and India, with incredible success. In less than twenty years over 2 million pumps were sold and on average each pump has generated \$100 per year in new net income for the users.

In 1990-91 we designed a new version of the treadle pump for East Africa. Unlike Bangladesh, Kenya is very hilly, and farmers are not familiar with channel irrigation, or in fact any other type of irrigation. In addition, pumps cannot be safely left in the field. So we designed a portable pump that could both pull water from a stream or shallow well and pres-

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Irrigation for Improved Health

The link between water for irrigation and improved health may seem tenuous at first. However, the increased incomes enable families to afford better nutrition and more preventative and curative healthcare. In addition small-scale irrigation has other, less obvious, but equally important impacts on health.

The World Bank and WHO estimate that 4 billion cases of diarrheal diseases kill more than 2 million people each year, the majority of them children. Having enough water to wash hands after using the latrine may be the single most important intervention in improving health in developing countries. Improved hygiene (hand washing) and sanitation (latrines) have more impact than drinking water quality on health outcomes, specifically reductions in diarrhea, parasitic infections, morbidity and mortality, and increases in child growth (Esrey et al. 1991; Hutley et al. 1997). Most endemic diarrhea is not water-borne, but transmitted from person to person by poor hygiene practices, so an increase in the quantity of water has a greater health impact than improved water quality because it makes it possible (or at least more feasible) for people to adopt safe hygiene behaviors (Esrey et al. 1996).

It is estimated that hand washing alone can save 1 million people a year, but those who must carry water from a village source do not have enough to facilitate good hygiene. And even clean water from a source in the village is easily contaminated by unwashed hands.

Creating a new water source for hygiene alone is too expensive for a poor farmer, but by using the water for irrigation (which makes them a lot of money) they can afford to buy a pump and dig a well next to their house, and this results in much more water for hygiene as well.

surize it through a hose pipe to push it up a hill or through a sprinkler system. However, the pump was heavy and bulky to carry, and KickStart had not yet established an efficient supply chain for our technologies. We only sold a few hundred pumps.

In 1995 Bob Hyde, an American former marketing executive, joined KickStart and convinced us that while we had identified the right business opportunity, we had not yet designed the ideal technology. For cost-effective distribution and mass marketing we needed a much smaller, lighter-weight irrigation pump. Bob also helped us greatly improve our distribution, sales, and marketing functions. In the following years we developed and marketed a line of low-cost manually operated irrigation pumps. Our first pump was a small portable suction-only pump that could pull water from a shallow well and dump it into a channel for furrow or flood irrigation. But clearly in Kenya a pressure pump was going to sell much better.

So we developed the “Super-MoneyMaker” irrigation pump. Its name gets right to the point. This small, portable “stair-master-like” machine has both suction and pressure capabilities. It can pull water from a hand-dug well as deep as 25 feet—or from a pond, lake, or stream—and can pressurize it to a total height of 50 feet above the water inlet. It can push water through a hose pipe as far as 400 meters, spray it through a hand-held nozzle or sprin-

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klers and can be used to irrigate as much as 2 acres of land. The pump weighs 45 pounds and is easily carried to the farm and from one spot to another for irrigating wider areas. It retails in Kenya for \$95. It enables farmers to grow multiple harvests of high-value cash crops such as fruits, vegetables, and flowers. The economic and social impacts of this technology have been remarkable. The average net farm income of farmers using this pump has increased ten-fold from US\$110 per year before buying the pump to US\$1,100 per year after buying it.

The pump literally lifts farmers from poverty into the middle class. For example, Janet Ondiek was widowed in 1999 and left completely destitute on a two-acre plot of land in Western Kenya with her 6 young children. With no income, she was forced to take her children out of school and beg from her relatives just to survive. But she grew a small plot of cabbages using a bucket to draw water from the stream running through her property. One day, while selling her cabbages in town, she saw our pump being

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demonstrated in a local shop. After working six months to save money, and taking a small loan from her sister, she bought the pump. Within the first year, she repaid her loan, employed two young men to help her irrigate, planted a full two acres with cabbages, kales, and tomatoes, and opened a small shop to sell her produce in the local town. She made \$3,200 profit in her first year and was able to send her kids to a private school. When we visited her a few years later she had rented additional land and employed four young men to help her in the fields.

We have since introduced the MoneyMaker-Plus—a single-cylinder version of the more expensive Super-MoneyMaker—that retails for \$55 and can irrigate one acre. We are test-marketing a very low-cost pump called the MoneyMaker-Hip Pump, which can irrigate up to 3/4 acre.

But our mission is not to design or sell pumps. Our mission is help people escape poverty. What sets KickStart apart is that from the beginning we knew that we wanted to measure the direct impacts we were having on poverty. So we created an innovative system to carefully track and quantify the individual and aggregate impacts created by our technologies. That system is described in more detail below. The impacts have been substantial. To date, we have sold over 59,000 irrigation pumps and other money-making technologies. They have been used to establish over 40,000 profitable new businesses; and currently almost 700 new businesses are being created every month. On aggregate, the new businesses generate over US\$40 million per year in new profits and wages.

Beyond the immediate income growth there are many other socio-economic benefits. Pump owners have created over 22,000 new waged jobs and have increased their expenditure

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on other farm inputs—such as seeds and fertilizers—by as much as 2000%. Middlemen buy the produce and sell it to vendors, who resell it at markets in the city, or to exporters, who clean, pack and label it for export. Other pump owners grow seedlings that they sell to local farmers. Some 30% of the pumps are lent out by their owners to even poorer family members or neighbors, who use them on their own small farms.

The new incomes enable the users to afford better nutrition, education, health care and housing for their families, and for the first time to climb out of poverty and plan for their futures. More than 50,000 children are either in school for the first time or in improved schools as a result of our work. And over 5,000 pump buyers have used their new incomes to build new or improved houses.

In addition, our pumps enable families to improve their hygiene and sanitation. Because they make money by irrigating they can now afford to dig a well on their plots of land. Thus the pump gives them not only enough water for irrigation but also plenty of extra for increased home consumption and hygiene.

Between 1995 and 1999 our efforts were gaining traction in Kenya. We were starting to create significant impacts on poverty while at the same time working to continually refine both our tools and our model. By 2000 it was time to prove that our model was replicable in a new location. We decided to start a program in Tanzania—a country even poorer than Kenya and one with a socialist and much less entrepreneurial history. With funds from British DFID, we established an irrigation pump manufacturing, wholesale, and retail network in Tanzania, and to date we have sold more than 14,000 pumps there. In 2005 we raised funds from USAID to start a similar program in Mali in West Africa.

We have proven that our intervention works on the individual level, with 40,000 new businesses generating over \$40 million in new profits and wages each year. We have also shown that it is highly cost-effective and can be replicated successfully in other countries. We are now on our way to proving the long-term sustainability of our model.

THE BUSINESS MODEL: HARNESSING ENTREPRENEURIAL SPIRIT

Nick and I built KickStart based on a set of basic learned truths (see box at right), learned from which we developed a systematic five-step model:

- identify profitable business opportunities;
- design tools and equipment to make those business opportunities possible;
- establish a profitable supply chain;
- develop the market; and
- end subsidies and leave in place a profitable private-sector supply chain.

Surrounding this model is an ongoing impact-monitoring effort that not only measures our results against the goal of moving people out of poverty, but also provides critical market intelligence and feedback for improving each step of the process.

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Lessons Learned: What Works

Many technology development and promotion projects have gotten a number of the following lessons right. However, only those that have gotten them all right have created significant impacts on poverty:

The number one need of the poor is a way to make money. The time of subsistence economies is over.

To assist people anywhere you have to understand their circumstances. In our business as in any other, we need to understand our customers' circumstances and what they need to change those circumstances for the better. We need to provide them with what they need to make their own choices—a way to make money—not what we think they should have.

There are no jobs. Developing countries have very small private sectors—and until these countries improve their governance, the private sectors will grow only slowly.

The solution is in the people's drive and determination. The rise of the informal sector shows that poor people in developing countries are willing to start their own businesses.

People in poor places need money-making business models and technologies. With little access to information on business models and very few affordable capital tools, the rural poor lack the opportunity to start profitable businesses.

Technology is important for job creation and economic growth. New technologies can open up whole new productive and value-adding industries—and growth on this scale is what is needed to eradicate poverty.

Micro-finance is very useful but is not enough. Small loans—without sound business models and the technologies to run them—will not by themselves end poverty. Pairing credit with business models and capital equipment will increase the benefits of both.

Entrepreneurs in poor places need high-quality technologies and designs. People are investing significant money. Products must perform as promised and last a long time.

People need to know about and be able to access the new business models and technologies. Marketing to isolated people in poor places is a large challenge—but is just as important as creating the technologies.

Sell the technologies, don't give them away. Those who buy tools are more likely to use them than those who receive them for free. This is true anywhere.

Do high-quality mass production in medium-or large-sized factories. Only these facilities can provide the economies of scale or the consistent quality needed

Establish a private-sector profit-making supply chain. This is the most efficient way of delivering goods and services. It endures only when the work is profitable for all.

Target individuals, not groups and communities. In general, groups don't do a good job of sharing and maintaining a productive asset. People in poor places are like people anywhere else: they will take care of their own families' needs before they will commit themselves to efforts to better their communities.

Step 1: Identify Profitable New Business Opportunities

Selecting the right business model is the most critical factor in determining the likely success of a new business. We use sub-sector and market studies to examine a particular sub-sector

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(horticulture, building materials, animal feeds, transport, etc.), and we look at the economics of the entire value chain to identify possible new “technology-based” business opportunities. We look for business opportunities that many thousands of people can start with initial investments of no more than a few hundred dollars, and that are so profitable that entrepreneurs will recover their investment in the first three to six months (“farm time”). Poor farmers are used to putting their money in the ground for short periods while they wait for the harvest, but a pay-back time of one to two years will be unacceptable.

What types of businesses can a poor person start? It is easiest to start a business that initially sells products or services to neighbors or in the local village. So at least initially, the new businesses must serve the needs of other poor people. However, it turns out that there are many opportunities because the poor generally pay high per-unit prices for low-quality products and services—food, farm inputs, fuel, water, clothes, building materials, transport, lighting, cosmetics, electricity and even entertainment, education, and healthcare. Thus, the new businesses must supply more affordable goods and services to local poor customers. As the businesses grow and the entrepreneurs become more experienced they can expand their market to include the local town and then can start selling to middlemen who sell in the local city and even to export markets.

Step 2: Design Equipment

KickStart focuses solely on technologies that are directly used to create income. Designing tools and bringing them to production is our second step.

A prejudice leads many to assume that poor people only need poorly engineered products. Nothing is further from the truth. To start successful businesses they require high-quality, well-engineered and highly durable equipment with consistent performance characteristics and interchangeable spare parts—just as the better-off require when they buy a photocopier, car or computer. This requires high-quality engineering and mass production.

The design criteria we set for ourselves are daunting. Designing tools that work is the easy part. Designing tools that incorporate all of these design criteria is a significant challenge. The vast majority of this design work is done by a small team of engineers, designers, and technicians in our workshop in Nairobi, Kenya. They research raw material properties and ergonomics, use CAD and stress analysis to develop the designs, incorporate design for manufacturability from the start, and do many hours of building and testing of prototypes to ensure the performance and wear characteristics, cultural acceptability and durability. As a result it takes many months to invent, design and produce each new technology.

Step 3: Establish a Supply Chain

By far the most efficient and effective way to get products (and spare parts) to people is to sell them through a private-sector profit-making supply chain. This is completely sustainable because everyone in the supply chain makes money on every sale and they are all highly motivated to make it work.

The first link in KickStart’s supply chain is manufacturing. We know that centralized mass production combined with effective distribution is the most effective model for getting products to the market. This has been proven time and again with products ranging from bicycles

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to computers, and soap to Coca-Cola. We use this same model for our tools and equipment. They are mass-produced in medium-to large-scale factories, using well-designed production tooling, efficient production methods and well-trained technicians. Our engineers design all the tooling required for high-quality mass production. This is a major challenge in Africa because of inconsistencies in the strength and dimensions of local raw materials, the lack of advanced production machines and the shortage of skilled labor. We have developed new manufacturing methods to help overcome these challenges and we out-source the manufacturing to the largest, most experienced and best-capitalized factories that we can find. However, we still have to train the production workers and help to supervise the quality control.

We then buy the equipment from the factory and recruit existing local private-sector players—wholesalers/distributors and retail shops—to establish a profitable supply chain where everyone, including KickStart, makes money on every sale. In many cases existing supply chains have to be strengthened to handle greater cash flows and credit. In other cases we recruit and train brand-new distributors and retail shops to reach the villages closest to the farmers. But the good thing is that these are local businesspeople, they are motivated by earning money, they are in the community to stay and they know the local customers. At present over 350 retail shops in Kenya and Tanzania sell our products. Most of them are small-scale agricultural-veterinary shops that presently sell small packages of seeds, fertilizer and other farm inputs, and we have shops in every high-potential city, town and village. Many of these shops are little more than a single room; for most of them our products are the most expensive items they have ever sold and all of them require significant training in the operation and marketing of our products.

Finally, since our final customers are very price-sensitive, we establish a national retail price that will be as affordable as possible while ensuring that the wholesalers' and retailers' margins are competitive with their other products. Because much of our initial marketing is national in scope (radio and newspaper advertisements), the fixed final retail price is an important factor to both us and our customers.

Step 4: Develop the Market

We want to get as many people out of poverty as possible so our technologies need to be as well known and easily available in Africa as are sewing machines and bicycles—everyone knows about them, what they can do and where they can be bought. While we know our tools can enable people to make a lot of money, they do not sell themselves, and have no impact if not used. Thus, developing our market is by far the most important challenge and this is where KickStart spends the vast majority of its resources.

We are selling “big ticket” items to extremely risk-averse buyers who buy very few capital goods, have very little cash and very limited access to information and marketing channels. This is not an easy sell.

If a poor person spends a large percentage of their annual income on a new tool and it fails to make them money, they will go hungry for many months. In addition, when they see these products for the first time they often have no idea what they are. They sometimes ask what magic is being used to move the water through a sprinkler or extract cooking oil from sunflower seeds. These are completely new and foreign technologies—as when people saw the first motor car in the 1800s. And, just as with buying a car, our customers not only need to see the

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Design Criteria for KickStart Pumps

Association with a highly profitable business model. The new tool or equipment must be associated with a highly profitable business model. To ensure this, one has to carefully examine the local economics, and determine the required capacity, scale and throughputs of the new technologies to assure that the new businesses will be viable and profitable.

Affordability. The new tool must be affordable to our cash-constrained customers. Poor farmers in Africa can rarely afford anything costing more than a few hundred dollars, and for most of them even affording as little as \$20 or \$30 is a major challenge.

Energy efficiency. Because of the lack of electricity or petrol in the rural areas our tools are human powered, and they must be extremely energy efficient to make the most of the limited power generated by a human operator.²

Ergonomic design and safety. They must also be ergonomic and safe. They must efficiently transfer human energy into mechanical energy and be used for long periods of time without injury. To be effective they have to make use of the operator's largest muscles and weight.

Ease of transport and storage. The new technologies must be portable and easy to transport and store. They must be delivered to and stored in small rural retail shops and be easily carried home by buyers and stored in their small houses. They must be transportable on a minibus, the back of a bicycle, and by hand over rough roads and trails. They must be small and lightweight or, if need be, easy to disassemble.

Ease of installation. The technologies must be easy to install and maintain with few tools and minimum spare parts. The poor do not own even the most basic hand tools, so any required tools, along with spare parts, must be made available in local shops.

Limitation on training required. Our equipment must also be easy to use with mini-

new machine in operation, but they also need to "test drive" it themselves. We need to make this test drive possible and convince them the tools will indeed help them to escape poverty.

These rural customers are very hard to reach. They live miles from the closest village and very often miles from the nearest road. They only rarely come to town, only see a radio or newspaper when a wealthier neighbor or relative facilitates it, have very limited means of transport and are often less than fully literate.

Word-of-mouth, or "viral marketing," would seem to be a great technique to reach our target market, but there are cultural barriers that prevent it from taking off. East Africans are modest people who are unlikely to boast about their successes and this tendency is magnified because in very poor communities people who succeed are more often envied than admired. In addition, it is common for the best-off member of a family to assume the financial responsibility for the whole extended family. People who find financial success often find nieces, nephews, and widowed in-laws on their doorsteps. So, advertising one's success is not as common as a marketer would hope.

We modify standard marketing and sales strategies to adapt to these circumstances. We work to build a strong brand—"MoneyMaker"—which speaks to a poor person's number one

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mal training. Training thousands of customers in remote locations is very expensive so the technologies should be as intuitive and easy to use as possible. The poor are not exposed to many new technologies and often cannot read operation manuals, so we try to make the operation of our tools implicit through their design.

Strength and durability. Our products must be strong. A poor farmer will tend to push a new technology to its limits, so we design our tools so that they won't break even if two grown men work on them at the same time. They must also be durable. They are used for many hours each day in the tropical sun, mud and water. If the tools break or wear out quickly, we've not only lost a customer but have put a family's survival at risk. We typically offer a one-year money-back guarantee and design the equipment to have a three-to four-year lifespan, although in reality many of them last much longer. Clearly, maintaining quality control during manufacturing is also of utmost importance.

Potential for local manufacture. We design our equipment to be (at least initially) locally manufactured in Africa. And although we are using the largest factories, the choices of raw material and manufacturing technologies are extremely limited. As a result our tools are all fabricated from welded and shaped mild-steel sections and plates, with only a few machined parts and a few simply molded plastic or rubber components.

Cultural acceptability. Our designs must be culturally acceptable. For example, the treadles on our pumps must be designed for bare foot operation and must be low enough to the ground so that when women use them, they do not display provocative hip movements at eye level.

Environmental sustainability. Finally, as much as possible using the technologies needs to be environmentally sustainable.

need, and we offer a product guarantee. Our most important strategy is live demonstrations, but we use radio and newspaper advertisements, billboards, competitions, promotions, and a commissioned sales force to pull in the customers to see the demonstrations. We also target wealthier relatives in the cities who travel to their rural homes a few times a year and carry news from the city.

The message is always the same—the buyers can make a lot of money and escape poverty if they go to their local shop, buy our equipment, and use it to start a new business. One very important thing is consistency—risk-averse customers will not buy products from here-today-gone-tomorrow salesmen. And since demonstrations are so critical, and labor is so plentiful, we use labor-intensive marketing methods, as they did in the early 1900s in the U.S. and Europe. Sales agents demonstrate the equipment in front of the retail shops and in the rural areas from the back of trucks and bicycles. Going forward we will need to convince even-poorer farmers to buy, and to do this we will need to lower both the actual and the perceived risks even further. This means finding new ways to promote word-of-mouth sales that get around the cultural barriers. These will include strategies such as training local pump experts to train others, rewarding people who recruit new customers, bundling advice and other farm inputs

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with the pumps on a service basis, and introducing a financing mechanism. Clearly, market development for selling new “big ticket” (from the standpoint of rural budgets) items to the rural poor in Africa is a very challenging and expensive activity.

Step 5: End Marketing Subsidies

KickStart uses donor funds to finance the initial market development for the new tools and equipment. When the sales reach a “tipping point” we will cease the marketing subsidies, and leave in place a fully profitable and sustainable supply chain that will continue to deliver the new technologies to poor entrepreneurs for many years to come.

When a new product is first introduced into any new market anywhere in the world, sales are few and the promotion costs required to make each sale are very high—so money is lost on every sale. The more radically new the product is, the more expensive it is to make these early sales. However, with successful products, the sales eventually take off, the marketing costs per sale drop drastically, and sales continue to increase without any further marketing subsidy. The introduction of our pumps to poor farmers in Africa is no different. We initially spend a lot to develop the market, but eventually we will reach a “tipping point” and KickStart will start to make a profit on each sale.

Think, for example, of telephones, color TVs, personal computers, the internet, cell phones, and on-line retail sales. Each of these required many years and many millions of dollars of investments before reaching their tipping points. To reach this tipping point requires spending both time and money on market development. It is no doubt possible to accelerate this process by investing more in marketing, but a new technology that requires a major cultural shift or expensive new investments will still take a significant period of time to catch on. In this case, time cannot be simply replaced with money.

Based on the history of the introduction of new products in Africa and elsewhere, we estimate that a tipping point will be reached when sales of a new money-making technology for the poor reach 15% to 20% of the total market potential in that particular country.³ In Kenya we have the experience of the Kenya Ceramic Jiko. This is a fuel-efficient charcoal stove that saves the users money because it uses 40% less charcoal than the common all-metal stove. It was developed and heavily promoted using donor funds in Kenya throughout much of the 1980s and 1990s and sales grew slowly. And then suddenly, when it reached 18%-20% of the market potential, sales took off. Today with no more donor funds it accounts for over 65% of all charcoal stove sales in Kenya.⁴ This tipping point behavior and “hockey stick”—shape sales curves for new technologies are common throughout history.

We predict that it will take between 6 and 15 years after the introduction of a new KickStart technology to reach the tipping point. The exact period will depend on the technology, the country, and the amount of money spent on market development.

KickStart uses donor funds as smart subsidies to finance the initial technology and market development for each new technology. However, once a tipping point is reached in a given market we will start to make a profit on every sale. We will then reinvest these profits (along with more donor funds) to develop new technologies and enter new markets so that we can further our mission of getting millions of people out of poverty.

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MEASURING IMPACTS AND COST EFFECTIVENESS

Defining and measuring impacts and cost-effectiveness should be a critical activity for any social enterprise. If you are not having any impacts, or are spending more to create them than they are worth, then you may as well go home. But unfortunately good impact-monitoring is still rare.

Much of impact monitoring is about collecting “market information.” Any company that sells a product needs to understand how their customers use the product, and how it can improve the product and the way that it is selling it. So, all good companies collect some type of market information. The additional information that social enterprises need to collect is the answer to the question “Are we meeting our social mission?” In KickStart’s case, the mission is to get poor people out of poverty, so our most important indicator is how much more money the people who buy our technologies make. We can then look both at the cost-effectiveness of our program and at other indicators such as: How much labor do they employ? What do they grow? Do they send their kids to school? Build new houses? Improve their diets and health?

KickStart has developed a systematic, replicable method to measure our impacts. Every product comes with a guarantee; every buyer (with the help of the shop keeper) fills out the guarantee form when they buy the product at the retail shop. These guarantees act as a marketing tool by reducing the perceived risk of buying the product, and they give KickStart a database of all the buyers.

From this database, we develop a randomized, statistically valid sample of recent purchasers. The sample represents 50 to 60 customers per year who comprise one cohort. To date we have monitored six different cohorts of pump farmers in Kenya and Tanzania as well as users of our oilseed press in Kenya. These customers are visited within a month of purchasing the products, before any impacts have been realized, then visited again eighteen months later and a few of them again after 3 years. The first visit creates a benchmark at zero impact, and the subsequent visits measure impact.

Data collected during these visits include the status of all farm activities from the previous year, crops grown, area under cultivation, production costs, income generated, number of employees, wages paid to employees, who performs what tasks (family, paid workers, men or women), other sources of income, number of dependents and number of children in school, physical assets owned, any problems with the technologies, and the effectiveness of our marketing methods. Based on these data we calculate the change in income and other social and economic indicators that result from using the new technologies. In addition, we prepare detailed case studies, deepening our understanding of the farmers and their new businesses.

The monitoring team employs culturally appropriate methods, and uses multiple questions and observations of the individuals, household, and business to cross-check and evaluate socio-economic conditions. For example, one person will ask how much land is being irrigated and how many cabbages were sold from that area. The other, who knows how many cabbages can be grown per acre, paces off the area. Each team consists of one man and one woman to ensure that interactions with owners and their families are comfortable and appropriate.

By collecting this data we can determine if we are having real impacts on poverty and how effective our interventions are. Again, our mission is to move people out of poverty, so measuring increases in net incomes is our primary concern.

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As a social enterprise, we also monitor our cost-effectiveness. Our donors are investing their money and their trust in KickStart and we are very serious about maximizing the return on their investment. Here we consider two numbers. The first is an absolute number—how much in donor funds we spend to take a family out of poverty. The second is a ratio, the Bang-for-the-Buck (BfB)—the sum of the new net incomes made by the entrepreneurs, and the new wages earned by their employees during the first 3½ years of using our technology, divided by the donor funds that we spend to enable them to do this. We pick 3½ years because although we know the buyers will continue to make new incomes for many more years (by reinvesting in new equipment) this is the approximate design life of our technologies. Between them, these two figures give us a useful way to gauge the cost-effectiveness of our program and a way to compare it to other programs with similar goals.

To date every donor dollar that we have spent on developing and promoting our irrigation pumps has resulted in \$17 in new profits and wages being generated by the new farming businesses in their first 3½ years of operation. This is a 17/1 “Bang for the Donor’s Buck.” At present, it costs KickStart \$250 in new donor funds to take a family out of poverty forever, or roughly \$40 to \$50 per person. This is an average cost across all of our pump marketing programs including Mali, where we have been selling pumps for only a few months. The pump marketing costs in Kenya and Tanzania are coming down every year and are presently less than \$160 per pump.

THE LIMITS OF THE MARKET: WHY KICKSTART IS A NON PROFIT

The KickStart model is based on the power of the market: we use private sector supply chains to help poor farmers acquire technologies that allow them to begin highly profitable businesses and escape poverty. Yet KickStart is itself a nonprofit. At present we spend \$250 of donor funds for each family lifted from poverty through the use of a \$95 pump, and we recover only 20% of our costs from earned income. Why? The reason is that it is not profitable for a private company to develop and mass-market new low-cost money-making technologies to poor rural farmers in Africa. Simply put, KickStart uses the market because we know that this is the most cost-effective and sustainable solution, but we are a nonprofit because we need to spend donor funds to overcome a classic market failure. To understand this we need to take a closer look at this failure.

The generic challenges of doing business in the world’s poorest countries are obvious—high political, security, and currency risks and poorly developed roads, electrical grids, ports, and legal structures. But there are many profitable businesses in Africa, and considerable potential for starting more. So clearly all these challenges can be overcome. What is so different about our market sector?

The critical difference is the very high marketing costs required to sell new “big ticket” items—such as a treadle pump—to the poorest and most risk-adverse customers in the world. They are unfamiliar with new technologies, undereducated and rightfully fearful of making a mistake. In rural Kenya, as in many other places in Africa, infrastructures for distribution, information provision, credit, and marketing are all highly undeveloped.

The trajectory of adoption for capital goods sold to the rural poor creates an additional challenge to self-sufficiency in our market. Usually when a new product is introduced in a new

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Cell phones: The Exception that Proves the Rule

There are millions of cell phones in developing countries around the world including in Somalia—a country with very few donors and no operating government. Why have private sector companies been able to market cell phones to both the wealthy and the poor without the need for subsidies? Cell phones have a number of rare properties that make them excellent technologies for the poor in developing countries.

First, *in developing countries cell phones are money-making and money-saving devices.* Phone calls save people a lot of money—often the only alternative is a long and expensive bus ride. In addition, phone calls greatly increase the level of family remittances back to rural areas - so even the very poor are willing to pay for calls. Thus every cell phone is a potential pay phone as local neighbors will pay to make calls.

Second, *unlike with manual water pumps, wealthy and middle class early adopters are willing to pay a high price for the convenience of a cell phone.* Their only alternative is to wait for many years to get connected to an unreliable and poor-quality landline. These high prices help companies recover the costs of the initial infrastructure and market development, and later enable them to lower the prices so that poorer customers can afford the phones.

Finally, *cell phones are unique because they have a built-in credit facility.* Most money is made not from selling the phones themselves—which can almost be given away—but from selling the minutes, which are sold in very small and affordable units.

Very few other money-making technologies for the poor share these characteristics; instead, like our irrigation pumps, they require initial smart subsidies to overcome the market failures.

market, the early adopters pay a much higher price than those who buy it later. This initial high price helps the company to recover the initial technology development and market development costs and then prices can be lowered to reach less-well-off customers. The first handheld calculator cost hundreds of dollars and all it did was add, subtract, multiply and divide. Likewise, early cell phones were so expensive that only the very wealthy bought them. Today prices have come down and these items are affordable to anyone.

However, when products are designed specifically to address the needs of the rural poor, the early adopters are also poor and they can not afford to pay higher prices. The wealthy don't need manually operated irrigation pumps, and if the margins are too high the poor cannot afford them. So the initial development costs cannot be recovered by high-priced early sales. In short, there is no "cream" to skim off the top of this market.

An equally significant challenge is that, although new money-making products for the poor are not easy to design, they are generally simple to copy. No one will copy them in the beginning—because the marketing costs are too high—but once the tipping point has been reached and they become profitable to sell, they will be widely copied. This is a particular challenge in a developing country. Patent laws are difficult to enforce and the poor are driven more by low prices than by quality or brand loyalty. Thus it is difficult to maintain market share and difficult to recover the market development costs through high-volume sales.

Financing of growth via market mechanisms is another challenge. In the developed world,

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the market development of brand-new products is most often financed either by debt or by equity investments. In East Africa equity capital is scarce—new business ventures typically face high risks and do not have easy exit strategies. For those who do want to invest in business development, there are more attractive business opportunities than trying to sell new big-ticket capital products to the rural poor. These include new products and services targeted to the middle class and wealthy, and consumer products (soap, cooking oil, beer, soda, etc.) marketed to the poor. And of course there are even more profitable opportunities investing in real estate, extraction industries or large-scale or contract farming.

Such is the nature of the market failure, and for all these reasons private sector companies rarely attempt to introduce new big-ticket items for poor people in Africa. Unless someone else is willing to pay for the initial market development costs, the cost-of-sales are simply too high compared to the possible returns and it is very unlikely to be a profitable venture—though one whose positive economic impacts far exceed its expenses.

KICKSTART'S NEW CHALLENGES

KickStart has received international recognition and has earned the support of large companies and major foundations.⁵ With this support, KickStart has grown. We currently have offices in Kenya (our African headquarters), Tanzania, Mali, and the U.S., and employ over 200 people. Our staff includes a small team of engineers, designers, and technicians based in Kenya; management, impact monitoring, and more than 125 marketing and sales staff in Africa; and 5 employees in the US.

Our African headquarters manages African-country sales and marketing, technology development, and all African-based administration, monitoring and impact assessment, and fundraising. The U.S. office was established as a 501(c)3 nonprofit in late 2001 to handle overall management, financial control, strategic planning, and fundraising. Our country offices in Kenya, Tanzania, and Mali are primarily responsible for sales and marketing, essentially franchising our successful products and marketing practices. They establish the retail and wholesale networks in their respective countries, and put in place cost-effective marketing activities to support and increase sales.

In the next three years we plan to expand into as many as four new African countries, including Ghana, whose government has taken note of our impact on the GDP of Kenya and Tanzania. We are also implementing a business-to-business model of sales to other NGOs to expand our impacts to the rest of the developing world.

Carrying out these plans will require two business decisions. First, we plan to focus on irrigation pumps, which already represent over 95% of our sales and impacts. We believe the worldwide market potential for these pumps is as high as 35 to 40 million pumps, which would translate into a major contribution to reducing poverty in the developing world. Second, we plan to centralize mass production and establish a global supply chain for the pumps. Rather than manufacture pumps in every country, we will produce our best-selling pumps in the lowest-cost location. We have recently ordered our first batch of Super-MoneyMaker pumps from China, and we can import them into any African country at a lower cost than we can produce them locally. Manufacturing in China will also allow us to serve new markets. Lower prices and higher quality will benefit our tens of thousands of customers, and global supply means we can

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sell to other organizations to increase our impacts and generate income.

In addition, we will develop new technologies. We are market-testing our very-low-cost “hip-pump,” which retails for \$33, and are developing a low-cost deep-well pump, low-cost well drilling, water harvesting and storage technologies, and low-cost transport technologies.

KickStart is in the process of developing a financing model for our irrigation pumps. For poor farmers the initial \$120 investment for a pump, hose pipe, and seeds is difficult to borrow or save—but since the pumps provide a very high return on investment to the buyer they are an ideal product for a financing mechanism. Our goals are to increase sales by lowering the barrier to entry, move us more quickly to the tipping point, and help KickStart recover more of the marketing costs.

To succeed we must examine lessons learned from past technology-specific financing programs and other micro-financing efforts around the world. Past efforts to give technology specific loans to the very poor have often failed because they encouraged people to borrow money for things they don’t want or need—as this is their only option for credit—and so led to many business failures. Micro-finance programs partially solve this problem, and they have worked well in urban and peri-urban areas in Africa. However, very few micro-finance programs have found cost-effective ways to reach the poorest, hardest to reach, and most risk-averse customers in the world—those in rural Africa.

KickStart will most likely develop its own model for pump financing. We plan to rapidly roll out our marketing and retail networks, and we need a financing method that can be rolled out just as quickly. It will likely be based in our retail shops and may use entrepreneurial agents on bicycles to reach the farmers. It will require very good vetting of the borrowers, and will have to get all the incentives right for the loan agents and the borrowers. Among many ideas, we will explore bundling the pumps with products and services such as fertilizer, seeds, and farming and marketing advice to increase the chances of the farmers’ success and loan repayments. It will be a major challenge to develop an effective financing program; however, we are confident that with enough determination and advice from others, we can make it work.

CONCLUSION

ENDING POVERTY IS THE GOAL, CREATING INCOME IS THE MEANS

In poor places just as in rich ones, developing and marketing new technologies is often too expensive for the private sector to do alone. In these cases governments provide major subsidies to help overcome the market failures. In fact, every major new technology from automobiles, to telephones, computers, the internet, solar panels and biotechnology have received significant government subsidies, and they continue to receive them today. For example, the sale of hybrid cars in the U.S. has been greatly boosted by the government giving every buyer a tax credit of as much as \$3,400. It is well demonstrated that smart subsidies for new technology and market development can help to fuel economic growth. However, the governments of the poorest developing countries are too cash constrained to provide such subsidies.

In the absence of the subsidies typically found in industrialized economies, KickStart—whose mission is to get people out of poverty—uses donor funds as smart subsidies to take over this role. We use them to subsidize the costs of developing the market for new money-making technologies. But once a tipping point is reached and our products are as commonly

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known and easily available as sewing machines or bicycles no further market subsidies will be required. Other companies will enter the market and compete with us on price, brand, quality, and distribution. Many more money-making products will be sold at zero additional costs to the donors, and more people will use them to escape from poverty.

However, reaching the tipping point will not happen quickly. The internet required trillions of dollars of government funding and equity investments (and losses) over a 15-year period before it created a few dozen profitable new business models. It took Amazon.com ten years and over \$3 billion dollars in investments before it made its first profitable sale—and this was to sell books to the wealthiest customers in the world. Similarly, over a 30-year period, hundreds of millions of donor dollars have been spent on the market development of micro-finance, yet today only a small percentage of micro-finance institutions have become profitable. It will be years longer before either the internet or micro-finance industries recover in profits the total money invested in creating them. But these early investments opened up completely new ways to do business and they are already creating millions of new jobs and many billions of dollars of new revenues and wealth—so the total economic impacts greatly exceed the initial investments.

Despite over a trillion dollars in development aid, poverty in Africa has gotten worse. Over the past four decades the number of people in sub-Saharan Africa living on less than a dollar a day has more than doubled and life for the average person has become much more difficult. At the same time, in many places the rural poor have been catapulted into a cash-based economy; as subsidies have vanished, they must now fund their own access to housing, food, and education. Most international development efforts focus on alleviating the adverse consequences of poverty rather than developing the means to escape poverty: technologies and business models that increase incomes for the rural poor. I have lived and worked in Africa for the past 20 years and I remain optimistic that there is a solution. But, to get there we need to move beyond the failed practices that have guided efforts to address the poverty challenge for the past four decades and take a very different approach.

We invite reader comments. Please send an email to <editors@innovationsjournal.net>.

1. See for example comments by Mark Hankins, Energy Alternatives Africa, “Southern realities and top-down marketing of the solar cooker.”

2. Humans can only generate about 80 watts of power over a sustained period of time. Our oilseed press, for example, is almost an order of magnitude more energy-efficient than the best motor-powered oil expellers.

3. E. Rogers, *Diffusion of Innovations*, (New York: Free Press, 2003). Rogers describes a “critical mass” or “tipping point” as the point where enough users have adopted an innovation so that the further rate of adoption becomes self-sustaining, and shows examples where for innovations from cell phones to hybrid seed corn this point occurs at around 15%-20% of the local market potential. This market potential has also been discussed in numerous other publications (*Wired*, etc.)

4. See studies by Mark Hankins and/or Hugh Allen, including M. Hankins, *Renewable Energy in Kenya*, (Nairobi, KenyaMotif Creative Arts Ltd., 1987), and M. Hankins, *The Kenya Ceramic Jiko: A manual for stove makers*, (Stylus Publishing, 1992),

5. ApproTEC/KickStart have received recognition from the Tech Awards, the Schwab Foundation for Social Entrepreneurs and the Fast Company and Monitor Group Social Capitalist Award; financial support from the Skoll Foundation and the Lemelson Foundation; and corporate support from John Deere and SC Johnson.