

ENDING POVERTY WITH WATER CONTROL AND MARKET ACCESS

**LINKING SMALL FARMERS
PROFITABLY TO THE VALUE CHAINS
AND MARKETS OF THE FUTURE**

**BY URS HEIERLI AND ELISABETH KATZ
WITH A FOREWORD BY PAUL POLAK**



High-value production and market access

Affordable water control technologies

Profitable supply chains for inputs



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The key to ending poverty is to raise the income of small farmers. However, they face an enormous challenge through declining prices for agricultural products and the fast rise of supermarkets all over. To prevent them from marginalisation, they need to produce what the market wants in quality, quantities and timing.

Three pillars of support are essential:

- 1) affordable water control technologies,
- 2) private supply chains for irrigation hardware and agro-inputs, and
- 3) access to new marketing channels.

This booklet is about these three pillars and the relationship between them.



High-value production and market access

Affordable water control technologies

Profitable supply chains for inputs



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FOREWORD

We have spent billions of dollars on poverty alleviation projects over the past twenty years without having very much to show for it. So far, there is slow progress in cutting the percentage of people who live on less than a dollar a day in half in Asia, and virtually no progress in Sub-Saharan Africa. Existing poverty eradication initiatives will continue to fail because they are based on false premises – that it is possible to donate people out of poverty, or that sustained national per capita growth will eliminate poverty in remote rural areas, or that the green revolution will end poverty. Centrally-planned strategies that give equal weight to addressing all poverty related factors simultaneously without setting priorities occupy center stage in the poverty eradication movement, in spite of the failure of previous similar initiatives like integrated rural development. With business as usual, the ambitious UN-led Millennium Development Goal of cutting the percentage of people in income poverty in half, is destined to fail.

Eight hundred million of the 1.1 billion people in the world who earn less than a dollar a day, live in rural areas in developing countries and earn their living from farming. What global poverty eradication efforts have failed to grasp is that these 800 million people earn their living from tiny farms where conventional modern farming and irrigation tools and strategies simply don't work. Of the 525 million farms in the world, 445 million are smaller than five acres!

Farms under five acres represent 49% of the total cultivated area in Egypt, 60% in Ethiopia, 69% in Bangladesh, 36% in India, and 15% in Pakistan. They contributed 40% of food grain production in India in 1990/91, 49% of total agricultural production in Kenya in 1985, 85% of total agricultural production in Malawi, and 97% of national milk production in Ethiopia¹. If we assume that a family of five lives on each of the world's 445 million small farms, more than a third of the world's population live and work on farms smaller than five acres. But the **average** size of the farms less than five acres is probably closer to two and a half acres, and the average size of farms where dollar-a-day rural people earn their living is even smaller. And even five acres are not much where water is scarce and soils marginal.

Since most of the people who earn less than a dollar a day in the world live on one-acre farms and earn their living from farming, surely the first step in ending poverty is help them find ways to improve their livelihood from farming. I have asked more than three thousand one-acre farmers to tell about their visions for ending their poverty,

and just about all of them say the two most important things are growing enough food to keep their family fed for the whole year, and finding ways to earn much more than they do now from farming. Just about all of them survive now as grass roots enterprises operating in a permanent liquidity crisis, making vital decisions on what to plant when, how to grow it, and where and when to sell it. All of them, just like the rest of us, operate in the global marketplace. The most pertinent question is, how can they play to their strengths in the global marketplace? There is little question about their comparative advantage – they have the lowest labour rates in the world, from half a dollar to two dollars a day, so their most direct path to new income is by growing labour-intensive, high-value marketable cash crops.

The three pillars that are described in this publication make it possible for small farmers to grow and profitably market the labour-intensive crops that are so well suited to their strengths. And they provide an approach how development initiatives can assist them.

To increase their income, most small farmers tell me the first step is affordable water control for their crops. This forms the first pillar. Most small farms depend on rainfall, but when they produce fruits and vegetables during the rainy season, everybody else produces them too, and the prices are usually so low it is difficult to earn much income doing it. During the dry season, these crops often sell at a three times higher price, but irrigation is necessary, and conventional water lifting, storage and application technologies are far too big to fit their quarter acre plots, and far too expensive to fit their miniscule pocket-books. The treadle pump and low-cost drip irrigation were the first two technologies affordable for the poor, that IDE, the organization I founded 25 years ago, developed, and their design was based on bringing the price down to less than a fifth of conventional comparable irrigation tools. With the support of the Gates Foundation and the Foreign Ministry of the Government of the Netherlands, we are now working on designing and bringing to market no less than thirteen affordable well drilling, water lifting, and water distribution technologies.

The second pillar, private sector supply chains, makes two critical assumptions: (i) poverty alleviation initiatives are more likely to be successful if they treat poor people as customers instead of as recipients of charity. This assumes that it is critical for poor people to invest their own time and money to move out of poverty; and (ii) if poverty eradication goods and services are being provided by the private sector to poor people who are willing and

able to buy them, their accessibility for poor customers is much more likely to be sustainable and scalable than if they are made available for free.

The sale of more than two million treadle pumps and the rapidly growing market demand for 10 million or more low-cost drip systems have demonstrated that private sector supply chains delivering income generating tools and services to poor people are effective, sustainable and scalable. They may take a little longer to implement than giving things away, but they provide the most efficient mechanism to deliver irrigation tools, seeds, fertilizers, other farm inputs, and micro-credit to the small farmers who need them.

Profitable marketing of high-value crops provides the third pillar. This requires a careful analysis of market opportunities in each agro-climatic zone, the selection of four or five high value crops that can be grown there by small farmers, and the removal of the barriers in access to markets. This might involve the facilitation of an effective value chain network from the farm gate to the end customer, the establishment of farm level and village level value added processing, the improvement of product quality, or the initiation of private sector transport services where transport is a constraint.

With their vivid description of these three pillars and the practical suggestions on how they can be translated into successful development interventions, Urs Heierli and Elisabeth Katz have performed an invaluable service for dollar-a-day farmers, and those individuals and organizations working at the grass roots and the policy level to enable them rise out of poverty.

Paul Polak, Founder of IDE (International Development Enterprises), November 2006

EXECUTIVE SUMMARY: ENDING POVERTY WITH WATER CONTROL AND MARKET ACCESS

Claiming that poverty can be ended with water control and market access is a bold statement and can be perceived either as naïve or as arrogant. Poverty is a deep-rooted phenomenon and cannot be overcome just by simply earning one dollar a day more, and we fully recognise the importance of having control over assets and reducing risks and vulnerability. However, nobody doubts that one dollar a day more makes an enormous difference to a poor family. To tackle income poverty does not solve all problems, agreed, but it is essential for poor people to be able to help themselves. In this sense, it is not meant as a naïve statement.

It is also not meant to be arrogant: the approach taken by organisations such as International Development Enterprises (IDE), Winrock International and others has demonstrated that it can enable people to get out of poverty. The example of the over 2 million treadle pumps sold in South Asia has shown that poor people can 'pedal out of poverty'. Similar successes are possible with low-cost drip irrigation and a range of other low-cost water control technologies. The net income of poor farming families can be increased very substantially, provided that essentially three elements are in place at the same time:

1. Smallholders have control over water through affordable irrigation, pumping and water storage technologies, not only to irrigate but to be able to schedule the harvest of their crops in accordance with market demand.
2. Affordable water control technologies and other inputs and services (know-how, seeds, soil fertility, plot protection, credit) are widely available in local markets, delivered through vibrant, economically viable, sustainable private sector supply chains.
3. Smallholders have access to the ever more demanding markets for high-value products: with the fast-progressing 'supermarketisation', taking place also in many countries of the South, smallholders may be driven out of business if they fail to access these new marketing channels.

This approach is not 'free of cost' and thinking that market forces will solve the problems on their own would be a severe misunderstanding. It requires substantial public investments to create and organise markets. However, as the private sector and the farmers invest the bulk of resources, it is not only effective but also efficient: some US\$ 200 of public investment are required to assist a poor family in such a transition.

This publication describes each of the three elements or pillars of the approach based on practical experiences and case examples from various countries, particularly in South Asia. First, it explains the principles of affordability and provides an overview of affordable water control technologies. Second, it presents the market creation approach to developing viable supply chains for such technologies. This includes a range of elements of marketing theory (such as the product cycle curve, the process of innovation adoption, the four Ps of marketing, and promotion strategies) and their application for market creation including fostering demand and encouraging supply. Third, it discusses opportunities and challenges for promoting smallholder farmers' access to higher value markets. Finally, it explains how development agencies can facilitate the implementation of the approach. It lists basic requirements for such interventions, establishes a set of dos and don'ts, and reports on recent experiences in different countries.

While many development agencies do work on smallholder access to high-value production and profitable marketing, and thus good practices are relatively widely known, there are only a few organisations involved in market creation for affordable technologies that target poor people. The understanding of how to do this is limited to rather few organisations. Thus, although the publication describes all three elements of the approach, the market creation element is at the centre of attention.

A massive scaling-up of the approach is needed in order to reduce poverty significantly, and a coordinated multi-stakeholder programme is required to implement the approach. A proposal on how this could be done through the 'Smallholder Irrigation Market Initiative' (SIMI), can be found at the end of the publication.

The publication is based on a broad range of practical experiences in all three elements of the approach, and a training course on 'Smallholder irrigation and value chains' held in India which was designed to enable the participants to apply the approach in their own organisations. In addition to this publication, two CDs on the topic are available, one for policy makers 'Ending poverty with water control and market access' and one with the learning materials from the above training and additional resources on the approach.

INTRODUCTION: HOW CAN SMALLHOLDERS PLAY IN THE HIGH-VALUE LEAGUE?

1.1. MOVING OUT OF LOW-PRODUCTIVITY AGRICULTURE

Traditional smallholder farming does no longer provide for decent livelihoods in most parts of the world. Its low productivity practices and occasional local marketing of surplus production is just not profitable enough. Prices are falling for staple crops and, increasingly, also for commodity crops such as coffee and cotton; they are only viable if grown on larger areas. For small farmers it is better to specialise in products with a high return from a small area, and thus get the maximum out of whatever land they have. Their only chance to make a decent living out of a few acres is to play in the league of high-value crops².

Horticulture crops play a major role in alleviating poverty. Despite their relatively small share in arable land use, the value that horticultural production adds to total agriculture is impressive. In many countries, the value of horticultural production equals or even surpasses the value of cereal production³. Staple crop production is important for the food security of smallholders. Growing their own food reduces the need for cash, and it is an often overlooked fact that poor people spend more than half of their income on staple food⁴. However, nowadays

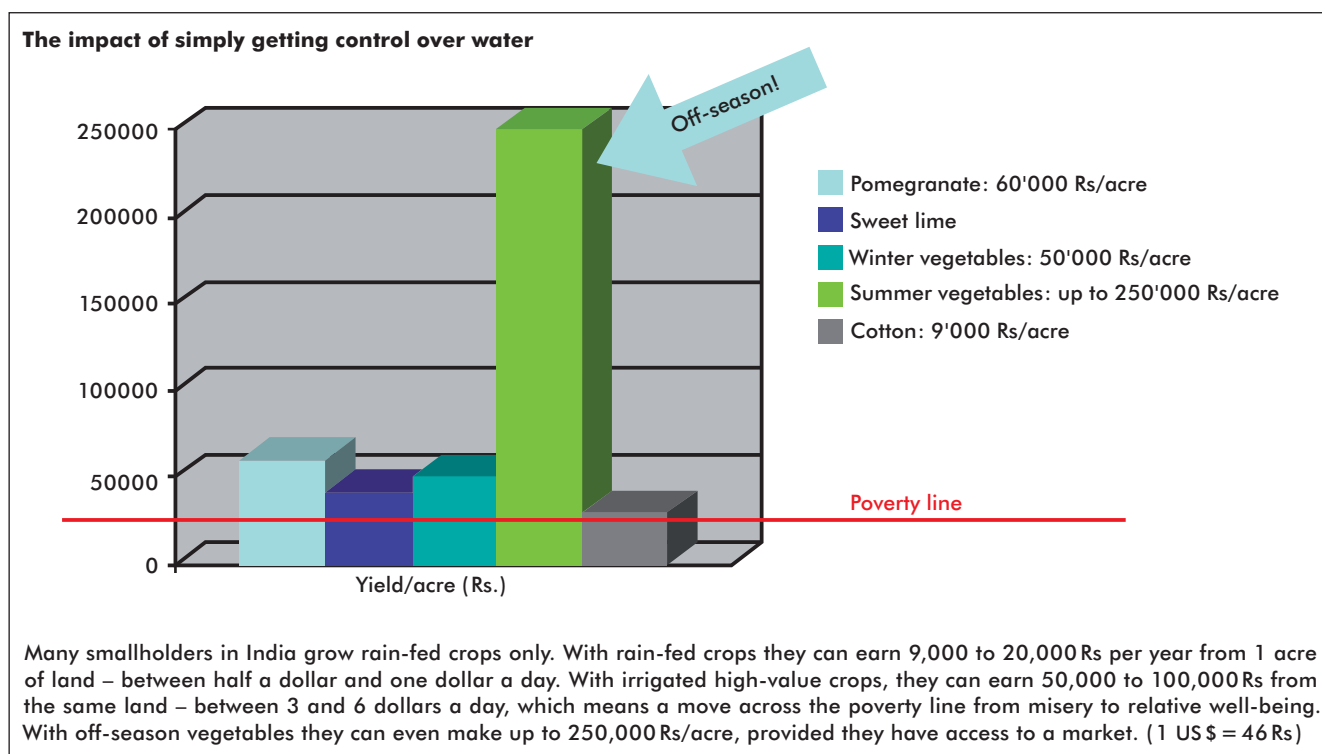
they increasingly need cash as well as food, and high-value horticulture crops are an efficient way to generate cash, even on a small plot of land. Thus the challenge for poor smallholders lies in increasing the productivity of their staple crops, and at the same time producing crops to meet their needs for cash.

Many of the poorest smallholder farmers live under difficult conditions, in arid and semi-arid areas, in mountains, or far away from markets and services. Under such conditions it is obviously very difficult for small farmers to produce high-value crops in the quality demanded and at the times when they can be sold for the best prices.

A promising approach to enable smallholders to play in the high-value league and to get out of poverty is based on three pillars:

1. water control through low-cost technologies,
2. viable supply chains for these technologies, and
3. access to profitable marketing opportunities.

The graph below shows the differences in income per acre of land that simply the availability of water for irrigation can make.



The end to poverty in Tippehalli (India)

The village of Tippehalli in the State of Maharashtra lies in a dry area. The villagers' main crop is rain-fed millet, unless they have access to water for irrigation. Until 1997/8 the village was a 'ghost town' for much of the year; most of its 350 families had to migrate for six months at a time to work in distant sugarcane fields and cities. A small number of better-off families were able to cultivate some 100 acres of pomegranate using drip irrigation subsidised by the government. There were only two bicycles in the whole village. The village was blighted by poverty; children could not go to school regularly because of being absent from the village for half of the year.

Tippehalli has changed dramatically in the last seven or eight years. Only a small number of families migrate now (often only the men). More and more families have their own well. Over 1,100 acres of land are under pomegranate cultivation, and several fruit traders and input dealers also make a living. The pomegranates are marketed to distant urban markets such as Delhi, the highest quality being sold as far away as the Middle East. The village makes an annual profit of around Rs 55m (approximately US\$ 1.2m) – on average Rs 150,000 or US\$ 3,300 per household. In the village there are now 50 motor-bikes, seven trucks, two tractors and six jeeps – and a bicycle in every household. The villagers have managed to persuade the government to tarmac the road to the village. Children go regularly to primary school and, increasingly, also to secondary school.

How has this been possible? What happened that has enabled the seasonal migrants to play in the high-value league? Since the early 1990s, some prosperous farmers had used drip irrigation to cultivate pomegranate. However, the drip irrigation equipment was expensive, and poor people had no access to subsidies. In 1999, new drip irrigation material became available, at less than half the cost of conventional systems. At the same time micro-credit became available. Since then, many households have been able to buy drip irrigation and to grow pomegranates. Over time, production practices have improved, traders have become interested in the village, market links established and marketing professionalised. Meanwhile, some young people in the village went into business as fruit traders and input stockists.

Development organisations have played an important role in this process. They brought in an affordable technical solution for the smallholders and made micro-credit available. They facilitated the organisation of the whole

input and output supply chain, by linking interested dealers with manufacturers of low-cost materials and offering them training, by linking farmers with traders, and by training local people in marketing and the business skills required to become fruit traders.



The good news about this approach is that it works: the case of Tippehalli on the next page is just one of the examples that demonstrate it. The bad news is that it works only if the three pillars are in place **at the same time**. If just one element is missing it is very difficult for small farmers to get out of poverty.

1.2. THE THREE PILLARS ONE BY ONE

Pillar I: Affordable water control technologies

Water control is a key entry point to more productive and profitable farming in many places, not just in semi-arid areas. Water scarcity is one reason for introducing better water control technologies such as drip irrigation, but it is not the only one. Even in regions with abundant water, rainfall is often unpredictable and high-value crops need a regular, reliable water supply. Rain-fed farming is at the mercy of the weather which makes market-oriented farming very difficult.

Water control, therefore, is more than just irrigation: it is the application of water precisely as the plants need it throughout the growing period. Water control is a precondition for small farmers who want to play in the league of high-value crops. With water control smallholders are able not only to produce bigger and better harvests, but also to schedule their production when demand and prices are highest.

Affordable water control technologies have the potential to allow a large number of small farm households to escape poverty. Low-cost drip irrigation, treadle, rope and similar pumps, small-scale water storage, low-cost well drilling technologies, as well as watershed management and micro-dams are technologies that can enable farmers to produce high-value cash crops for local and more distant markets. They also enable food production during the dry season, thus increasing household incomes and improving livelihood security.

Pillar II: Viable supply chains for technologies and inputs

Many development organisations and programmes working in rural areas distribute useful technologies to poor families free of cost, through credit or subsidies, and train them in its use. Such strategies, however well-intentioned, are unsustainable and do not reach enough people.

No NGO or government institution will be able to deliver subsidised or free goods forever to all poor farmers, or ensure the availability of spare parts and the 'embedded services' which are usually part of a package of technolo-

gies. Only technologies that are commonly available in local markets have a real chance of being widely and sustainably accessible to smallholders. This requires that an economically viable, profitable supply chain in the private sector is in place, covering all the steps from raw materials, manufacturing and assembly to distributors and spare part dealers who sell the equipment to the users. For low-cost technologies and products for poor people such supply chains normally do not develop by themselves, but their establishment can be fostered through a market creation approach.

A market creation approach⁵ in parallel facilitates the development of demand for a technology and the building up of a viable supply chain. To be viable, every link in the chain must be profitable and there should be an adequate number of suppliers. Market creation needs efforts over several years and substantial marketing expertise. Fostering the establishment of a profitable supply chain can be likened to walking a tightrope. In order to make a profit, a manufacturer or dealer of water control equipment needs to have a certain volume of sales, but this volume may be difficult to attain: small farmers are conservative and will only invest in a new technology if they have seen it operating successfully for some time.

Market creation not only makes useful technologies widely available for poor people; it is also a unique opportunity to create business for numerous small enterprises, thus contributing to an additional development goal.

To make effective use of new water control technologies, farmers also need access to other services such as agricultural advice and inputs. Where such services are not available, supply chain development efforts need to be complemented with interventions to make these other necessary services sustainably accessible.

Pillar III: High value production and profitable marketing

Water control alone is usually not sufficient for substantial livelihood improvement. Traditional smallholder farming is characterised by mainly staple crop production for household consumption; surplus products and small quantities of cash crops are marketed occasionally. These practices no longer provide adequate income for poor households and frequently also harm the environment. The profitable production of staple crops, and, with lower world market prices, increasingly of commodities such as coffee too, requires more land. Small farmers do better if they can specialise in crops that have a high return per area.

Of course, this does not mean that small farmers stop producing staple crops for their household food security.

Why does the private sector need market creation?

A profitable supply chain means that farmers can go to a place where they can buy the equipment they need, and obtain spare parts when they need them. In other words, it has to be profitable for a dealer to sell these items and have them in stock. In remote rural areas, it is often difficult for a dealer to make a living from selling drip irrigation equipment and to have material in stock, even spare parts. It is viable if there is a good market, and if many farmers buy regularly. It is not viable as long as there are only a few buyers.

Market creation means stimulating demand so that the volume of sales reaches a critical mass, making it viable for one – or preferably more than one – dealer to sell the goods and services that the farmers need. Because farmers, especially poor farmers, are slow to make up their minds, it may take a long time to reach that critical mass. Development agencies engaging in market creation may shorten this period considerably by investing in promotion such as demonstrations, farmers' visits to other farmers and other activities that make it easier for new adopters to decide to invest.

Along with stimulating demand, a gradual increase in supply is needed. This entails encouraging actors in the supply chain such as distributors, dealers and manufacturers. Since advice on installation and use of the technologies is best provided by actors in the supply chain, installers are often a further element of a functioning supply chain.

Investment in market creation is more sustainable than subsidies, which often have a distorting effect. The aim of market creation investments is to reduce the transaction costs of the private sector, whereas interventions that subsidise the transactions themselves may distort the markets and prevent a supply chain from emerging. This will likely be the case, if for example, NGOs play the role of intermediaries by buying equipment in the capital city and bringing it in their pickups to the rural areas, rather than choosing a small dealer and giving him the means to become a regular supplier.



Only a viable supply chain, where every link is profitable, can make water control technologies widely accessible for poor farmers



Curiosity is a good starting point for market creation. It will still take many steps and months before these farmers come and buy what they have seen in the demonstration

High-value crops are obviously more risky than low-value staple crops. Smallholders often prefer to produce their own food crops even if this is not the most viable option in terms of comparative advantages, but it is the best option in terms of food security and minimising risk. Thus, when fostering entry of smallholders into commercial production, it is important that food security and risk are taken into account and that support strategies are designed accordingly. This means encouraging production of intensive high-value crops on part of the land to generate some cash income, while at the same time supporting increased productivity of staple crops⁶.

The markets for agricultural products are changing very fast. Smallholders can only get a competitive advantage if they produce what is demanded in the market (in terms of quantity, quality, packaging and timing) in a tailor-made way. An IFPRI conference on 'The Future of Small Farms'⁷ highlighted the importance of small farms for poverty reduction but also warns of the potentially dramatic consequences of a 'business as usual' approach.

In the production of high-value crops, although smallholders face a range of obstacles and constraints, such as high transaction costs in marketing and lack of information, they have a unique advantage in their ability to 'care for' their crops. For example, silk worms are best reared by families with caring women who feed the worms every two to three hours, just as they look after children. Many horticulture crops have similar characteristics.

Therefore, to enable small farmers to earn more value from their land and labour, access to affordable water control technologies needs to be combined with opportunities for higher value production and more profitable marketing (see also page 13)⁸.

This requires the identification of promising high-value opportunities through an in-depth analysis of value chains with potential for poor smallholders, as well as the exploration of the best points of interventions to enable the exploitation of this potential. To be a valuable option for poor smallholders, the crop must be compatible with the smallholders' livelihood system. Such new opportunities may be of diverse types and include new crops, new products, new varieties; access to price and market information; selling to more distant markets; joint actions to reduce transaction cost; local processing or links to processors; off-season production; storage when prices are low and selling when prices are good; better links to markets and market actors (output markets as well as access to inputs and credit); branded and maybe certified products (organic or fair trade), and links to supermarkets.

1.3. THE ROLE OF DEVELOPMENT ORGANISATIONS IN ENABLING SMALLHOLDERS TO PLAY IN THE HIGH-VALUE CROP LEAGUE

Because of their peculiar circumstances (small and often scattered landholdings, high transaction costs, low purchasing power and low production volumes), smallholder farmers usually need external support to be able to play in the high-value league. This support has to be carefully designed without market distortions and artificial subsidies. Market-based approaches are the only sustainable way of enabling smallholders to play in the high-value league persistently on their own, without external financing and technical assistance.

This is by no means an easy task: it is neither particularly profitable to deal with smallholders as suppliers of agricultural products, nor to market low-cost agricultural equipment and inputs to smallholders. The transaction costs of marketing the outputs of smallholders are high, the supply is erratic and of mixed quality, and thus not very interesting for formal enterprises. This means that markets in which smallholders can play a substantial role do not come into existence on their own. Market forces alone neither lead to smallholders improving their production systems nor allow them to benefit from new market opportunities. Therefore, it is a worthwhile task for development organisations to foster the creation of durable and profitable supply chains for water control equipment and other inputs, as well as to increase high-value market opportunities for smallholders. In this way they can enable the changes seen in Tippehalli to happen elsewhere.

This typically requires interventions on each of the three pillars. However, development agencies can do many things the wrong way: the investment of public money can easily distort markets and thus do more harm than good. A key principle is that development organisations should mainly act as facilitators and accompany those immediately concerned and not deliver services directly. This is a challenging task and requires specific know-how and functions. For each of the three pillars there are specific dos and don'ts. While many development agencies do work in high-value production and profitable marketing, and thus good practices are relatively widely known, there are only a few organisations involved in market creation for affordable technologies aimed at poor people. The understanding of how to do this is limited to rather few actors. Therefore, this booklet presents principles and good practices for development interventions on each of the three pillars, but with a focus on low-cost water control technologies and on creating markets and viable supply chains for them.

Experiences and approaches from various places, organisations and events are included in the booklet, the main ones being:

- an international training course on smallholder irrigation and value chains held in India in 2003, in collaboration between International Development Enterprises India (IDE-India), the Confederation of Indian Industry (CII), and the Swiss Agency for Development and Cooperation (SDC),
- the work on supply chain development for treadle pumps, low-cost drip irrigation and other water control technologies in various places in India (mainly by IDE-India),
- the experiences of the Nepal Smallholder Irrigation Market Initiative (SIMI), a joint programme of IDE and Winrock International, which supports, among other activities, the building of supply chains for low-cost water control technologies and links of small farmers to markets,
- the long experience of IDE in Bangladesh of working in treadle pump supply chains,
- the IDE's twenty years of experience with market creation approaches in other countries,
- the publication 'Poverty Alleviation as a Business' which explains the market creation approach by way of different case studies (Heierli and Polak 2000), and more recent studies on 'Poverty alleviation as a business' by Urs Heierli in collaboration with various other persons,
- the work of a range of other organisations and individuals, prominent among them Practica Foundation (a Dutch NGO), the International Water Management Institute (IWMI), Centro de Estudios y Acción para el Desarrollo (CESADE) in Nicaragua, and a joint project by the ECOM group (a supplier of Nestle) and IDE on coffee in Nicaragua.



The treadle pump is affordable without any subsidy: investing around US\$25 allows cultivation of irrigated crops



With a treadle pump a family can grow this much more rice on half an acre – more food security and income



Farmer in Orissa, India, operating a treadle pump



A popular film star gets in on the act in a promotion photo

Learning from the US\$ 500 treadle pump farmers

The treadle pump is a simple low-cost water lifting technology that costs around US\$ 25 in India. It has enabled millions of smallholders in India, Bangladesh and other countries in Asia and Africa to increase their income dramatically. Up to now, over 2 million pumps have been sold worldwide.

A study in Bangladesh has shown that marginal treadle pump farmers with less than half an acre of land increased their annual income by an average of US\$ 100. However, it was also noted that around 20 per cent of the farmers managed to generate US\$ 500 additional income per year – five times above average.

Why this difference? How are the US\$ 500 farmers different from the US\$ 100 farmers? An analysis showed that the US\$ 500 farmers produce more vegetables for the market, use adequate external inputs (mainly seed and fertiliser), schedule their crops carefully, have a high cropping intensity, and their return per acre is generally higher, although, some of them simply cultivate more or better quality land.

The US\$ 500 farmers have managed to advance to the local high-value league, by producing the right product in the right way in terms of quantity, quality and timing.

THE PARAMOUNT IMPORTANCE OF EFFICIENT WATER USE AND AFFORDABLE WATER CONTROL TECHNOLOGIES

2.1. WATER OR NO WATER: A DIRECT CORRELATION WITH POVERTY

Access to water is the key to wealth or poverty. Having enough water means prosperity, scarcity of water means poverty. In India lack of water means migration for many months in a year: during the dry season when their wells are running dry, people have to migrate and look for work outside their villages. In India – and in many other semi-arid regions of the world as well – millions of hectares are increasingly prone to drought. The example on the following page, together with the one from Tippehalli, illustrates how much water and prosperity are inter-linked.

Water scarcity and food security

In much of the world national, regional and seasonal water scarcity is increasing. Groundwater levels are declining. As well as some 900 million rice-based farms – of which two-thirds are irrigated – there are 1,400 million rain-fed farms whose production is erratic and whose potential would increase dramatically if they had access to irrigation⁹. The extraordinary investments in irrigation expansion between 1960 and 1990 led to a reduction of real food grain prices by approximately 50%. The poor benefited directly from this, as they spend up to 70% of their income on food grains. It has also created many rural farm and non-farm jobs. On the other hand, in the arid and semi-arid regions, the point has now been reached where the overexploitation of water resources poses a major threat to food security and livelihoods. Many countries are entering an era of severe water shortage¹⁰.

Agricultural production requires huge quantities of water, accounting for over 70 per cent of all water consumption, much more than water for drinking and industrial purposes. The virtual water content of food – the amount of water required to produce the food – is astonishing: 1,000 litres of water are needed to produce 1 kg of wheat, and 1 kg of rice requires 2,500 litres¹¹. The production of dairy products and meat is even more water-intensive.

In India the number of irrigation wells has increased from less than 0.1 million in 1960 to nearly 20 million today, which annually draw some 200 km³ of groundwater for irrigation, and this trend continues. Projected at current growth rates, groundwater will irrigate 70-80 million hectares by 2020. The unlimited, anarchic spread of wells

and pumps in India is leading to rapid groundwater depletion and widespread water stress¹².

Managing water scarcity and water control technologies

More efficient use of scarce water resources is becoming a matter of survival. It is of paramount importance to optimise the use of water through systems that are more efficient than flood irrigation in order to harmonise the needs for water and its availability. Simply to repeat the wasteful methods of large-scale irrigation in the past is not a practical avenue¹³.

Advanced water control technologies such as drip irrigation, small pumps and water storage tanks can help small-holders to manage their scarce water. Individual water scarcity exists not only in drought-prone, but also in fairly water-abundant areas. Even farmers who have access to a well, may not have enough water to irrigate their entire land. In Maharashtra many farmers share their well with others. For example, one farmer shares his well with two brothers and has access to irrigation water only every eight days. With flood irrigation, the water is sufficient only for a small plot; with drip irrigation he can irrigate a much larger surface. Even in areas where water is not so desperately scarce, better control over water can make a huge difference in prosperity. Treadle pumps in Bangladesh allow farmers to grow a successful rice crop or some cash vegetables in the dry season. Water storage tanks function in many places as an insurance against crop losses in years where rains are less than average. Drip irrigation allows growing good quality vegetables and fruits, or off-season cash crops instead of just millet and sorghum. Well-drilling technologies make it possible to deepen wells to make the water last longer into the dry season. There are many other examples of how water control technologies offer opportunities for poor people in area where water is scarce to generate modest wealth and cross the poverty line. However, poor people can only exploit the opportunities of water control if the technologies are affordable (see section 2.2. for more on affordability of water control technologies).

Managing water scarcity through watershed management and water conservation

More efficient irrigation technologies are often not enough. The increasing water scarcity calls for integrated



Wells are dry for six months a year in this woman's village; she and fellow villagers have to migrate and work in road building



She lives in a tent camp, in the scorching heat, along with other road worker families. The children cannot go to school; many work on the construction site



In this farmer's village the wells have been replenished through watershed management. He now earns more than US\$2,000 per year growing grapes



As water is now abundant, this nursery can grow pomegranate trees with sprinkler irrigation

Labour migrants in Maharashtra (India)

In a village in Maharashtra State, not so long ago, we met a group of people – families, women, men and children – working on a road repair site and living in a small tent camp nearby. They recounted how they came from a distant village to work here, because they have no water in their wells during the summer. They live away from their village for 5 to 6 months every year, and their children can't go to school then. Men and women work very hard under the baking sun: even women work with pick and shovel. If their home village had water throughout the year, none of them would migrate.

The inhabitants of the nearby village whose wells have been replenished through watershed management measures, say that they no longer do road repair work – not even in their own area. Since water is available in the village for most of the year, they can grow enough food and earn enough to live there all year. Prosperity has returned with the water. The annual income of farmers has increased to over 100,000 Rupees per year (US\$ 2,200), and the daily wages for labour have also increased considerably. Nowadays people say: 'It is hard to find agricultural labourers from within the village.'

measures of water conservation. Watershed management measures, which make the water 'walk' instead of 'run' and thus percolate into the soil, have proven to be very effective in bringing back rural prosperity (see box below and the story on the previous page).

A range of other water and soil conservation measures which help to manage water scarcity have been developed around the world¹⁴.

What is watershed management?

An aircraft passenger who flies over the Indian Deccan plateau – say from Mumbai to Chennai – sees mostly barren and denuded land which is only productive during the monsoon. This situation can be remedied through watershed management measures as they are widely implemented in India. Watershed management aims at slowing down the runoff of water during the monsoon so that it percolates into the soil instead of eroding the soil away. Heavy rain often lasts for only a few days. Watershed management has the effect that the water is 'walking' instead of 'running'. In much of the world water conservation and management measures are a crucial prerequisite before any form of irrigation can take place, and they are thus a fundamental complementary instrument for smallholder irrigation.

It is amazing to see how a drought-prone region can recover within a period of only a few years and regain its prosperity. However, once water is available again, it is important to use it judiciously by employing water-saving technologies like drip irrigation, and not to grow water-intensive crops like sugarcane. It has happened that wells have dried out again only a few years after a successful recovery of the water resources.

2.2. AFFORDABILITY – DESIGNING TECHNOLOGIES FOR THE POOR

Technical solutions for more efficient water management have been on the market for a long time. However, most of them are too costly and are designed for large-scale operations; therefore they are out of the reach of poor people. The irrigation industry is still mostly catering to modern farms and plantations with high-tech solutions. In order to make an impact on poverty, these technologies must be made affordable and suitable for smallholders.

Most universities in developing countries prepare their students for government jobs, while in the rich countries 90 per cent of the creative designers develop products

for the richest 10 per cent. Thus the key challenge of design for the poorer half of humanity is not met¹⁵.

The following are some of the key design parameters for affordable water control and other technologies:

Small is beautiful. Most smallholder farmers operate plots of around 0.25 acres (1 acre = 0.4047 ha), even if their total landholding is more. Thus technologies for them must be feasible on such small plots.

Divisibility. Just as the 'sachet revolution' markets shampoo and other products in small quantities for poor rural customers, technologies for the poor should be divisible. Instead of covering the entire farm with drip irrigation, a cheap system for a 20 m² plot can be a good entry point.

Short pay-back period. Poor farmers find it very difficult to invest in something which is profitable only after several years. Affordability also means a short pay-back period of a year or less.

Low cost instead of sophistication. Poor people put less emphasis on high quality and longevity of a useful piece of technology than a middle-class person would expect. For them it is much more important that it is cheap.

Trade off labour for material. In poorer countries material tends to be the larger part of the cost of any product, while labour accounts for a rather small part. Thus products which use less material and more labour tend to be more affordable.

Large potential number of users. Technologies for markets with low purchasing power can have only very small profit margins. These low margins need to be compensated by high numbers of units sold: only mass marketing makes selling these technologies a viable business.

Simple to handle. The simpler a technology the better the chances that poor people generally can handle it successfully without the need for sophisticated training and accompanying set-ups.

Repair and replacement. Pro-poor technologies need to be easy to repair or replace, and spare parts and replacements need to be easily available to the customers.

Local production. Equipment that can be produced locally or be imported from other (nearby) developing countries tends to cost less due to lower labour costs, and it will also provide much needed local business and employment opportunities.

Low entry cost for manufacturing. Technologies that are manufactured with simple, low-cost machinery and require only modest investment to set up manufacturing are more likely to cost less and are more likely to be produced locally.

2.3. EXAMPLES OF AFFORDABLE WATER CONTROL TECHNOLOGIES

Bringing down the cost of drip irrigation

Drip irrigation is one of the most effective water saving technologies and has been used in developed countries for a long time. Today, large-scale commercial producers use sophisticated drip equipment in industrialised and developing countries. Compared to flood irrigation, up to 70 per cent of water can be saved, and there are several other advantages such as less weeding, better yields and better quality of products.

However, drip irrigation developed in industrialised countries as a water saving form of 'precision irrigation' is a costly technology: conventional systems easily cost up to US\$ 1,800/ha. Such sophisticated drip equipment is not useful for poor farmers in developing countries. The costs per area are too high, and it is not practical for smallholders if it cannot be broken down to small plot sizes. Only the development of less sophisticated, but much cheaper, drip equipment has given small farmers an opportunity to get out of poverty (see also pages 21-24). This has been the case in parts of India, Nepal and a range of other countries.

We tend to say that drip irrigation saves water, while farmers in Maharashtra say that with drip irrigation they can irrigate four acres instead of one, and the water in their wells lasts longer into the dry season. Thus, the savings are relative savings: farmers will use less water per area of land and will use the water they save to irrigate more land. So, the impact of drip irrigation is often not absolute water saving but 'more crop per drop'.

Low-cost water storage tanks

What matters to farmers in dry areas is not only the quantity of water but also the security of the water source. If a well falls dry earlier than usual and before the crop is ready for harvest, the entire effort and the investment may be lost. This is a very high risk for the farmer.

Water storage tanks are used in many places to retain water from unevenly distributed rainfalls and to supplement water if wells fall dry too early. However, tanks made from bricks and cement are relatively expensive for a

poor farmer. Low-cost options can make water storage affordable for a broader range of small farmers.

Plastic sheet tanks of up to a volume of 10,000 litres are being developed in India. So far, prototypes are available and are being tested. The 10,000-litre version is expected to cost around 4,000Rs (~ US\$ 80). Farmers are showing keen interest in these tanks as a means to increase their water security. One farmer expressed it this way: 'this tank is like a savings account; if I have enough water I store it, and if I need it, I can take it out' (see page 20)

For smallholders, this kind of risk mitigation is absolutely crucial and probably more important than the prices they get for their crops. If small farmers lose their crop just before harvesting, the family may be ruined and get into debt, the start of a steep downward poverty spiral. A recently introduced crop insurance system in India reduces the premiums if a farmer has a water storage system¹⁶.

Treadle, rope and other low-cost pumps

Affordable water lifting devices, especially low-cost pumps, are very important for smallholders. The treadle pump has helped many small farmers out of poverty in India, Bangladesh, Nepal and in other countries. A full range of treadle pumps is available in India, for example (see page 20/21), but in many other countries and regions there are no (or only very limited) supply chains that make them accessible to the mass of small farmers¹⁷.

The rope pump is also a very interesting low-cost lifting device, which can be used in combination with drip irrigation on small plots (see page 20)¹⁸.

Cheap diesel pumps, mainly Chinese models, are now available in many countries and are within reach of smallholders. The situation has completely changed in the last few years as small diesel pumps have become much more affordable. In Bangladesh such pumps have already started to replace treadle pumps.

Well drilling

One of the costliest investments on a farm is often to dig or to drill a well. There are interesting innovations relating to the cost of drilling wells. Traditional low-cost well-drilling methods from India and Bangladesh were further developed and the well drilling cost reduced by some 40 per cent. Several technologies are documented: the rota-sludge technology as a manual well drilling method in soft ground (see page 21) and the stone hammer method for drilling in rocky soil¹⁹.

2.4. COMBINING DRINKING WATER SUPPLY AND DRIP IRRIGATION

Combining water supply systems for drinking water with low-cost drip irrigation can be an interesting option. It allows farmers to finance the cost of their drinking water supply with sales of cash crops, and thus to finance water supply investments through loans instead of grants. Depending on the situation, the pay-back time for investments in such combined systems is estimated to be between three and five years.

Combined systems are possible if there is enough water for both uses. If water is too scarce, conflicts are likely, and it is advisable to put in place early arrangements for settling any conflicts.

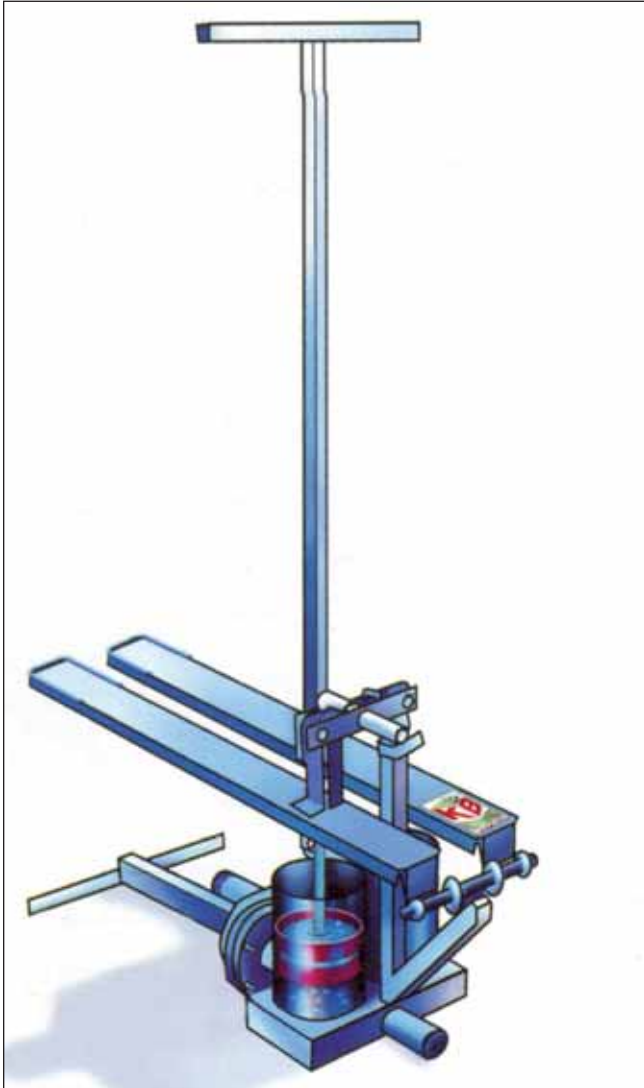
In Nicaragua a systematic field experiment combining dug wells, rope pumps and drip irrigation was undertaken²⁰. Thirty families, most of them smallholders, who already a dug well and a rope pump obtained drip irrigation equipment for around 540 m² with an interest-free loan. The farmers also received training in the use of the systems and in vegetable production (during the first six months an extension worker visited them regularly), as well as basic entrepreneurial and marketing exposure, and they had to establish a repayment plan.

The systems were highly appreciated by the farming families, and some of them have already increased their area under drip through their own means. Others have expressed plans to do so. The systems have the potential to be a real economic alternative to the rare opportunities people enjoy in rural Nicaragua. During one production cycle they earned on average nearly US\$ 180 from the 540 m². During the dry season typically two production cycles are possible. The average return to labour was estimated at US\$ 0.5/hour, which is over 25% more than with dry season off-farm activities – that is, it is substantially higher than the opportunity cost for labour. Another observation was that the net incomes from drip irrigated vegetable production increased with the number of production cycles completed. With the experience farmers gained, they improved production practices as well as their ability to understand the market and to handle marketing. Another highly appreciated benefit was that men no longer need to migrate far away for off-farm work during the dry season. The biggest challenges they faced were pest and disease management. Excessive and hazardous use of pesticides was common.

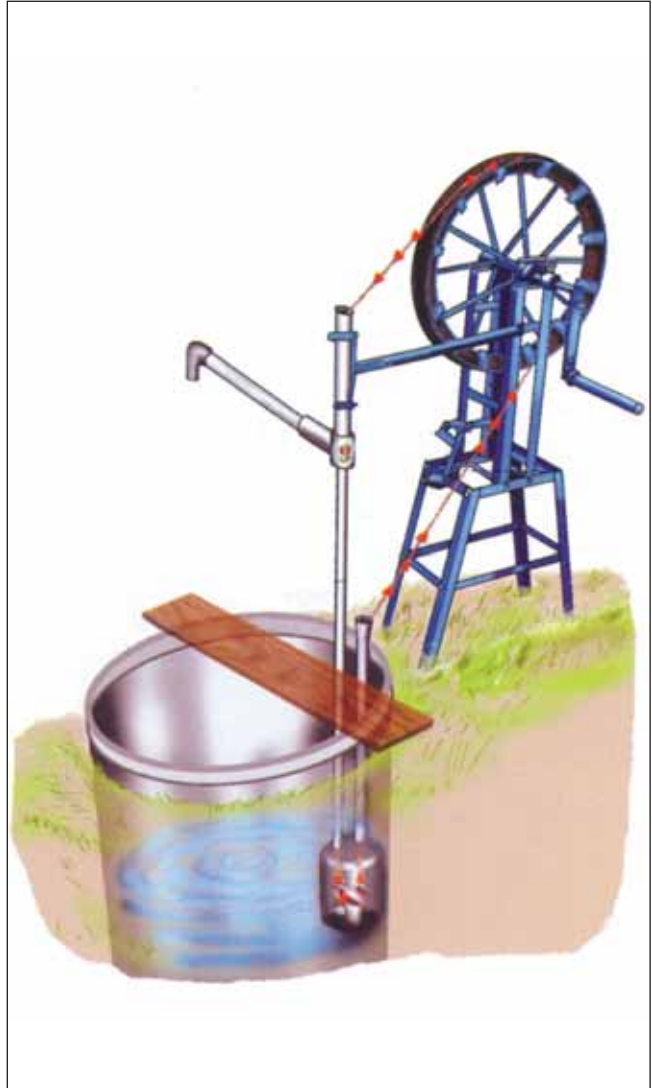
The families confirmed that without the loans they could not have engaged in drip irrigation. This indicates that access to micro-finance is often an important factor in the dissemination of low-cost technologies. In addition,

initial capacity building in all aspects that are new for farmers is essential to facilitate successful adoption of the technologies (see also page 26).

Low-cost water management technologies



Pressure treadle pump which can lift water up to 17 metres (6m depth and with pressure another 11m above the ground)



Rope- and washer-pump which can lift water from depths of 20m with dug wells and 40m with bore-holes



Low-cost water storage bag and tank made of plastic sheeting developed in India, costing around US\$ 80 for 10,000 litres





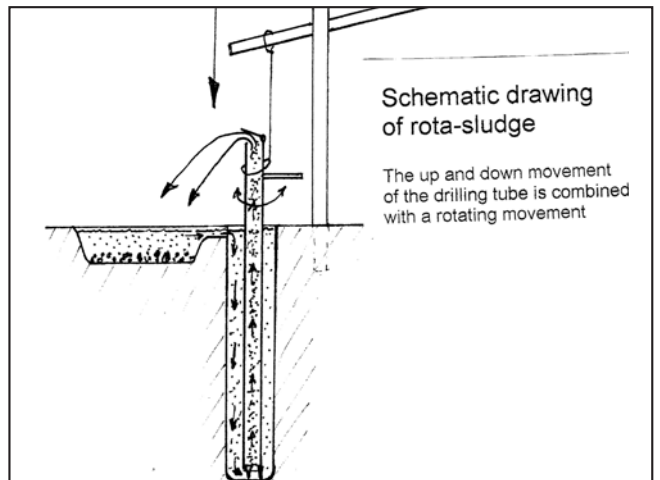
Classical bamboo treadle pump, which can lift water up to 6 m



5-inch metal sheet treadle pump



Modified Thai jar tank of 3,000 litres developed in Nepal



Rota-sludge – a low cost well-drilling method for soft ground

Bringing down the cost of drip irrigation equipment: from sophisticated to affordable

Drip equipment was introduced in India many years ago and promoted with heavy subsidies. The BIS systems cost around Rs 16,000 per acre (~US\$ 360), have a lifespan of 15 years and satisfy the norms of the Bureau of Indian Standard (BIS). Only systems with expensive so-called BIS drippers qualify for subsidies. This adds to the cost and makes them impractical, because the drippers clog easily and unclogging is tedious. In recent years, the government has offered 25 per cent subsidies, reducing the cost for farmers to Rs 12,000 per acre (US\$ 270). Earlier, subsidies amounted to 50 per cent and more, but the dissemination of the systems was slow and limited. Only prosperous, literate farmers with good connections managed to satisfy the formalities for the subsidies.

Later, non-BIS systems came on the market. They are made of similar materials, but are of less sophisticated quality, have a lifespan of 5-7 years and cost around Rs 8,000-10,000/acre (~US\$ 180-225). Since the government does not subsidise them, their price for farmers is not much lower than that of the subsidised BIS systems, and they are still not affordable for most smallholders.

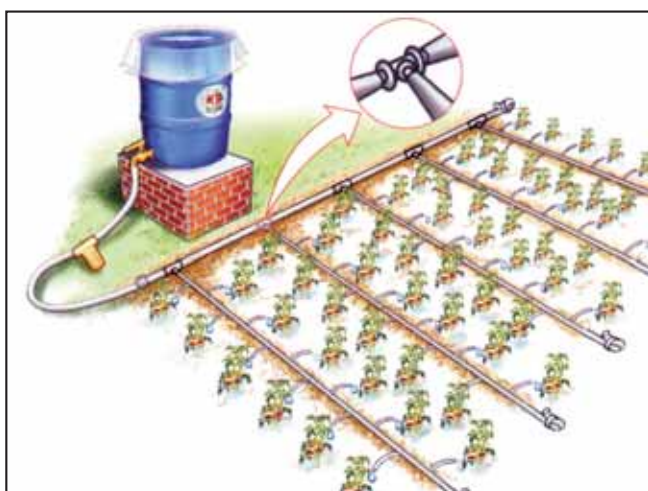
Then came the first version of the KB system (Krishak Bandhu/Farmer's Friend) developed by International Development Enterprises (IDE). It too is non-BIS, but with quality control. With a price of Rs 7,000/acre, and with extensive marketing efforts in IDE's working areas, the number of smaller farmers adopting drip irrigation has increased substantially.



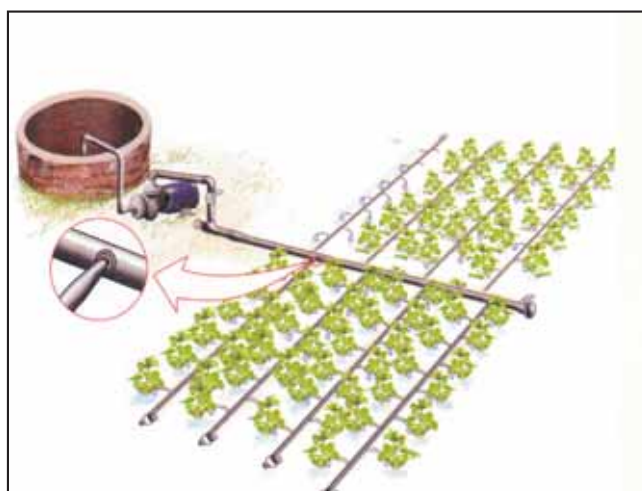
Such a BIS standard dripper costs Rs2.5. Farmers dislike it – it is very expensive and often clogs



These micro-tube emitters cost ten times less and do not clog easily. But government subsidies are only available for systems with BIS standard drippers



Customised KB systems are cheaper than BIS systems: the latter may last for 15 years, but are only viable with subsidies, and small farmers usually do not qualify for these



The KB system is available for plots of 200m² to 500m². It does not need high pressure: a barrel at one metre above the ground provides enough pressure to irrigate such a plot

The story of 'KB Drip' – invented by farmers, engineered by scientists

The real breakthrough in affordability came with an adaptation of the first KB drip system – a technology invented by farmers and engineered to a practical and affordable system by scientists. The cost per acre came down from Rs 16,000 (US\$ 360) for the BSI system and around Rs 7,000 (for the first version of KB Drip) to Rs 5,000 (~US\$ 112). This innovation was invented by farmers in the Maikaal organic cotton area in India. The farmers need irrigation only for a couple of months before the monsoon starts. This allows them to plant early and have better yields. Looking for a cheap solution, some of them started to use a plastic tube tape, normally used as packing for a popular local liquid sweet called 'Pepcee'. They simply punched holes in it and 'Pepcee Drip' was invented. It is very cheap, costs only Rs 2,000 per acre, but does not last for more than a couple of months – which is all that

these farmers need. This was a clear signal that costly, long-lasting systems are not responding to most farmers' needs. They prefer cheaper solutions despite the shorter lifespan, and do not like to invest in a long-term, high-quality solution. Prompted by the innovation of Pepcee Drip, Indian engineers developed a new version of KB Drip (originally named Easy Drip). Almost as cheap as Pepcee drip – Rs 5,000/acre – the system has a much better performance. It consists of UV-resistant standardised plastic tube tape with a wall thickness of 125 or 250 microns and spaghetti-like micro-tubes instead of expensive drippers as emitters. Its lifespan is at least three years, and the stronger variant is estimated to last up to five or six years. This KB Drip is not only cheaper, but also technically better (less clogging and easy cleaning by blowing through the micro-tubes when clogged), and it has a reasonable lifespan as well. This type of KB Drip is now spreading rapidly among poor and less poor farmers alike. Its costs are so low that most farmers can afford it.



The same machine used by local manufacturers to produce tube for 'Pepcee' packaging can be used for 'KB Drip', sold in rolls by the kilogram



The development of 'KB Drip' was inspired by the packaging of these local 'Pepcee' liquid sweets, very popular among children

The cheapest drip irrigation kits: the entry points to ending poverty

These kits are an application of KB Drip and consist of drip tape, micro-tube emitters, a water bag as tank and the necessary joints and tap. They come in two sizes – one for 20m² and one for 50m². In India the small kits cost only two to five dollars. When all the margins for a supply chain are included, the larger kit will cost approximately US\$ 5 in India and some US\$ 9 if exported.

The water bag is made of two layers: an inner waterproof lining, and an outer layer which gives the bag its strength. With such a kit, a family can irrigate a small kitchen garden comfortably, by filling the tank twice a day.

These small kits are not meant to make a poor family rich, but to add some food to their diet and to allow them

to earn some additional income (up to US\$ 40 per season is possible, depending on the crops grown).

However, these kits can serve as an 'entry product'. They enable newcomers to try out drip irrigation on a very small scale. For some people, especially the poorest segments of the population, this may even be their first experience with irrigated agriculture, since they may not have had such an opportunity before, not even in a kitchen garden.



R&D to make technologies more affordable is a must



R&D efforts focusing on efficiency and affordability are crucial for developing low-cost and low-pressure sprinklers



IDE-India and Professor Jack Keller have developed sprinklers operating at only 1.0 atmosphere (10m head) pressure



The new sprinkler heads manufactured in this foundry in India are made of brass; they can be produced locally



New low-cost water tanks are developed and tested. They can produce enough pressure to operate drip irrigation systems



Practica Foundation of the Netherlands has worked extensively on low-cost well drilling methods in Africa and Latin America



Well drilling is an important cost factor in irrigation; the cheap 'rota sludge method' of drilling developed in Latin America is now being spread in Africa

Water supply and income generation in Nicaragua

The SDC-supported Aguasan programme in Central America conducted a thorough test with hybrid systems. Tube wells equipped with the traditional and popular rope pumps are used with a dual purpose: to provide drinking water, and at the same time to irrigate a small plot with drip irrigation.

The full benefits became approval only in the third year; the yields then were higher than in the first two years, because farmers had gained confidence and experience with irrigated agriculture. The systems cost some US\$ 150 for 540m² and generated additional incomes of US\$ 177 in a three-month cropping cycle.

Scaling-up this innovation will require solid technical support to the farmers, establishing an efficient supply chain and granting farmers access to markets by linking them to commercial marketing channels.

However, the fact that farmers can generate an income from a well is extremely beneficial for implementing a drinking water programme.



DEVELOPING PROFITABLE SUPPLY CHAINS THROUGH MARKET CREATION

3

3.1. WHAT IS A MARKET CREATION APPROACH?

For an affordable technology to be accessible to the broad masses, including the poor, it needs to be sold with profit by someone in the local market. It is as simple as that. How many technologies with high utility for poor people have failed to reach the broad masses? Many of them were subsidised or handed out free of cost, but they failed to spread because with subsidies and handouts only a limited number of people can be reached, and no market development efforts were undertaken.

Why do markets for such products not develop on their own? The answer is pretty much the same as in the case of the pharmaceutical industry: why do pharmaceutical companies not develop drugs against malaria? As malaria is mainly a disease of the poor, there is a huge need but a very limited and low-profit market. It is not attractive to invest into such markets, and developing such markets involves overcoming a 'chicken and egg' problem.

Initially, in markets for pro-poor technologies there is no supply and no demand, simply because the technology is not known. But even if people would know, the market would not grow fast (see also page 10). Low-cost products aimed at poor customers must be sold cheap and margins kept low, despite high initial transaction costs. As these low margins generate only low profits, it may take considerable time to recover investments, and there is no 'fast buck' to make. Being a rather cumbersome business, supply and demand for such products may never develop on their own and potential actors in the supply chain may not be interested in investing. Companies, dealers and shops prefer to deal with the 'fat cats', where larger quantities can be sold in one transaction and higher margins are possible.

This is true in the short run. In the long term, however, smallholder markets can be very interesting, because – due to the high numbers of potential customers – these markets are indeed huge. There is a 'fortune at the bottom of the pyramid'²¹, but to exploit these markets new business models need to be developed. 'Business as usual' will not do. A market creation approach is one such new business model.

A market creation approach means facilitating the development of a market for a promising product. This is achieved by judiciously using public funds to gradually build up supply and demand in parallel, with the aim of

developing a self-sustaining supply chain in the private sector in which every link is profitable. The essence of a market creation approach is to pave the way for the private sector to act profitably for the benefit of the poor. Market creation approaches generally aim at bringing down the transaction costs instead of subsidising the transactions.

Learning from the micro-finance revolution

For many years, donors and governments have tried to correct market deficiencies through subsidising transactions – for instance by subsidising interest rates and farm inputs – based on the perception that the poor cannot afford these services. Most of these interventions were not very successful in reaching poor people, as the disappointing performance of directed lending in the finance sector and of subsidised fertilisers have shown.

Finding ways to reduce the transaction cost proves to be a much more successful approach – as it was done in the micro-finance sector through group lending instead of subsidising the interest rate. The latter made the transactions artificially cheap and discouraged banks from delivering micro-finance services. The new approach reduced the transaction costs, as well as the risks, of delivering financial services in small amounts and proved that 'business with the poor' is feasible with a revamped business model.

3.2. THE SECRETS BEHIND SUPPLY CHAIN DEVELOPMENT AND MARKET CREATION

The secret behind a successful and powerful supply chain is a very simple one: it must be profitable for all the links in the chain. If the prices are to be low – in order to be affordable for smallholders – profits are mainly a function of volumes. The higher the sales volumes are, the more profitable it becomes for everybody to do business along such a chain.

Even where a supply chain for large farmers exists, it is often not in the interests of the chain actors to undertake efforts to include smallholders. In Latin America for example, a market for drip irrigation has existed for many years, but the key customers are flower and banana plan-

tations with either very sophisticated needs or large areas. A flower plantation has very special needs: in order to deliver some 20,000 flowers every day, it relies on a 'fertigation' system (supply of liquid fertiliser through the drip tubes) working day and night. Thus, a company installing drip irrigation systems in flower plantations must provide a technical backup service for 24 hours a day. Banana plantations cover huge areas and have sophisticated pumping and filtration systems. Usually, to install drip irrigation in Latin America costs at least US\$ 2,000/ha. There are no supply chains catering to small farmers at all. However, it is possible to build them up.

Market structures that cater to the high-cost professional segment on the one hand, and to the low-cost customer segment on the other, are not new: It is very common that markets are segmented between a professional customer segment (selling at high cost in small volumes) and an 'amateur' customer segment with low cost transactions and high volumes. For instance, film cameras for professional filmmakers and TV stations cost from US\$ 20,000 to US\$ 250,000, while for amateurs, camcorders are available from US\$ 500 to US\$ 8,000. In many countries, drip irrigation has only touched the 'professional' market segment so far, and the smallholder market has not yet even been touched.

It is profitable for private sector commercial actors to deliver to smallholders only if the volume of business is sizeable enough to justify the cost of developing the market. As poor farmers are often difficult customers who think for a long time before they spend any money, the scaling up of business volumes in smallholder markets usually takes a long time.

Substantial investments have to be made which can only be recovered after substantial time. This is due to an initial research and development phase during which the product is developed, tested and adapted. There is then a subsequent market introduction phase during which the product is demonstrated and the interest of supply chain actors as well as users is gained. However, there is even some risk that the efforts fail and these initial investments cannot be recovered (see diagram and explanations in section 3.3).

The market creation approach supports interventions that help commercial actors to reduce the cost (and the time) until profits can be made in the case of products with benefits that are in the public interest (that are beneficial for the poor). The task of market creation is twofold: **a)** to provide support in the design and testing of appropriate products, and **b)** to demonstrate them in such a way that high volumes of sales can be achieved within a reasonable time.

Market creation and supply chain development have a lot to do with marketing. Marketing theory can thus provide conceptual direction to such efforts. In the following sections selected concepts from marketing theory are presented and applied to the case of supply chain development for drip irrigation and other low-cost technologies to explain their implications for market creation strategies:

- Market creation and the product cycle curve
- The four Ps of marketing – product, place, price, promotion
- Innovation adoption curve showing how people are different as customers
- The time dimension: the AIDA model – awareness, interest, desire, action

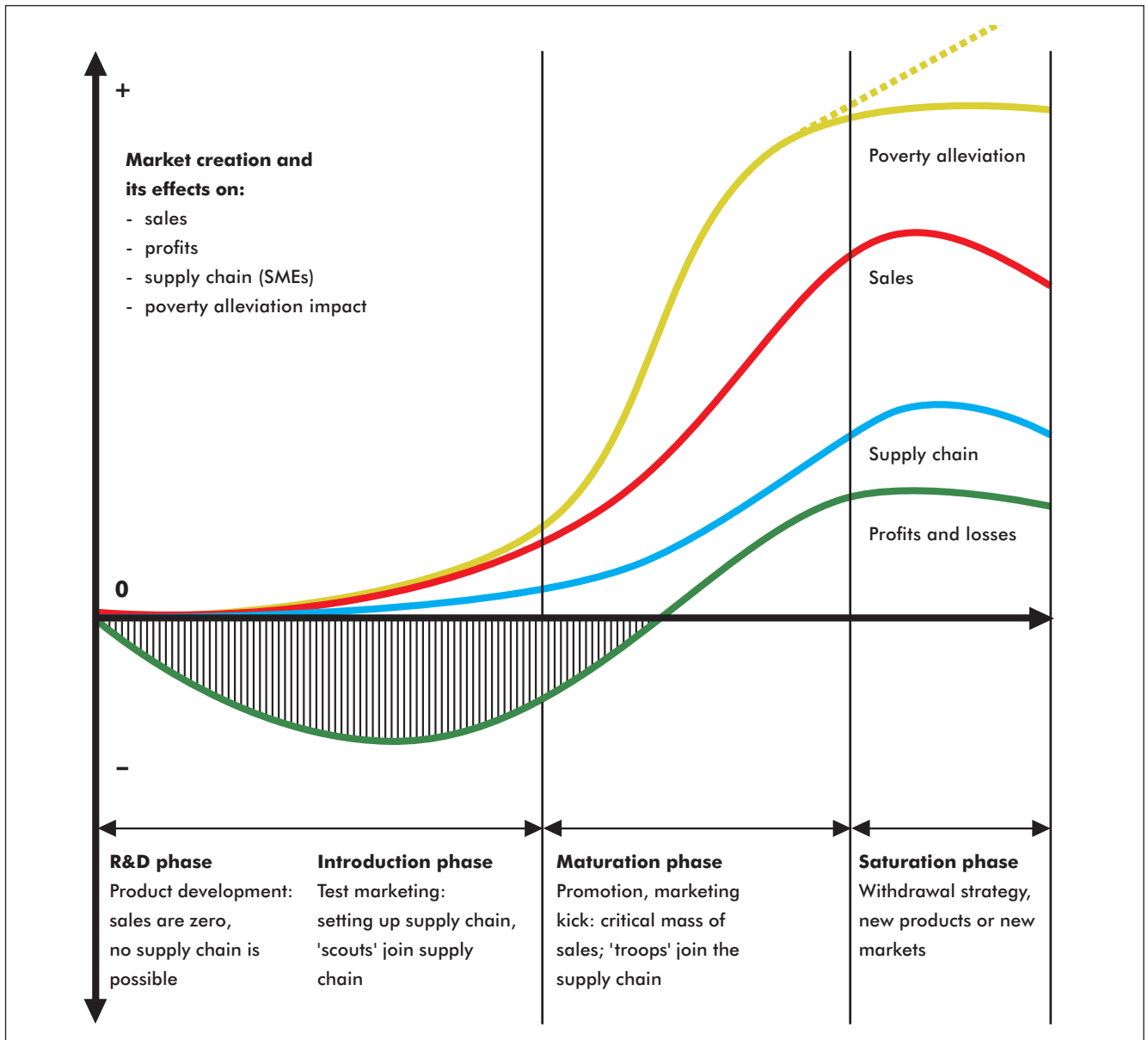
3.3. MARKET CREATION AND THE PRODUCT CYCLE CURVE

The graph on the next page shows an adapted product cycle curve taken from basic marketing theory. The product cycle curve describes different phases in the market introduction of a new product. Since with a market creation approach we introduce a new product, the market creation process follows the same phases.

The basic elements of the product cycle curve are the sales and the profit and loss curve over time. Additionally, the graph shows the development of the supply chain and the poverty alleviation effects. The product cycle consists of four phases:

1. In the R&D phase a new product is developed, adapted to the local situation and thoroughly tested. A few units are produced. There are expenditures but no sales, and thus no profits, only losses. These expenditures are an investment in future sales. The private sector invests in R&D under the assumption that these expenditures can be recovered later. If they are not confident that profits will be high enough to recover the R&D cost – as is often the case with products useful for poorer people – they will not invest.

2. In the introduction phase the first customers and the first sellers in the supply chain come in. Those who are willing to buy and those who are willing to sell are typically 'innovators' who like to be pioneers. The early sellers are called the 'scouts' who explore the potential. The innovators on both sides are risk-takers, enterprising people, rather better-off, unlike the poorest who are (and have to be) much more cautious and conservative. This phase requires extensive demonstration and testing efforts, and also first promotion activities to create interest



on the demanders' side, as well as to motivate supply chain actors to enter the business. Sales volumes are low, and there are still no profits. An important aim is to achieve a critical mass which leads to a take-off into the maturation phase.

3. In the maturation phase mainstream customers are targeted, sales pick up rapidly and more and more profit is made. More actors in the supply chain see the potential of the product and join in (in marketing theory terms they are called the 'troops'). Promotion makes the product widely popular. The higher the sales, the more sellers want to join in. Particularly in the reality of developing countries and for easy-to-make products, 'copy-cats' will appear overnight and offer the same or a very similar product – usually of a much lower quality and very cheap. These copy-cats are one of the reasons why it is

often difficult to recover the R&D cost, as they can compete with much lower margins.

4. In the saturation phase a large part of the potential customers are served. The sales and the profit curves flatten or decline. Now the supply chain actors either have to come up with new products or move to new areas.

The **poverty reduction curve** shows the social impact along the product cycle. What is remarkable and attractive from a development point of view is the fact that the social impact of a market creation approach is more sustainable than the sales. It will continue even once the market is saturated and sales slow down, as the pumps or water control devices are continuing to operate and generate benefits for their owners.

This is the 'good news'. The 'less good news' is that the first buyers will almost never be the poorest people. A good market creation strategy needs to target first better-off, more innovative and risk-taking customers, before the poor can also benefit. Poor customers usually must have seen a product operating successfully with their neighbours before they dare to adopt it. The risk-avoiding strategy of poor people imperatively forces them not to be among the first buyers.

3.4. MARKET CREATION AND INNOVATION ADOPTION

Analysing how markets are segmented helps to understand the development of sales over time and to design marketing strategies accordingly. Not all customers are alike, and reaching different types of customers needs different strategies.

On early adopters, late adopters and laggards

It is well known that customers have different attitudes. Some are more innovative and curious, while others are more conservative in their purchasing behaviour. As the diagram below shows, there are **innovators** – people who want to be the first ones to have new things. **Early adopters** are easily convinced and quick in adopting a new technology. The **early majority** is a group of customers who are fairly open for innovations, but need more time to take the decision to adopt, while the **late majority** will come much later. Finally, there are **laggards** who may resist for a very long time to adopt any new thing.

In practice, however, things are even more complicated: There is a distinction between **continuous innovations** (for example, the colour TV, which is exactly the same device as the black-and-white TV, except that the picture

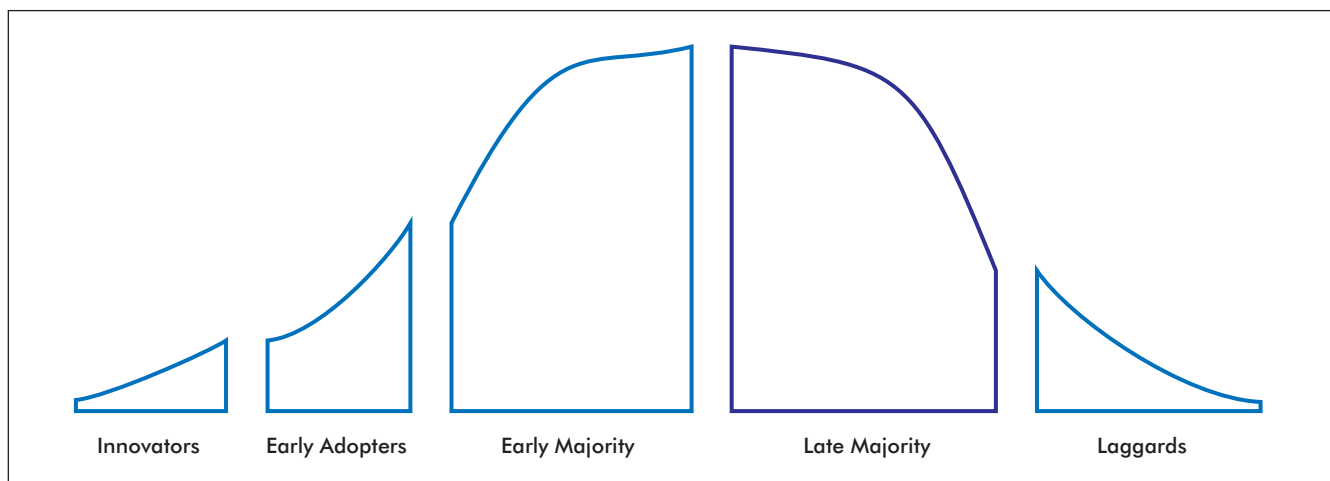
is coloured) and **discontinuous innovations** (such as a video recorder which operates in a new way, different from a TV). Continuous innovations are more easily adopted. The adoption of discontinuous innovations is characterised by chasms between the different customer segments. These **chasms** can only be overcome by using specific marketing strategies for each group²².

The decision to adopt an innovation is not an individual decision but is influenced by social peer groups. Each customer segment has a different peer group or reference persons who influence them in whether or not they are going to adopt an innovation. For instance, while early adopters may be influenced by innovators, the early majority is not imitating those at all. Having convinced innovators does not mean that majority group customers can be convinced in the same way. Typically, customers of the early majority will only be influenced by **their peers** – that is, by other customers in the early majority group. To understand these distinctions is very important if one wants to achieve a take-off and reach a critical mass.

Following is a closer look at the behaviour patterns of different farmer customer segments (see page 34 for concrete examples):

Innovators are pioneer farmers who actively seek out innovations. If they travel around, visit a research station, or read a magazine, they will want to try out things for themselves. Their curiosity level is very high, as is their willingness and capacity to take risks.

Early adopters are lead farmers who are interested in innovations once they have seen it working with an innovator. They often belong to the village elite. They would rarely visit a research station themselves but they may hear (from an extension officer or a seed dealer) that somebody has introduced an innovation successfully.



Their curiosity level is also very high and they are – moderate – risk takers too. Typically they would say: 'If s/he can do it, then I can do it as well.'

Early majority may be, for example, vegetable farmers who already irrigate, but with the bucket and watering can or with flood irrigation, and who would like to try out drip irrigation, provided it does not involve too much risk. The farmer in India who was convinced by his son that KB Drip is useful for him (see page 34), belongs to the early majority. He would not actively seek out new things, but if somebody whom he trusts (such as his son) recommends something, he adopts it. Typically, he would ask: 'Show me a farmer whom I know and who has done it successfully.'

Late majority may be farmers who so far have not grown vegetables for the market and have not used irrigation; they would be more sceptical, but that does not mean they are conservative people as such. They tend to be poorer and have less capacity to absorb risks. For instance, one farmer in India said that he was not sure if he had enough water until the time of harvesting, and he would risk losing his entire crop and the investment already made. Typically, such farmers would ask: 'Can I be sure that somebody like me can use it without risk?'

Laggards are farmers who are – for whatever reason – averse to any risks and changes. For supply chain development, one can ignore them because the effort to make them change is too big compared to the profit to be made if they adopt too. From a poverty reduction point of view, the efforts to reach laggards may be worthwhile.

In order to cross the chasms, specific strategies are needed and one has to get to know two things first:

Who is who: It is absolutely crucial to know who are potential innovators and early adopters, and who typically belongs to the early majority and the late majority. This can only be found out through solid market research and a deep knowledge of the farmers' realities.

Who influences whom: It is also essential to know which group can be influenced by whom. Depending on this, the marketing strategy should be designed in a way to get the optimum outreach. For instance, for early adopters, visits and demonstrations to successful large-scale farmers are useful, even if they are rich people. For late majority farmers such visits would have no impact at all, as they would say: 'Of course, for them, this works very well, but not for me; I am a poor farmer and I cannot bear this risk.'

Tackling the late majority and reaching the poor

From the viewpoint of poverty reduction and of reaching the poor, it is important to have a good strategy to deal with the 'late majority' and even the 'laggards'. A purely commercial operation would usually be satisfied with reaching the easily reachable early majority because the benefits from reaching the late majority are not worth the efforts required. However, since many of the poorest farmers are late adopters, for poverty reduction it is important to target this market segment specifically with suitable strategies.

Tackling the late majority is the true development dimension of a market creation approach and requires perseverance. In India, for example, donors have stopped support to the treadle pump market creation programme at an early stage, believing that the market would develop on its own. However, the penetration of the market with treadle pumps in India is less than two to three per cent of the potential users and has hardly reached the early majority of customers. In contrast, market penetration in Bangladesh has reached 40% to 50% in certain regions.

Farmers of the 'late majority' are not at all conservative, stupid or lazy. What is needed is a thorough understanding of the specific constraints they face. Sometimes, one may also simply need to respect their wisdom and reluctance; their situation may be such that they cannot bear even a small risk. Among the constraints may be:

Some farmers do not have a well, others share their well, and some have a well which does not deliver enough water, especially towards the end of the season. Others cannot afford enough electricity to operate their pumps. Sometimes, the main constraint is that the farmers are not sure to have enough water throughout the season. Farmers in Maharashtra found drought risk management crucial, and they would be willing to invest in emergency water storage tanks or in drought insurance.

Access to additional services such as quality seeds and agrochemicals may not be ensured, but also know-how and access to advice are constraints that need to be addressed if investments in drip irrigation are to be feasible.

To reach the late majority it is necessary to understand who may influence them. Usually, late majority farmers need to see the technology working with other people who are like them. Sometimes it is a good strategy to try to influence their sons and daughters or other close relatives.

Pioneers, early and late adopters



The vegetable grower adopted KB Drip on the recommendation of his son, who carefully studied the systems in fields of progressive farmers (early adopters)



The farmer's wife is happy – now she needs only two days a month for weeding instead of eleven



This grape producer is a pioneer farmer, he has more than average land and access to credit. His banker told him to see other grape farmers who were doing well. He can take some risks



This farmer is a late adopter because he is not certain of having enough water in his well until the end of the crop cycle. He cannot bear the risk of losing his crop. For this reason, he must wait and see. He will adopt once he is sure to have enough water

Many people would like to try things out before going for a major investment. The bucket kit provides an easy and low-investment opportunity for this and is thus an excellent entry into drip irrigation.

Sometimes, constraints can be resolved through an adaptation in the technology. Therefore, supply chain development needs to be combined with an innovative technology development component.

Unless the 'laggards' real constraints are understood and addressed with suitable solutions, they will be left out.

It is for these reasons that a market creation approach cannot leave it solely to the private sector to find the right answers.

3.5. THE FOUR PS OF MARKETING AND HOW TO ACHIEVE HIGH VOLUMES OF SALES

High volumes of sales can only be achieved with a good marketing strategy that taps into an existing demand or uses state of the art knowledge to stimulate a new demand based on potential. The well-known four Ps of marketing provide helpful guidance for this (see also page 37).

Product:	What is the product or service to be sold?
Price:	How much does the product cost?
Place:	Where do I sell the product?
Promotion:	How do I make the product known?

Product: more than just 'hardware'

A product is more than just a piece of hardware and satisfies more often emotional than rational needs. If cars were only a means of transport, there would be only a few models and certainly no market for brands like Ferrari. India, after independence, decided to build only one brand of car, the sturdy 'Ambassador' as a means for transport. But everybody knows that a car has many more features that satisfy the customers' desires. People buy cars for emotional reasons, and without the attribute of prestige, probably fewer than half of the expensive cars would be sold.

This is, however, not only true for luxury products. A good product is not only a rational and useful tool to do something; it stands for a lifestyle, it transports feelings and values. A perfume is not just a chemical essence – and even a one rupee lady's arm bangle in India is not just a ring made of glass; it is a product that gives pride, dig-

nity and a feeling of well-being to a woman, no matter whether she is rich or poor. That's why jewellery is so important, for the poor even more than for the rich.

Classical development co-operation has been dominated for a long time by a 'supply side' approach. Times may have changed now, but in the early days of development co-operation it was suspect to promote a product which looked good. Products for the poor should look poor, and should be simple.

Today, we should acknowledge that people, and especially poor people, have aspirations and feelings which should be taken seriously. When the director of a samba school in Rio de Janeiro was asked why poor people spend so much money on carnival costumes, he replied 'You know, you rich people may adore poverty, but we poor people, we love luxury!'

On the other hand, and as mentioned already before, the products must be affordable and provide high returns on investment to have a significant impact on poverty alleviation. Quality does not need to mean luxury; quality means a good cost-benefit ratio, good value for money. One of the big and classical mistakes is the positioning of products with a high 'development value' (latrines, solar lanterns, cooking stoves) specifically 'for the poor'. Very often then wealthier people do not want these products because they think they are not meant for them. And if the rich do not want them, the poor do not want them either, because their aspiration is to have the same things as the rich people.

Drip irrigation is typically a product of the rich. To make it affordable will also make it attractive for the poor. In this sense, we have an ideal product which can be marketed well as a prestigious product which is now also affordable for the poor.

Price: the art of pricing – what price for which quality?

Pricing is a sophisticated art which needs good intuition, and at the same time an important management tool.

- The price can be too high → no sales
- The price can be too low → no profit

The demand of products used by the poor is extremely price elastic: a small price increase can reduce sales considerably. This sensitivity to prices implies also that quality (connected to higher prices) is not a primary criterion for purchase decisions of the poor. Poor people often prefer lower quality at lower prices instead of long-lasting, high-quality products.

This is by no means an argument for giving a low priority to quality. On the contrary, the poor deserve the best value for money. Customers should have a choice between a drip system which is expensive and lasts for 15 years, and a system which is cheap and lasts for 2 to 3 years. The willingness to pay should be the guiding principle for quality, not bureaucratic standards which have been designed by research laboratories. It is the customer who sets the quality standards.

Many products are over-designed because they are designed for affluent markets, developed by research institutions or development agencies with rigid quality standards. Better-off people, particularly in Western development organisations, but also engineers from developing countries, tend to design products with a higher quality than poor people demand.

Despite the general preference of farmers for low prices, it is very important for a profitable supply chain to offer a range of products. Price differentiation linked to product differentiation is a very common strategy to cater to the needs of different customer segments. For example, even the low-cost KB Drip is available in two qualities, with different prices. The stronger and more expensive quality may be preferred by the better-off clients, while the really poor ones go for the lowest-cost version.

Pricing for the poor and for the rich

When a very wealthy classmate at the university told me he bought hand-made shoes for US\$ 500, I asked him: 'Are you crazy to spend so much on shoes?' He replied: 'My shoes will last for 15 years; I am sure I will spend less on shoes than you do'.

This is the typical purchasing behaviour of a rich person: top quality and longevity. But this cannot be the solution for a poor family. If they can either choose between a cheap product and a warm meal, or only buy an expensive product and no meal, it is clear what they have to do.

In Bangladesh, attempts to eliminate cheap and low quality treadle pumps failed miserably: over 50% of the pumps bought were in the lowest category of quality, lasting for only 2 years.

The examples of PepCee and KB drip systems in India mentioned before (see page 23) also illustrate the preference of poor people for cheap products even if they are of lower quality and have a shorter life-span.

Another intricacy with respect to the markets of the poor is the entry price, which must be low. For poor people, cash is such a precious commodity that they often prefer to buy in very small quantities, although they pay more in the long run. The art of marketing to the poor is to pack the goods in very small units which require only small amounts of cash at a time: rural retail shops sell single cigarettes, shampoo by the sachet, tea by the cup and beer by the glass. In India and other South Asian countries Coca Cola is available not only in the conventional 3.3 dl bottles, but also in smaller 2 dl bottles.

One of the main strategies of modern marketing is to lower the entry barrier for new customers. There are many ways to lower the initial down-payment and still make profit: for example, cell phones are sold at US\$ 1, but only together with a monthly subscription lasting 2 years.

The art of pricing has been developed over many years. For instance, when Gillette introduced its first razors at the turn of the 19th century, the razor device was sold very cheaply, but the blades were priced at a decent level. This was done in order to compete with the barbers who charged 5 cents for the service of shaving, and razors had only a chance if they were perceived to be cheaper or faster²³.

Place: sales points, supply and servicing chain

Place means the location where customers can buy the product and get related services such as spare parts or advice on how to use it. The place may be a shop, a farmers' market, a mobile dealer. Linked to this place is the supply chain which brings the product to the customer. But 'place' means more than just 'where' to buy; a vibrant and profitable supply chain is also a place of action. Good dealers do not sit on the goods and wait until someone comes to buy. If it is beneficial for dealers or other supply chain actors, they actively search for new customers and promote the product. They try to impress customers with all sorts of services they can offer: explain how it works, troubleshoot if it does not, arrange spare parts, and give credit. These are all small but crucial things which make a big difference to the customers.

A well-functioning supply chain is – next to its own staff – the most precious asset for any company. It is the dealer who convinces the customer to buy this or another product. Companies use creative means to keep their dealers happy and to increase their loyalty, by organising training in posh hotels, inviting them to exposure trips and providing financial incentives. But the best incentive they can give to their supply chain is the value creation which finally makes the dealership profitable. A company can create such value by providing not only a good, but the

The 4 Ps of marketing in the case of drip irrigation



Product: The market indicates a clear preference for affordable products. Farmers in India do not want expensive equipment with a long lifespan. Thus, a new product was designed by standardising low-quality 'Pepcee' drip to KB drip with an acceptable quality standard (see also page 23). This product can be manufactured locally by small enterprises.



Price: Pricing is a sophisticated art: to make products affordable to poor customers, it is important to scale them down into smaller units. This low-cost drip system for 50 m² costs only some US\$ 5; it cannot bring a family out of poverty, but it is an excellent entry point into irrigated agriculture (see also page 24).



Place: 'Place' means having a network of dealers close to the customers. Farmers can get advice, assistance in installation, spare parts, repairs and sometimes even credit from a local dealer. A dealers' network can only emerge if it is profitable to sell materials, spare parts and services to rural customers. Market creation is the basis of increased sales volumes and the key to viable supply chains in rural areas.



Promotion: It's not just Coca-Cola which needs constant promotion: small farmers are conservative customers and will buy innovative technologies only if they have seen that it works. Promotion of low-cost drip irrigation must focus on demonstrations in the field. Static promotion (posters, wall-paintings) and dynamic promotion (demonstrations, farmers meetings and field visits) need to be balanced in a smart marketing strategy.

best, product: by positioning and promoting it well, by enabling the dealer to provide embedded services so that the customers appreciate not only the hardware side but also the software that comes with it. If this happens, then a supply chain will become a source of profit for all participants, for the company, for the dealer and for the customer and so get into a dynamic gear.

In order to build a viable supply chain for pro-poor products a range of issues have to be clarified – often in an iterative process.

Issue 1: Where is the best place to sell the product?

Poor rural customers are usually not very mobile and a place as close to them as possible is desirable. However, if the place is too remote or there are too many sales points, the turnover may be too low for a profitable business. Apart from permanent markets, weekly rural markets may be good sales places.

Issue 2: Who is an appropriate seller? If possible work with existing actors. In the case of drip irrigation equipment, hardware dealers or agro-input dealers may be involved. Dealers usually need a broad array of products to be viable; specialising in one or a few products for the poor may not bring adequate profits.

Issue 3: Does the supply chain need intermediaries (stockists, distributors)? This depends on the geography, the market structure and the volume of sales. Every intermediary is a cost factor; each person needs a profit margin or a commission. Even marketing professionals sometimes wonder why intermediaries are needed. On the other hand, direct links between manufacturers or importers and local rural dealers may be rather inefficient. In such a case a distributor may provide a useful and specialised service, making the whole chain more efficient and ultimately more profitable, despite cutting out a part of the margin. With intermediaries too, it often makes sense to utilise existing actors, for example such traders who deal with similar products (in the case of treadle pumps, people involved with hand pumps or selling pipes and tubes, could be interested).

Issue 4: Who provides user support, after-sales services and spare parts? Quite often, a dealer provides additional services to the customer such as repairs, advice, stocking of spare parts, etc. Sometimes, dealers also provide credit or instalment buying to their customers because they know the people in the village. Many dealers – for instance for agro-inputs – can be very good extension agents and advisers too and sell 'embedded services' to their customers. It may also be an option to have specialised installers, who provide installation support and give advice to customers. In one place in India,

a dealer had several installers working with him in support of customers in different villages.

Issue no.5: Local manufacturing or importing? Local production may be more economical, but it is usually only viable with a certain sales volume. It is possible to produce KB Drip in a relatively small workshop with a simple extrusion machine. In India, existing manufacturers of plastic bags switched from the production of tubes for plastic bags to KB Drip production, because they saw a market for it. For a new country with low sales volumes it may be cheaper to import the products, at least initially. However, to import one full container of equipment is also a capital-intensive affair (around US \$ 60,000 for a 40-foot container). Smaller containers are of course cheaper but the transportation cost per unit may be higher. A complete manufacturing unit with one Indian extrusion machine costs around US \$ 15,000; local production is thus usually feasible as soon as there is a substantial market.

Promotion: Creating interest and desire for the product

The **AIDA model** provides a basis for understanding promotion. It describes the decision making process of customers before they buy a new product. For each of the steps in the process different promotion tools are appropriate.

Awareness:	it takes time to create awareness (early adopters first come forward)
Information:	it takes more time till a user has all the information he/she needs
Decision:	only then, will people take a decision (for instance to buy a pump)
Action:	it may take even more time till people (especially the poor) take action (they may for example have no money)

Promotion is costly, and resources are easily wasted if it does not reach its target audience, and if it does not lead to increased sales within a reasonable time. One of the major challenges is to select the right promotion instrument for the targeted customers at each step.

Promotion is more than advertising, it implies a two-way communication with the customers. People do not primarily want drip irrigation equipment but reliable irrigation for their crops over the whole growing season. The product to be promoted is thus 'reliable irrigation', not 'drip-irrigation equipment'²⁴.

Promotional activities for low-cost water control technologies can be grouped as follows ²⁵:

Static promotion: handbills, wall painting, dealer signboards, caps, t-shirts, fixed demonstrations, banners, posters, radio messages.

Dynamic promotion: personal selling, opinion leaders, mobile demonstrations, farmers meetings, video van shows, short campaigns, farmers' exposure.

In general terms, static promotion activities can only achieve awareness and maybe interest, but wherever desire and action are to be targeted, social interaction is required. Desire and action are only stimulated if social communication – from peer group to peer group – is achieved. Impersonal and rational communication with static promotion methods cannot influence people more than superficially. This is even the case in modern advertising: persuading somebody to purchase a prestige product requires referring to an 'idol', a football or film star, a person with whom people identify and want to be 'like them'.

Each promotion tool has its specific objective(s):

Type of activity	Objective
Farmers' meeting	Awareness, interest, desire
Short campaign	Awareness, interest, desire, action
Mobile demonstration	Awareness, interest, desire, action
Farmers' exposure	Desire, action
Video van show	Interest, desire
Handbills	Awareness, interest
Fixed demonstration	Awareness, interest
Wall painting, banner, posters	Awareness
Radio and newspaper advertisement	Awareness

Mass media may play an important role in promotion, but not at an early stage. Rural customers need to see what they intend to buy. They don't buy anything unless they have experienced it in operation, or – even better – once their neighbour has bought and used it successfully. Farmers in particular want to touch it, feel it and try it out before buying. For this reason, demonstrations and testing opportunities are important promotion activities for farmers.

What does AIDA mean for rural marketing?

It is a huge challenge to reach large numbers of people in rural areas with their often difficult road access and raise their **awareness** about new products. As many people are illiterate, dynamic oral and visual forms of awareness creation are much more effective than static forms of promotions such as newspaper advertisements that are normally used to raise awareness with masses. This means going to the rural areas with tools like demonstrations in farmers meetings or rural markets.

For converting awareness into **interest**, direct contacts and follow up visits to farmers are required. The farmers may then be not only interested in knowing how it works and what it costs, they may also ask how it would work in their field and how much it would cost for them.

If one wants to stimulate **desire**, one has to know 'who influences whom'. Whereas early adopters will desire something because they have seen it work with an innovative farmer, late adopters will only be convinced if a farmer 'like them' has tested it and recommends it to them. For this reason, interactive forms of promotion such as farmers' meetings, exposure visits and farmer-to-farmer field visits, are most suitable to stimulate desire. To reach the later adopters, one may have to wait until a critical mass of early adopters in an area is successfully using it. If the later ones can observe the success of other farmers with whom they can compare themselves, their desire increases.

The step from desire to **action** is also critical. Not all people decide quickly. Some people – especially poor rural customers – take a long time to be convinced. Poor people can only invest in innovative technologies if they are absolutely sure that they will benefit from this investment. Even when a farmer is really convinced that it would be useful to have it, it may take still a few months or even years until they have enough cash to purchase it.

Promotion in rural areas is very costly: on the one hand, at a farmers' fair or at rural market places, thousands of farmers may be reached at the same time, but farmers are there only one day. Promotion needs more intensive contact, so follow-up is required. To reach out to individual farmers can become quite a costly affair, especially where locations are geographically distant and population density is low.

In summary, a well targeted communication strategy must carefully select and focus the different instruments. Each instrument has its costs and some of the measures are very costly. Which instrument to choose is very situation-specific, but it is evident that the task of creating a market

Different forms of promotion



Demonstration at a village market



A dealer explains the KB system at a farmers' meeting in the field



Promotion stall at a village market day



Mobile dealer with bicycle and microphone going from village to village distributing leaflets



Wall painting for the KB brand system on a rural house in a village in Maharashtra



Village theatre in Bangladesh for the promotion of the treadle pump

through targeted promotion can not be achieved with static promotion alone. The more the promotion is a two-way communication based on an intensive interaction between dealers and farmers, the more it can also be utilised for feedback on the products and thus for improving them further.

This has been confirmed in Bangladesh, where an assessment of different promotional activities was undertaken²⁶. It clearly showed that interactive promotion means are more effective than static ones. Farmers meetings, folk songs performed by 'troubadours' ranked higher than any static promotion such as treadle pump displays, TV and video promotion. Wall paintings were rated as comparatively least effective.

Benjamin Franklin once stated: 'If anyone invents a better mouse trap, people will find him even in the darkest woods'. Unfortunately, this statement is absolutely wrong. Promotion that is not continuously repeated fades out. Even the best mouse trap does not sell without continuous promotion. Coca Cola is nowadays known to everybody, but if it were not continuously advertised, customers would even forget Coca Cola and remember its competitor's brand better. For this reason, nothing goes without continuous promotion.

How to finance promotion? In the initial stages of market creation there is a clear case for using public funds. The supply chain would normally not be able to recover the cost of the massive promotion efforts required to build up sufficient demand from (close to) zero.

A reason for this is the difficulty to include the cost of promotional activities in the price of investment goods. In the case of consumer goods this is easier. To add a few cents for promotion on each bottle or each sachet is less visible than adding a hefty amount to the cost of an investment good, which has to be paid upfront and in one go. Another reason for promotion not paying off for individual supply chain actors in the case of simple investment goods, is the incentive to copy them; especially in developing countries, copy-cats are watching markets carefully and are quick in copying a promising product and so benefit from promotion efforts by others. Moreover, the nature of investment goods does not allow for repeat sales, and the cost to convince one single customer may be very high.

Finding sustainable ways of financing promotion efforts in market creation is thus challenge. On a longer term, supply chain actors will have to take on the cost of sustaining promotion. Links with the corporate sector and tying the products to their supply channel may be an answer; private companies may be willing to help in promotion

as a goodwill activity, or may have a long-term interest in it, if they can develop business models catering to the 'bottom of the pyramid'. If it is profitable, dealers will also invest in promotion and participate in advertisements and play an active role.

3.6. SALES CURVES IN PRACTICE – EXAMPLES FROM SOUTH ASIA

Sales profile of treadle pumps in Bangladesh

The sales curve is helpful in assessing the effects of different approaches on market development. The sales of treadle pumps in Bangladesh in the graph below²⁷ show a continuous annual increase from 1984 to 1995, when almost 180,000 pumps were sold in one year, and a dramatic decline in the years after.

The steady rise until the mid 1990s was the result of the following two factors:

From 1984 until around 1993 the treadle pump was a very competitive technology at a cost of around 1,200 Taka as a fully installed tubewell (US\$ 40). At that time it was much more affordable than the shallow tube well diesel pump sets sold at around 30,000 Taka (US\$ 1,000). A treadle pump yielded US\$ 75 to US\$ 100 of additional profits after only 3 to 4 months and could be paid back in less than one season.

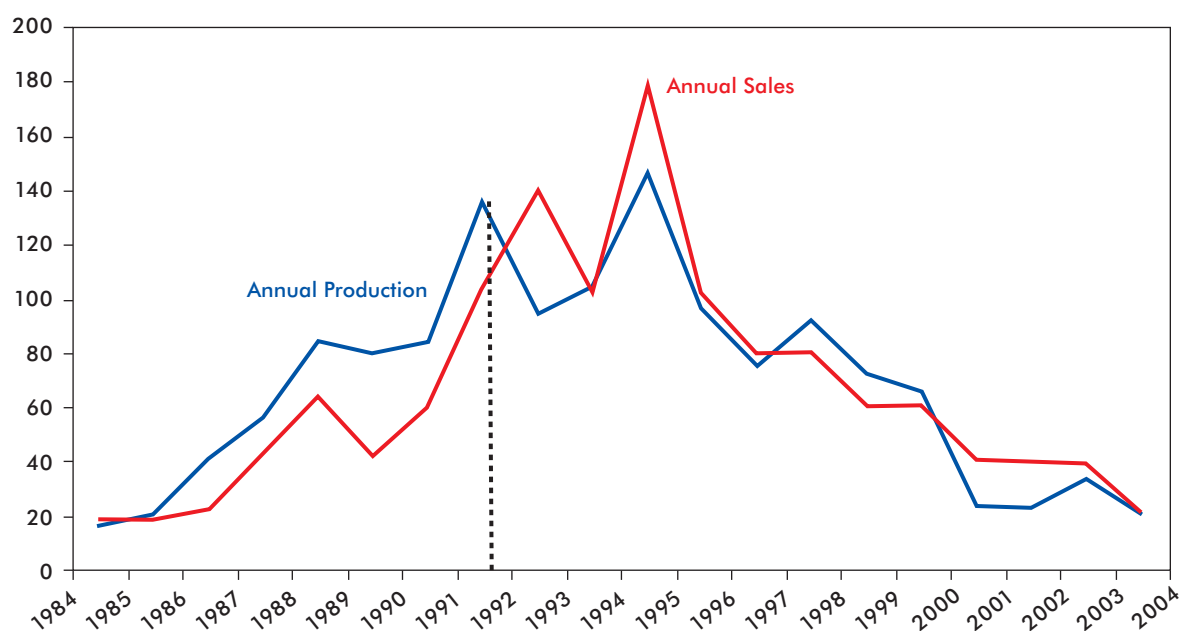
Second, with ever better marketing campaigns (by the implementing agency IDE) more and more farmers became convinced about this incredibly positive cost-benefit ratio (positioning a treadle pump as a 'goose that lays golden eggs'), and a profitable supply chain developed.

The subsequent decline in sales was also caused by two crucial factors:

In 1989 the Government of Bangladesh introduced a major policy change – complete de-regulation of the market for diesel pumps. Before that the Government had exercised a strong control over irrigation equipment, and this kept the prices very high. In the years to follow, more and more farmers installed new, cheaper and smaller diesel pumps, and the prices dropped by more than 50 per cent to below 20,000 Taka for a shallow tubewell. Previously, the scarcity of irrigation water had created the phenomenon of 'water lords' (rich farmers earning handsome profits from selling water from their diesel pumps); now, more and more farmers started to have excess capacity, as their pumps were too big for their scattered pieces of land. They started renting out their diesel pumps for prices as low as 40 Taka per hour. After

Production & Sale of Treadle Pumps 1984 - 2003 (in ,000)

Source : MAT Evaluation Study, Roda Mehta, 2004



some years, second hand diesel pumps appeared on the market for only 3,000 to 5,000 Taka. Still, for many small farmers the treadle pump remained the most suitable technology but it had dramatically lost competitiveness. Moreover, cheaper treadle pumps appeared in the market. Competition from cheap diesel pumps **and** cheap treadle pumps eroded the profitability of the supply chain: investing in promotion was no longer interesting, as returns were low; moreover, any promotion by a dealer would also help promoting the competitor, the dealer next door.

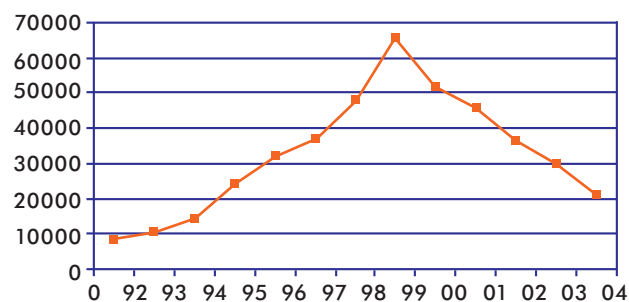
Treadle pumps in India

The treadle pump sales curve in India can be explained with the approaches used.

The treadle pump programme (implemented by IDE-India) had several phases which were radically different in orientation²⁸. In the introduction phase from 1991 to 1995, the pumps were mostly introduced through NGOs, and not much emphasis was put on the development of an effective supply chain. In the growth phase, from 1996 to 1999, extensive efforts went into promotion and supply chain development.

After 1999, donors thought that the market is now mature enough to sustain itself, and the programme reduced its involvement in market creation (under pressure from

Treadle Pump Sales India



donors). Sales dropped gradually. It can be assumed that this happened because the market creation efforts were reduced too early, and not because the market was already saturated (it was estimated that only 2-3 per cent of the potential market was covered in 2000).

Low-cost drip irrigation in India: massive take-off soon?

The following table shows the sales figures of the low-cost lay-flat KB drip system in India.

KB drip sales	Season 02-03	Season 03-04	Season 04-05
No. of farmers	14,185	21,150	11,859
Volume sold	n.a.	30 tons	70 tons
Total area	n.a.	1,323 ha	1,876 ha
Area per farm	n.a.	625 m ²	1582 m ²

There has been a massive increase in sales in just three years. There are several reasons to believe that in India affordable drip irrigation is just about to experience a massive **take-off**. A decade of government promotion with subsidies and increasing water scarcity led to the adoption of drip irrigation on modern farms on a large scale, particularly in Maharashtra. The government promoted expensive systems mainly to well-off farmers, who were innovative and who introduced new crops. Several such crops, such as grapes, are now grown widely. This introduction of the technology to richer farmers was a pre-requisite for large-scale dissemination to small farmers: the technology has become known and proven, and it can be seen in the field. Many farmers have several years' experience with it. The intensive promotion of drip irrigation made it also possible for a large industry to become established in the region, and there are at present over 50 manufacturers of drip irrigation equipment, some of them with ties to larger companies in Israel and the USA.

With the development of cheaper drip systems, the technology has become affordable to smallholders. The dramatic cost reduction allows small farmers to also grow high-value crops, and, thus, the market is presently expanding very quickly. There are already at least five manufacturers producing KB Drip in India. Furthermore, 'copycats' – manufacturers who produce a very similar product, though sometimes with deficient quality – have appeared²⁹. All this indicates that the market is approaching its take-off very soon.

In other countries where drip irrigation is new, the situation is completely different. In Bolivia, for example, farmers only know the benefits of sprinklers so far; drip irrigation is such a new technology that it will probably take much more than three years until smallholders adopt it on a large scale.

3.7. BEYOND WATER: OTHER HIGH VALUE INPUT SUPPLY CHAINS

Apart from water control, farmers growing high-value crops need high-quality inputs: seeds, agro-chemicals, seedlings and saplings for quality trees are as important as access to know-how and information. And last, but not

least, credit is an important means of production, because high-value farming depends on costly inputs that must be purchased upfront and often can be paid for only once the produce is sold. If access to adequate input and know-how services is not ensured, then development efforts aimed at high-value production through water control must in some way facilitate access to such services, though they normally would prefer not to invest in the massive tasks of building whole input or advisory service systems themselves.

Seed, agri-inputs, seedlings and tree saplings

In many areas, planting materials and agri-inputs are meanwhile a private sector business. In remote areas however, this is often not yet the case, and links to more distant sources of inputs may have to be built. This can be done through producer groups and associations or through capacity building for small local entrepreneurs.

However, a word of caution. Often, high-value production is perceived as being inevitably linked to the use of synthetic fertilisers and agro-chemicals, although low-external input, largely organic, practices are often as productive as, and more economical than, conventional practices. Thus when planning an intervention one should carefully consider whether to focus on access to chemical inputs or to foster low-external input practices.

Seed and agro-input dealers can be good partners in a supply chain. It can be a very interesting option to encourage seed or agro-input dealers to combine their original business with irrigation equipment, as it is economically more attractive to sell goods that lead to repeat sales: seeds, fertilisers, pesticides and fungicides are inputs which farmers need regularly, whereas they only invest occasionally in drip irrigation. Therefore, selling drip equipment alone may not be an attractive business. For small local entrepreneurs in remote areas, combining inputs and water control equipment may make a more worthwhile business than either of the two alone.

Large companies have shown the way to make a good business out of one-time investments. Hewlett-Packard and its competitors are subsidising their printers heavily and sell them at low prices, but they make high profits on selling the ink cartridges which constitute repeat sales. The same principle can be applied for water control supply chains: if drip equipment is sold through agro-input dealers, the transaction costs can be reduced, because the dealers can make repeat sales with agro-inputs as well.

In Jalna, India, two brothers are running two shops next to each other, one agro-input shop selling all kinds of inputs, and one shop selling irrigation equipment. The turnover – and probably the profit as well – of the agro-input shop is several times higher than the turnover of the 'hardware' shop. Similarly, an agro-input dealer who is an agriculture graduate, provides technical advice as an 'embedded' service to his customers and also sells KB Drip. He may not make much profit from selling the drip equipment, but if his customers use drip irrigation and are producing high-value crops, they purchase more agro-inputs from him too.

Good quality saplings for fruit trees are a crucial input for high-value farmers, which can be a profitable small business. Nurseries are labour-intensive operations, require little land and can be highly profitable, but they also require a high level of technical know-how. The production of seedlings for high-value vegetables too can be a profitable and innovative business. Women are successfully engaging in this in various places. Even seeds for high-value crops do not necessarily need to be produced by large companies, but can be a business opportunity for specialised farmers or producer groups.

Advisory services: what are the options?

Farmers who adopt new practices need access to training, knowledge and information services. In some countries such advisory services – of varying quality – are provided by public extension organisations. In other countries the public extension organisations have been abolished or privatised, with the result that in many places advisory services are difficult to reach, particularly for small farmers and in remote areas. Even where services are available, the specialised services needed for high-value production may be unavailable, or inaccessible to small farmers.

There are different ways of fostering access to the advisory services necessary for high-value production. Although it may not be realistic to expect that small farmers pay the full cost of all the advisory services they need for high-value production, it is equally unrealistic to rely only on public funds. There is a need to employ innovative financing mechanisms and to mobilise private initiative. Only if providers of advisory services can make a living out of their work, the services will be sustainable.

The following options³⁰ are worth mentioning in this context:

While individual small farmers normally cannot afford the services of those highly competent private advisers who serve the larger farmers, the cost of such advisers may be

shared among a group of farmers with the same service needs.

Strong producer organisations can employ or contract advisory service providers which are financed through membership fees and/or income generated through marketing services.

Another option is to embed services and their cost into business transactions. It is common that input suppliers provide some advice on fertiliser doses and pesticide application to farmers who purchase their products; the cost of these services is embedded in the cost of the products. In this sense, agro-input dealers, nurseries, irrigation equipment dealers and similar service providers play an important role in providing advisory services. Such embedded services can be promoted by development interventions through provision of training to the service providers. Embedding of 'soft' services in supply chain transactions can increase the profitability and thus the dynamism of the supply chain.

Processing enterprises and marketing/trading companies often provide embedded know-how services to producers, the costs of which are deducted from the price paid for the produce. These can be enhanced by building the capacity of the respective staff of the enterprises.

Embedded services, however, have limitations too. Commercial actors have an interest in providing advisory services only as far as it enhances their business, while smallholders often also need services that go beyond this. Furthermore, in the case of pesticides, and to some extent chemical fertilisers, the interest of the input suppliers to sell more of their products can conflict with environmental considerations and even with the economic interests of not very well informed and calculating small farmers.

If there are strong public extension service providers whose financing is secure, selected staff can be trained to provide the services that the high value farmers need. If the legislation for government bodies allows, farmers can be asked to participate in financing these services by paying direct fees. However, one needs to keep in mind that the competencies of the service providers will need constant updating, and this will also have to be put on a sustainable financial basis.

Smallholders who just start with high value products, will initially need much more training, advice and know-how than later, once they have established themselves in the high-value league, to maintain and update the achieved level. This initial capacity building can well be funded with donor money, while a certain service level needs to be accessible continuously, and there it is very important to pay attention to financial sustainability.

Various support services



This nursery owner grafts pomegranate saplings and provides grafting services to other farmers



This woman owns a small nursery enterprise and sells quality saplings to many farmers in the area



These brothers own a hardware and an agro-input shop in Jalna, Maharashtra State, operating side by side



Pomegranate saplings ready for sale in a nursery in India



This agro-input dealer is an agriculture graduate. He sells seeds, pesticides, fertiliser and drip irrigation equipment to farmers. He also gives advice to his customers (embedded services)

MOVING TO HIGH-VALUE FARMING – THE NEED TO COMBINE NEW MARKETING AND PRODUCTION PRACTICES

4.1. WHERE ARE THE OPPORTUNITIES?

Traditional smallholder agriculture, based on subsistence production and occasional sales of surpluses in local markets, nowadays does not provide for a decent living in most places. Better water control alone is usually insufficient to improve the profitability of traditional smallholder farming. Sometimes a simple increase in yield becomes possible through better water control and allows small farmers to improve their situation, but in most cases the key to more profit lies in market access. This requires innovations in both production and marketing practices. One of the key challenges on this path is to identify appropriate opportunities with higher profit potential and moderate risks. High-value opportunities are likely to be appropriate for small farmers if they:

- fit fairly well into the existing land use system,
- are not excessively complex for the farmers to manage,
- require low capital investment, and
- can be adopted without excessive risk.

The more complex an innovation in production or marketing is, the more external support – not in terms of finance but in terms of capacity building and coaching – will be necessary. In many cases the best high-value opportunities are very complex and thus not practical for the broad mass of small farmers. For instance, the production of grapes is a high-value but also a high-risk business.

Higher value opportunities may lie in improving existing marketing patterns or in new, mostly more distant, markets. The opportunities can be very diverse – simply getting organised for joint marketing; grading and better packaging; marketing to a larger town instead of the local village market; shifting production to the off-season; storing produce to sell in higher price periods; producing varieties that fetch higher prices; getting access to price and other market information to enhance bargaining power; building links to international markets or supermarkets; targeting niche markets such as fair trade and organic markets; branding and labelling. Often, with interventions to optimise local and national marketing, many more people can be reached than with interventions to link up smallholders with international markets. For development interventions there is often a trade-off between supporting opportunities of very high value for a smaller numbers of farmers and supporting those of moderate high value with potential for many poor farmers.

Mastering commercialisation processes efficiently is beyond the scope of individual smallholder farmers. Generally speaking, private commercial entities are not interested in – or cannot afford – dealing with large numbers of individual small farmers, because the transaction costs and the uncertainties are too high. Nevertheless, there is a trend for more direct procurement in international agribusiness in order to get guaranteed quality.

Development organisations tend to qualify markets as inherently exploitative and anti-poor, and often try to devise interventions that work outside, or in parallel with, the existing market structures. The results of such efforts are usually minimal and unsustainable. Despite the fact that markets are sometimes cruel and exploitative for the less powerful participants, it is much better to work with the markets than against them. There is a lot of scope for pro-poor innovations in existing market structures, provided there is competition between traders, and farmers have a reasonable bargaining position. However, as many small farmers are very vulnerable and indebted, they may not always be in a position to benefit from the optimised opportunities that the existing marketing patterns provide. If farmers are forced to sell a crop in distress, they are likely to accept any price and there is a high risk of exploitation.

There is much dispute about the extent to which interventions to support small-scale producers to organise themselves are worth their money. Many resources have been invested in the formation of groups around projects and apparently common interests. However, many of these proved to be unsustainable and became defunct as soon as external support ceased. Nevertheless, better marketing practices usually require some degree of organisation and, in some cases, a high degree of organisation. Development interventions thus need to carefully consider what form and degree of organisation make most sense for a particular purpose.

4.2. THE MEANING OF VALUE: DISTINCTION NOT VOLUMES

High-value opportunities for smallholders lie in distinction, not in commodities and volumes. Distinction may mean speciality products and varieties which make a product different from a commodity. It is a product with labels, trademarks, distinction of origin or of the way of

production, such as ecological or organic production. The products will be positioned for niche and speciality markets. A distinct quality can also be achieved by simply sorting, grading and packing more common products.

Prices for a commodity product such as wheat are quite uniform. Wheat is, more or less, a homogeneous product. It is traded in huge quantities, it can be stored, and it is often procured under government-regulated price control schemes. Wheat production is in most countries not a profitable opportunity for smallholders; to be a lucrative business it needs to be produced on a relatively large scale. Of course, many smallholders produce wheat and other staple grains on part of their land for household consumption, but it is usually not very rewarding for smallholders to produce more than their own needs and market the surplus.

Rice is a much more heterogeneous product and many varieties exist, each of them fetching different prices. While common rice varieties are usually also not interesting for smallholders, specialised rice varieties may well be interesting as high-value crops.

This is even more true for fruits and vegetables. Here, in addition to different prices for different varieties, the quality and time dimensions come into play. Nice and fresh looking produce fetches much better prices. Prices also vary seasonally with supply quantities. Price fluctuations are typically very high for perishable products, even within the same day: a fish may well fetch one dollar in the morning and only five cents in the evening³¹.

A critical point regarding value is that there should be a relation between quality and price. If the different qualities of a product are mixed together, the price cannot be anything else than low. Thus, to differentiate between high and lower quality by sorting, grading and distinguishing, and finally by branding the products, is often a first step towards more value.

Coffee, tea and cocoa are generally traded as commodities but their markets are becoming more and more differentiated, and for small-scale producers the generally decreasing prices of normal qualities have often disastrous consequences. As the example of coffee shows, the opportunities lie in distinction.

In the coffee sector, prices have collapsed with the entry of Vietnam as a large-scale exporter and a 'coffee crisis' has emerged. Huge amounts of cheap, lower quality 'Robusta' coffee have inundated a stagnating, or even shrinking, market, whereas there seems to be a scarcity of high-quality 'Arabica' coffee. Prices (for green coffee) have decreased greatly over the past decade, both in

absolute and in relative terms: one kilogram of green coffee fetched up to 70 US cents in 1984; in 2002 a farmer in Kenya received scarcely 14 US cents for the same quantity. Also, the relative share of the raw coffee in the shelf price for roasted coffee has declined (in the US from 64% to only 18%). That means that most of the value addition for coffee takes now place in trading and in processing³². Although coffee prices have increased again recently, producers can still barely recover their production costs at the current price levels. It is hard to understand the 'race to the bottom' for coffee prices, when people do easily pay two dollars or more for an 'espresso', a 'caff  latte' or a 'cappuccino' in a Starbucks coffee shop. If farmers receive scarcely 15 cents for a kg of green beans, enough to brew more than 100 espressos, why does the commodity price matter so much? There is a consensus among roasters that at the present low prices it is not viable for farmers to produce the high quality of coffee that Starbucks or Nestl  need, so companies dealing with high-quality coffee increasingly shift to direct procurement of the required quality from producer cooperatives. The production of high-value branded speciality coffee can be a way out of the low price trap, in which small producers are caught. These high-value coffees are branded by reputed roasters or bear a certification label as being organic or fair trade products.

Reversing the 'race to the bottom': the Sustainable Agriculture Initiative (SAI)

In the last few years, awareness has been growing that farmers need a reasonable price for their products if they are expected to produce the quality required in international markets. For this reason, a group of the largest food processing companies have created the 'Sustainable Agriculture Initiative (SAI)', which aims at paying 'fair prices' for products of good quality. During the coffee crisis of the past two years, the largest multinational firms (Nestl , Kraft, Unilever and many others) have realised that they may lose their supply base of good-quality products, if the farmers are paid prices below the production costs. The SAI aims at more direct procurement of high-quality agricultural products from farmers. This initiative will not automatically benefit smallholder farmers, but it may provide a good opportunity for well-organised smallholders to enter the high-value market³³.

4.3. DO TRADERS ADD VALUE OR EXPLOIT POOR PRODUCERS?

Traders and other market intermediaries are perceived by many people as exploiters who do not really contribute to value creation but are a cost factor that unnecessarily consumes a share of the margin between producer and consumer prices. Though exploitation sometimes happens, in most cases traders provide services that add more value than they cost. After many years of ideological struggles aiming at the elimination of the middlemen, we have to admit that traders play an important role in an economy, and if competition and some fairness is guaranteed, a good network of traders is often the best option for agricultural marketing.

Traders perform important functions – information, logistics and working capital – that all reduce transaction cost, one of the key constraints of smallholders.

They have **information** on quantities, qualities and prices of products in different markets and know about requirements regarding varieties, qualities and timing. If traders have a monopoly on such information, farmers are at a disadvantage. Nowadays, with modern means of communication, it has in many places become easier for farmers to gather such information as well. With independent access to such information, the bargaining position of smallholder farmers improves remarkably.

Traders have **working capital** to pre-finance the marketing transactions. Farmers are usually most happy to get paid in cash on delivery, while the traders invest money in purchasing produce, getting it to the final market and selling it for the best possible price. Traders may also provide credit for seed and other inputs to farmers.

They have longer-term **business connections** to actors in the targeted markets, so their transactions in the market are more likely to be based on mutual trust.

They often take care of the **post-harvest handling**, such as:

- pooling produce to get higher volumes and so reduce transportation costs,
- sorting and grading into different quality categories,
- packaging with the right materials to protect products and make them attractive to customers,
- storing, for example until prices are higher.

They organise **transportation** to the right market at the right time and in good condition, either through their own vehicles or by linking up with transporters. Transportation

costs depend very much on volumes; they decrease more than proportionately with larger volumes. Smallholders may well hire a small truck, but they would pay more per unit of volume and they would still not be able to have good connections to the wholesale markets.

All of these functions may also be performed by well-organised smallholder farmers themselves, but it would not necessarily bring more profit and would increase their workload and worries. As the example in the box illustrates, farmers may fare better when using the services of traders.

Traders are profitable for farmers in Northern Pakistan

In the 1990s a study in a major fruit and vegetable growing area of Northern Pakistan was conducted to compare the profits of onion and apple growers with self-marketing and marketing through traders. Those farmers who marketed through traders throughout made higher profits, while the traders' profits fluctuated strongly between years, with substantial losses in bad years. The self-marketing farmers were larger than those who marketed through traders. It has also to be noted that the study area is easily accessible and normally each farmer was in contact with several traders, and they could get price information. In remote areas, the picture may look different.

The plea for involving traders is not a plea against small farmers organising themselves, but the question is whether building up marketing capacity in smallholder organisations and so cutting out the intermediaries is worth the effort. Thus such interventions should be carefully weighed. What is important, if smallholders are to benefit from the services of traders, is that they have enough **bargaining power**. This can be promoted either by supporting smallholders in organising themselves (but see also remarks in section 4.1) and/or facilitating access to market and price information in any appropriate way (see also the following page).

The function of a trader/market intermediary can constitute also a rural business opportunity. It may well be a useful development intervention to support building the capacity of young rural people, for example, as agricultural traders or market intermediaries.

4.4. OPPORTUNITIES IN EXISTING MARKETING PATTERNS

There is often a great deal of scope to improve the existing marketing patterns by relatively simple but effective means.

Reducing transaction costs – a key to more profitable marketing

Marketing costs decrease more than proportionately with higher volumes, so economies of scale are important. Smallholders face very high transaction costs for marketing their products: transporting one or two bags of agricultural goods on the roof of a bus is costly in terms of money and time spent. Similarly, the transaction costs for purchasing seeds and other inputs are also often high. If the goods are not properly packed, the losses during transport may be substantial. To overcome these constraints smallholders can organise themselves and pool resources, so they can increase volumes and benefit from economies of scale, or build up linkages to reliable traders and use their services.

The organisation of smallholders to reduce transaction costs can take various forms, from simply jointly hiring a truck, over collectively marketing their products, and establishing collection centres, to building cooperative storage and processing facilities. However, success stories of farmer-managed marketing and processing structures are relatively rare. Effective marketing is a very demanding task that exceeds the potentials of smallholders in many respects. Trading agricultural goods is often also very risky. Thus it is often more promising to build the capacity of local entrepreneurs to provide marketing related services than that of producer organisations.

Market information – an asset for better bargaining power

Information on current prices in different markets, and on market requirements regarding varieties and qualities, are an important asset for smallholders. With better knowledge they have much better bargaining power with traders and wholesale market actors.

Traditional market information schemes have bad records because they are usually unable to offer the necessary daily price information in time. With increased access to new communication technologies, quick and flexible information can become available, also to smallholders. In various countries (such as India, Kyrgyzstan, Tanzania and Uganda), on-the-spot price information is meanwhile communicated by mobile phones and text messages. The internet can also be a way to communicate market in-

formation. The provision of market information can be a profitable business opportunity for individuals or small enterprises. It may also offer a win-win situation for large agricultural marketing companies, as the example from India shows. In other places producer or value chain organisations maintain market information schemes.

E-Choupals in India

E-Choupal is an extensive agricultural information system established by ITC, one of India's largest exporters of agricultural commodities, to enhance the efficiency of their supply chain. The core of the system are farmer-managed village internet kiosks through which the agricultural community can access information in their local language on the weather and market prices, knowledge on scientific farm practices and risk management, and facilitate the sale of farm inputs together with embedded knowledge. Farmers have the possibility – but are not obliged – to sell to ITC procurement offices at the prices published, and they receive immediate cash payments³⁴.

E-Choupal services today reach out to more than 3.5 million farmers growing a range of crops, for example soybean, coffee, wheat, rice, pulses, shrimp, in over 31,000 villages through 5,200 kiosks across six states. E-Choupal is probably one of the most important improvements in the marketing system in rural India, and it has attracted a lot of interest as a model to be replicated elsewhere.

Off-season production

During the off-season when there is no supply from mainstream producers, prices may be up to ten times higher than in the main season. Vegetables can offer very rewarding off-season opportunities for smallholder farmers. In India, for example, summer (dry season) tomatoes are fetching very high prices, because most farmers do not have enough water to produce them – it is possible only with drip irrigation (see also pages 56/57). In Pakistan, farmers in the mountains can produce cabbage, cauliflower and other winter vegetables in summer, when it is too hot for these vegetables in the large lowland areas where they are produced in winter.

Sometimes a small shift in production and marketing timing can make a big difference in price. In Pakistan, onion prices are lowest at the time of harvesting and marketing of produce from the larger production areas. In the following three months the price gradually increases to about double. Due to the hot and humid climate it is difficult to store onions until prices are higher. Only

Optimising market access in traditional markets



Vegetable markets in India are very lively: mobile vegetable sellers offering a range of products are a common sight



The best prices are obtained with specialisation and off-season vegetables



Transportation over long distances and with small volumes lead to very high transaction costs for marketing



Grading of the products and packing in plastic crates are essential for reaching more distant markets



More demanding markets can stimulate a local packaging industry and contribute to rural non-farm employment



This market information service allows farmers to know about agricultural product prices in distant markets

in the mountains is it possible to store the onions with much care for some time. Farmers who manage to do that make substantially higher profits. Also in Pakistan, prices for cucumbers are several times higher in the early days of the supply season than at the peak. Some innovative farmers have developed a fairly complex production system where seeds are pre-germinated in large clay pots and the plants are grown under low plastic tunnels for the first month or so. In this way they get their cucumbers to the market two months before the peak season, and the additional revenue earned by far offsets the increased cost of production.

However, off-season production is not a solution for everyone. If too many people produce off-season, the supply will no longer be limited and the prices will come down. The price-depressing effect of too many people entering off-season production, and the resulting disappointment, has been observed in many places.

Off-season production can also be viewed as having a stabilising effect on prices. This may be desirable for processors, who find it difficult to maintain regular production if prices fluctuate too much. At times when prices are high, farmers are not interested in selling their produce to the processor, or at prices that make any processing unviable. Ultimately, a whole sector may be more competitive with price stabilisation as the example from Ecuador in the box shows.

Competitive disadvantage for blackberry processors

For blackberry producers in a particular area of Ecuador, the irregular production and price pattern is not only a blessing but also one of the main constraints. Prices for a basket fluctuate from US \$ 3 in the peak production season to almost US \$ 30 in the lean season. Because farmers do not have access to irrigation they cannot control their harvesting calendar, and this leads to a competitive disadvantage for the whole sector. Under these conditions, a regular processing industry is not viable, as jam production at US \$ 30 is not economical. Unless the farmers manage to regularise production and produce every month of the year – the climate would allow this, provided they can irrigate – imported jam is much more competitive. While some farmers enjoy the high prices in the lean season, they suffer altogether when the harvest comes and prices drop to US \$ 3 for a large basket of beautiful blackberries.

4.5. DRASTIC CHANGES AHEAD IN MARKETS – CHALLENGES AND OPPORTUNITIES

Agricultural markets in general, and especially those for fresh fruits, vegetables, commodities and processed agricultural goods, are changing very quickly. For smallholders, these changes offer new opportunities and enormous challenges at the same time.

Generally speaking, there is a need for long-term, direct relationships between farmers and buyers. Small farmers may need to opt for contract farming if they want to cope with the fast changes in the marketing structures. With contract farming they may lose independence, but they may be able to play in the league of high-value products (see also page 59).

Linking smallholders to export markets – a challenge in organisation

Exploiting export markets is possible for smallholders, provided they are very well organised. In many cases regional markets are more appropriate export markets than those in the North. For example, the Middle East is a market that is relatively easily accessible for the South Asian countries. Markets in countries of the North are more complex to access and have higher quality and organisational requirements. Exporting fruits and vegetables to European countries increasingly requires a EUREPGAP certification which assures the traceability of the products and also the guarantee that certain standards in quality and pesticide use are met. However, if farmers manage to meet these requirements, these markets can be highly rewarding, as the example below shows (see also pages 56/57).

There is a clear lesson to be learnt from this example. It is possible to link small farmers to perishable export food markets, but only if they are efficiently organised and can deliver quality and quantity at the right time.

The challenge for smallholders to tap new markets



Supermarkets are a key challenge for smallholders: they require constant supply and consistent quality



Only if farmers get organised and schedule the delivery of their crops, they can sell to supermarkets



Commodity prices are largely declining. Smallholders need speciality commodities such as organic cotton



Farmers participating in the Maikaal organic cotton project in India have significantly better incomes and no debts



Processing of agricultural products, as here with turmeric in India, adds value and eliminates large price fluctuations



Coffee prices are not attractive for smallholders except when they can produce speciality coffee (organic, shade-grown)

Broccoli export farming in Ecuador: every day 9 tons



These farmers deliver 9 tons of fresh broccoli every day to this collection centre for export. It was a big change to venture into commercial vegetable production. Now they earn now up to US\$ 15,000 per year



Hygiene, and careful packing and handling, are prerequisites for being competitive in export markets. Strict quality control is performed at the collection centre; a small testing lab determines whether the produce is fit for export



A steady supply of consistent quality is only possible with irrigation, even in the equatorial climate of Ecuador. Farmers had to get organised and agree on a strict cropping calendar.

Broccoli from Ecuador

A commercialisation project in Ecuador³⁵ has organised some 450 smallholders for the production of broccoli for export. An important achievement is that these producers, who are organised into a cooperative, manage to get around nine tons of fresh broccoli of good quality to their collection centre every day. For this they designed, agreed upon and adopted a cropping calendar that coordinates the production so that a steady supply is possible. They also follow strict production practices. The export company sends a quality inspector to the collection centre at agreed intervals. He checks the quality, supervises the weighing, and inspects for pests and damages. Bad produce is rejected on the spot. The collection centre functions as well as a service centre for inputs: after the farmers have unloaded the broccoli in plastic crates, they collect hybrid seedlings to take back to their fields. Only in this way was it possible to reduce the transaction cost to a level at which small Ecuadorian producers are competitive in supplying broccoli to foreign markets. These farmers now have incomes of up to US\$ 15,000 per year. However, there is a high risk too, since the farmers have become so specialised and rely on one single product. Although the markets could absorb even more broccoli, because the supermarkets like the quality and regularity of the supplies, and increasing the production could further reduce the transaction costs, the project plans to promote diversification into other products in the coming years in order to reduce these risks.

Fair trade and certified organic markets

The markets for fair trade and organic products are growing at a fast pace. Consumers in the North, but increasingly also in developing countries, more and more want to 'know what they eat' and pay better prices for products that are traceable (with known origin) and carry a certification label that guarantees that they are produced according to ecological and social standards. Certified products are no longer sold only in niche markets, but more and more in mainstream marketing channels. In Switzerland, for example, the fair trade label 'Max Havelaar' has gained a market share of 50% for bananas, and in the order of 5-10% for other products such as coffee, honey and cocoa.

Fair trade and organic markets are of course interesting opportunities for smallholders. However, the process of certification – learning to follow the required production standards and building the links to the specific traceable marketing channels – is complex and usually requires a

lot of external support. In India, there are efforts underway to build up local certification agencies for organic agriculture and to create a research institute for organic agriculture. Without local certification, the transaction costs for certification can be prohibitive.

Two important evaluations of IFAD have clearly shown advantages of organic farming for smallholders in Latin America³⁶ and in Asia³⁷. Many governments have for a long time considered organic farming methods as being marginal and – for instance in India – access to credit is denied for farmers who do not use chemical fertiliser, as this is perceived as 'backwardness'. The view on organic production is now changing very quickly. For instance, the Indian Government has revised its attitude towards organic farming and is now much more supportive. With organic produce a fast-growing US\$ 27 billion market, this change of attitude is more than appropriate.

Obviously, there are constraints for smallholder farmers in entering organic agriculture and obtain access to the right inputs, to knowledge and market access. If organic farming is understood as not just low-input/low-output farming but as market-oriented production of certified products, it becomes a challenging farming system requiring access to a considerable support structure on both the input and the marketing side. On the other hand, many smallholder farmers, especially in Asia, have not adopted many of the chemical methods of big farmers and can thus more easily adopt organic practices. A thorough study of organic cotton in India³⁸ has revealed that organic farming is very relevant for poverty reduction; poor farmers in particular benefited from being part of an integrated value chain, whereas the richer farmers were more opportunistic and became defaulters (using chemical pesticides for boosting their yields) and were dropped from the programme. Organic cotton farmers may have lower yields during the conversion process, but after two years net revenues are significantly higher due to lower input costs and the premium paid for certified organic cotton. Surprisingly, the yields are not lower than in conventional farming, mainly due to improved soils with more organic matter because of the use of compost and farmyard manure. It pays off, especially for poor farmers, to be embedded in an integrated organic cotton value chain which provides them with regular payment, inputs on credit, and good prices³⁹.

The paramount impact of supermarketisation

In general, the market share for fresh agricultural products is declining and the share of packed or processed agricultural goods is increasing. For these, but also for fresh products, there is a trend towards supermarkets

even in developing countries, which is very marked in Latin America and East Asia, while it is a process just starting in Africa. In South Asia this trend seems slower; urban wholesale markets and weekly rural markets are still the largest trading places. But, sooner or later, this will also change in India, Bangladesh and Pakistan.

This supermarketisation process is a recent phenomenon which took place in three waves⁴⁰. The first wave includes much of South America and East Asia outside China (such as Argentina, Brazil, Chile, South Korea and Taiwan) where the share of supermarkets in food retail went from roughly 10-20% in 1990 to 50-60% on average by the early 2000s. The second wave includes much of South-East Asia and Central America, where the share went from 5-10% in 1990 to 30-50% by the early 2000s (Mexico, Colombia, Costa Rica, Guatemala, Thailand and the Philippines). The third wave includes Nicaragua, Peru, Vietnam and China, where supermarkets were either a tiny niche or non-existent in 1990, and have come to represent 10-20% of national food retail by the early 2000s.

This retail transformation is in turn transforming other segments of food markets such as the wholesale, processing, and farming sector. Now, what are the implications for development? Certainly, smallholder farmers face many difficulties in participating in supply chains for modern supermarkets. Unless they get well organised and equipped for the dramatic changes in procurement systems, they face a strong threat of becoming more and more marginalised. Four areas of change can be distinguished⁴¹:

1. There is a trend towards centralisation and regionalisation of procurement. As the number of stores in a given supermarket chain grows, there is a tendency to shift from a per-store procurement system to a distribution centre serving several stores in a given zone, district, country or region. The reason for this centralisation is clearly to reduce the transaction costs, and there are examples from China where centralised procurement is saving up to 40 per cent in distribution costs.

2. The second area is a shift towards the use of specialised wholesalers and logistics firms. Supermarkets are increasingly working with specialised wholesalers, dedicated and capable of meeting their specific needs. For instance, the supermarket chain Corporación de Supermercados Unidos (CSU) in Costa Rica, has created Hortifruti, a separate large procurement company. Hortifruti undertakes contract farming and spot-market purchases to source produce for the CSU stores in Costa Rica, Nicaragua and Honduras, following the private quality standards set by the chain.

3. The third area is a trend towards 'preferred supplier' systems, where suppliers have to qualify to be included in a list. This form is very close to contract farming and provides many potential opportunities for small farmers. Contracts serve as incentives to the suppliers to stay with the buyer and over time make investments in assets (such as know-how and equipment) specific to the retailer specifications regarding the products. These contracts sometimes include direct or indirect assistance for farmers to make investments in human capital, management input quality, and basic equipment. Evidence is emerging that for many small farms these assistance programmes are the only source of much-valued inputs and assistance, in particular where public service systems have been dismantled or their coverage is inadequate.

4. The fourth area is a trend to rising private standards also in non-Western countries. Global supermarket chains are increasingly applying quality standards that are in compliance with the toughest markets in the set, including European and US standards.

These new procurement channels can be a big threat to smallholder farmers. There are many examples where even innovative cooperatives have failed to meet the rigid and extremely demanding standards of supermarkets⁴², and there are some examples which give hope⁴³. Supermarkets are in fierce competition with each other and they do not pay for the farm-level investments needed to comply with their standards. Who will pay for water-secure wells? Latrines and hand-washing facilities in the fields? Record keeping systems? Clean and proper packing houses with cement floors? The suppliers have to bear the financial burden of access to supermarket procurement.

Unless development interventions assist small farmers in this transition, they will simply drop out of the supply chain and the new markets.

A very interesting and effective marketing project in Honduras links small farmers with supermarkets to enable them to participate in the US\$ 500+ million market of fruits and vegetables that the supermarkets had been sourcing from neighbouring Guatemala. The Honduran farmers were not sufficiently organised and technically equipped to produce the quantities and qualities that their own urban supermarkets demanded. To become competitive and gain access to this home market, the farmers needed to improve their organisation, introduce drip irrigation, schedule their cropping according to a tight calendar, and adopt many other measures⁴⁴ (see also pages 60/61).

Links to processing industries and contract farming

Marketing to processing enterprises can also be a rewarding opportunity for small producers. Depending on the situation, it may well be worthwhile for development interventions to support the establishment of a processing enterprise in order to create profitable and sustainable outlets for smallholder farmer produce. For example, this is happening in Mozambique with cashew processing. Small-scale, village-level processing can provide an outlet for smallholder farmers, and at the same time offer a business opportunity for small and micro-entrepreneurs, provided that the economic viability is assessed carefully. Many such efforts have failed because they proved to be insufficiently profitable.

Processing means adding value. The example of chilli processing in India (see box below) illustrates how much scope for more profits exists with high-quality products.

Diversity of dried chilli in India

A processing factory for chillies and turmeric in Maharashtra state in India provides an important outlet for the surrounding farmers. The factory produces many different qualities for each of the spices with very differing prices. The price that farmers receive depends on the variety, the quality, and, in the case of chillies, whether they deliver green or dried produce. Good quality fetches more than double the price of bad quality. By drying the chillies themselves, farmers could get more than three times the price, provided they manage to produce the adequate quality.

Processing enterprises are very dependent on the farmers in order to have a reliable supply of good-quality produce at the right time. Many processing industries therefore opt for contract farming with smallholders and assist them in the production process with inputs and know-how in order to get the right raw materials.

Contract farming⁴⁵ is a demanding undertaking where trust on both sides is crucial. If farmers feel cheated because they do not get the right prices (or perceive it like this), they may drop out and simply sell their crops in the open market. This is sometimes bad for the farmers, but very often disastrous for the processing industry. An industry with high fixed costs may simply collapse if it does not get the raw materials in time and at a reasonable price.

Contract farming has a bad reputation for being exploitative of smallholders. The danger of exploitation indeed exists, and small farmers may become dependent on commercial firms under contract farming arrangements. However, often the contracting company is as dependent on the farmers as the farmers are on the company, for example, in the case of processing plants for which contract farming may be a considerable risk. Such companies may prefer to grow the necessary produce on large plantations. In this case, smallholder farmers will be even greater losers than with contract farming.

In summary, contract farming may be an opportunity for smallholder farmers if the conditions are such that power and dependency are balanced. Development organisations may support smallholders in negotiating appropriate rules and conditions in contract farming that allow farmers and the big companies to work together in fairness and transparency.

Linking smallholders with large market players – a case for public-private partnerships

It is an illusion to believe that small farmers can conquer mainstream markets on their own just by forming producer associations and linking up to large distant market actors. Equally, development initiatives alone find it difficult to provide the necessary support to them. In these processes, also related private sector actors have essential functions to play. There is case for public-private partnerships (PPP) in which the public sector (i.e. Government agencies, bi- and multilateral agencies, and NGOs) support and finance the public functions (organising the farmers, helping them to master the transformation, facilitating the infrastructure, capacity building, etc.) while the private sector performs the commercialisation tasks. Such PPPs have proven to be a good way to foster the building of links between small farmers and dynamic value chains in a structured way⁴⁶.

The advantage of such PPP co-operation is that the private sector brings in market experience and skills in branding and creating added value. Public support is essential because smallholders could never invest enough in their own organisation, infrastructure and capacity building to become eligible partners for the private sector. The private sector, on its own, would not be interested in investing in smallholder development either, if their goal can equally be achieved with large farmers or big plantations. However, the combination of both can result in a win-win-situation for both parties.

Making farmers fit for supermarkets in Honduras



Before the project, supermarkets in Honduras purchased all vegetables from neighbouring Guatemala



The Agroyme project of Swisscontact/SDC in Honduras aims at enabling small farmers to sell to supermarkets



It's unthinkable to produce for supermarkets without water control; before the project, all cabbage ripened at once



Seedlings must grow under controlled conditions in a green-house for farmers to produce high-quality vegetables



Jalapeño pepper is packed for the processing plant; each crate must be handled with care and the product graded by size



Sorting, grading and cleaning of red beans in the collection centre before packing and marketing

ROLES OF DEVELOPMENT AGENCIES: ACTING WITHOUT TRANSACTING

5.1. MARKET CREATION – A DEVELOPMENT TASK WITH HIGH PRO-POOR RETURNS

Among development actors it is generally agreed that interventions with public funds are needed to enable smallholders to link up with markets. The development of appropriate technologies is also considered by many to be a development task. Regrettably, with respect to enabling smallholders to access new useful technologies, this need is not always recognised. Some people assume that market forces alone can take care of making these technologies accessible. However, many pro-poor technologies have been developed, often with public funds, which never reached a wide constituency. In some cases this may be because the technology was not really practical. More often, it is because no adequate efforts were undertaken to create markets and build viable supply chains. The fairly wide spread of treadle pumps and low-cost drip systems in India, Bangladesh and Nepal would not have happened without the publicly-funded market creation efforts. Thus, as explained earlier in this document, market creation is a development task.

Development interventions using the three pillar SIMI approach generally have high returns on investment (RoI). An estimate for a typical SIMI intervention for drip irrigation in India is that the RoI with farmers in one year is around 1:6; for every US\$ invested by donors, farmers earn around US\$ 6. After three years the RoI adds up to around 1:11. If the earnings of the supply chain actors are also counted, the RoI becomes up to 1:12 (the earnings of agri-input suppliers and market actors are not included). For the Nepal SIMI programme an investment of approximately US\$ 1 million has resulted in almost US\$ 6 million additional income of 30,000 households after two years, a RoI of nearly 1:6.

IDE's efforts to create a market for treadle pumps in Bangladesh are another example. It is estimated that a donor investment of around US\$ 9 million has resulted in over a million treadle pumps operating in the field and generated over US\$ 1.4 billion of additional income with small farmers, a RoI of 1:156 over around 20 years.

Even when considering that the conditions for market creation are comparatively favourable in South Asia, the RoI of such investments has the potential to be high also in places where more public funds are needed until markets are working.

5.2. LONG-TERM ENGAGEMENT AND THE NEED FOR ORCHESTRATION

Market creation interventions require **long-term engagement**, as it takes time to create markets where poor people can participate on adequate terms. They also need an adequate scale, because a vibrant market needs a certain size/critical mass. Interventions are challenging and demand a range of diverse competencies, among them:

- commitment and resources to accompany the process over many years,
- a good sense and related skills for marketing,
- small enterprise promotion know-how,
- technical know-how about water control technologies,
- a good understanding of value chains and agricultural markets,
- sound agricultural know-how, including the skills for adaptive experimentation,
- know-how on options for agricultural support services.

Of course, local agencies that engage as facilitators in such an intervention may not have all the necessary competencies available within their organisations, and this is also not necessary. Specialist know-how can be acquired through consultants who backstop and support the process (facilitation of facilitation). However, the commitment for an engagement of several years, and the willingness and ability to make resources available, the **ownership** in the undertaking, **must be anchored locally**.

A single development agency may not have the resources to implement all necessary interventions. This does not matter. The different functions and tasks may well be taken on by different facilitating organisations. However, it is important that the **different activities and interventions are orchestrated** in order to work effectively towards the achievement of a common goal – enabling smallholders in a particular area to play in the high-value league. Orchestration does usually not happen by itself; the different facilitating organisations have to organise themselves and cooperate in an orchestrated way. One of the facilitating organisations may take up the role of orchestra director or, in more common words, take a leading and coordinating role.

5.3. FACILITATORS – BETWEEN DOING AND LETTING OTHERS DO

In interventions following the three pillar approach, development agencies using public funds have to restrict themselves largely to acting as a facilitator. However, this is easier said than done. What exactly are the tasks of such a facilitator? Moreover, the role of a facilitator changes over time; it is different in the introductory stages of an intervention than when the market is becoming mature. Early on, a lot of 'doing' is necessary, while later it becomes more 'let others do'. The dos and don'ts cannot be described in a textbook, and for each situation the best course of action needs to be determined. Courageous development interventions are needed, but it is essential to use public funds very cautiously in order not to distort emerging markets. But supporting a supply chain, in any case a better solution than the common practice of giving farmers free or subsidised equipment and sidelining existing or emerging supply chains. This is a severe market distortion and the worst possible donor intervention.

In the following paragraphs some guidance on dos and don'ts for development agencies regarding such interventions are given.

Judicious use of subsidies: what may be financed by public funds

In any market interventions, be they along supply chains or output value chains, it is essential not to undermine the market development process by imprudent subsidies using public funds. Some key principles to be observed are:

Fund activities that help permanently reduce the transaction cost of the actors in the supply and value chains, but do not subsidise transactions themselves (the cost of pumps or drip equipment, the installer's service, the transport of produce to the market). The concerned entrepreneurs will inevitably get a wrong picture of the real cost of the transaction, even if they know very well that it is only a subsidy for a limited time.

Use public funds only for things which benefit, or are accessible to, all entrepreneurs in a particular business. Avoid subsidising individual entrepreneurs and not their competitors.

Avoid using public funds to finance things that should be financed by private actors. It is an illusion to believe in the gradual taking over of cost by entrepreneurs.

Stick to the facilitator role: do not become part of the actual supply or value chain, but remain outside the chain.

In some cases it may be a promising option to use public funds to create a commercial structure within the chain, a wholesale or marketing company that takes on business functions that none of the existing actors is able to perform because they are too small in size or geographical reach (see section 5.5 for more on this).

To enable small farmers to play in the high-value league, public funds will be required for the following:

R&D and product adaptation/diversification need to be (partly) publicly funded, because private entrepreneurs are often unwilling to invest in the development of technologies that can be easily copied and do not promise high margins, as explained in Chapter 3.

Generic promotion and social marketing of the technologies through tests and demonstrations, awareness creation through mass media targeted at innovators and early adopters can be publicly funded, because it is justified to open up opportunities for many private entrepreneurs through public funds. This promotion does not distort but creates markets. The market creation process will only become self-propelling once a critical mass is achieved. Until then, it is justified to invest public funds in promotion: this will considerably reduce the transaction costs along the supply chain and make the technologies much more affordable. Once a market is there, generic promotion is less needed and promotion costs have to be borne by the supply chain actors, who will go for branded promotion of their own products. Incorporating some of the promotion cost into the product price from the beginning is advisable to ensure that the supply chain actors and the customers get a realistic perception of the economics.

Quality control and branding may be supported initially with public funds. Branded products will be spearheading the supply chain, set a benchmark for the market in quality, price and service delivery, and help customers distinguish good quality from cheap copies. However, quality control will have to be ensured ultimately by the supply chain actors, and efforts towards this should not be initiated too late.

All kinds of capacity building of actors in supply chains, output value chains, other service providers and farmers need to be at least partially publicly funded, provided that this does not result in unfair advantages for particular actors. In the case of capacity building with very direct and obvious benefits for private actors, it is desirable to have financial participation. The publicly funded capacity building efforts will support the actors to reach a new level of expertise that enables them to do all the

new tasks well. However, in the longer term there will be the need for further upgrading of knowledge, and this needs the permanent presence of capacity building services, either public or private. Thus, fostering longer-term availability of know-how services at all levels of the system also needs publicly-funded interventions.

Organising smallholders into producers' groups, or supporting existing groups to become viable suppliers to modern marketing chains, is also a task which needs public funds because the smallholders are unlikely to be able to achieve this on their own.

Identification of high-value opportunities is another case for public funding because smallholders usually do not have the wide-ranging exposure necessary to identify new profitable opportunities on their own.

Facilitating links between actors is another area for intervention with public funds, but also we need to pay attention to the question of who will take care of these linkages once there are no public funds, and the capacity of chain actors to maintain the necessary linkages in the longer term needs to be built.

There are no unambiguous rules on what can be subsidised and what should be left to the private initiative, and we are in no position to give a final answer to this question. What is important is that facilitators are aware that improperly applied subsidies can do much harm, and that they think carefully how to use their funds and always keep in mind that they should not create an artificial environment that would collapse after withdrawal⁴⁷.

Changing roles of facilitators

Facilitators need to undergo subtle role changes in the course of a market creation intervention. Initially, when there is no supply chain and while it is not viable for private actors to play an active role in the market, the facilitator needs to play a very active role. Only the facilitator can bring the first demonstration kits or pumps to the fields. Therefore, the facilitator will be running around installing drip systems, while the farmers and the prospective supply chain actors will watch with curiosity and a good deal of scepticism.

However, once the market creation starts working and private manufacturers, dealers, installers and nurseries can start selling, the facilitator has to stand back and let the others do the job.

It is crucial to have an explicit withdrawal strategy from the very beginning. The difficulty is to know what is the right moment to play a certain role. Sometimes a facilitator needs to push, sometimes s/he needs to pull, and

sometimes s/he has to step aside and let the others do. It is psychologically challenging to withdraw and to let go.

In Chapter 3 we introduced the four phases in a market creation and supply chain development process and the four Ps of marketing (product, place, price, promotion). The roles of the facilitator change for the different P with the phases.

R&D phase. In the R&D phase the facilitator needs to work on both ends of the chain to create first supply and demand. Apart from technology R&D, the situation and opportunities of the potential customers/users and the supply chain need to be studied. Potential partners among development institutions should be identified.

Product adaptation is crucial. Adapt it to diverse local needs, make it serviceable, aim at affordability and efficiency. One or a few manufacturers and a small number of different types of farmers should be involved in the R&D process.

Promotion aims at farmers, supply chain actors and development agencies. Good tools at this stage are demonstrations and experiments, exposure trips, and seminars (mainly for development agencies). The key message is utility, reliability and credibility. Make sure that every demonstration works.

The time required for the R&D phase depends on how well the technology already fits the requirements. In the case of imported products the R&D phase will serve to test and compare different types of equipment and identify those types that are most suitable under the given circumstances.

Introduction phase. The key strategy in the introduction phase is to create a critical mass of demand and supply as quickly as possible. Without this, no supply chain will ever emerge. The main target users are the innovators and the earliest adopters.

At this stage a few hundred pieces are manufactured or imported as showcases and placed with suitable customers (local innovators, respected in their community). Motivate supply chain actors to increase supply gradually, by guaranteeing sales, and by linking them with customers.

The price should be realistic but is not yet central. Quality is more important than price at this stage.

Start building up a supply chain, involving the most interested manufacturers/importers, distributors, dealers, installers. Build capacity, let them gain interest and experience.

Raise interest and create visibility and demand through demonstration and tests at innovators' places, in markets and so on. For development actors, conduct impact studies and engage in policy dialogue.

The time required for the introduction phase varies between one and three years. It depends a lot on how new a technology is in an area: whether, as in the case of drip irrigation in Maharashtra, the technology in principle is known, but only in a form that is unaffordable for smallholders, or whether, as the other extreme, irrigation is completely new.

Maturation (take-off) phase. In the maturation phase the facilitator has to step back gradually; the supply chain actors become the doers in all aspects. The early majority and the faster ones of late majority are the target. Reaching the late majority may need further efforts by the facilitator. Links to complementary interventions may be helpful (in the case of drip irrigation to watershed management and water storage).

The products need to be diversified, new R&D to be undertaken to develop different models for different customers, particularly models suitable for poor customers.

Pricing is crucial. The supply chain needs adequate margins, but affordability is important too.

Encourage more supply chain actors to create adequate competition. The supply chain becomes the driving force. All transactions must be done by private actors. Customers may need access to credit.

The focus is on large-scale generic promotion (mass media). Branded promotion paid by supply chain actors first complements and then gradually replaces generic promotion.

The maturation/take-off phase can be estimated to take between three and five years.

Saturation/withdrawal phase. In the withdrawal phase the facilitator gradually withdraws and focuses on consolidating the supply chain by identifying and resolving problems, and on ensuring that all links are stable and do not collapse after withdrawal.

With a strong supply chain, there should be enough competition to keep prices low. Prices and related qualities become more diverse.

The supply chain should now work without support. However, controlled withdrawal is necessary to ensure that there is no collapse. The facilitator should continue to keep an eye on the chain economics to check whether all links are sufficiently profitable.

The supply chain should take care of continued promotion.

5.4. DESIGNING MARKET CREATION INTERVENTIONS

The following paragraphs describe an approach to assess the constraints along supply and value chains, and to design appropriate interventions.

Constraint and opportunity assessment

A key step in designing interventions is a constraint and opportunity assessment. A good way to proceed is to put the farm families at the centre and analyse what constraints they face for increasing their productivity. The graph on the following page shows that typical constraints and opportunities may occur in one of three areas within the vertical value chains in which smallholders operate:

The input market – the enterprises and organisations that provide the goods, services, and information required for agricultural production.

The small farm – the household production unit that consumes inputs to cultivate crops for self-consumption and for sale to output markets.

The output market – the enterprises and organisations that provide the goods, services and information required to move the small farm production from field to consumers at economically rewarding prices.

Typically, inputs and support services are not available to smallholders in forms that are useful to them or at affordable prices. Constraints faced by smallholders may fall into one or more of the following categories:

Technology – the technologies required to increase smallholder productivity, deliver the necessary inputs and move outputs to markets.

Finance – the micro-credit needs of smallholders and capital needs of enterprises that serve the smallholder market.

Capacity – the knowledge, skills and experience of smallholders and the enterprises that serve them.

Information – timely and accurate market information to aid in decision making, including prices, consumer preferences, product standards and regulations.

Policy – the policy environment within which smallholders and small enterprises operate.

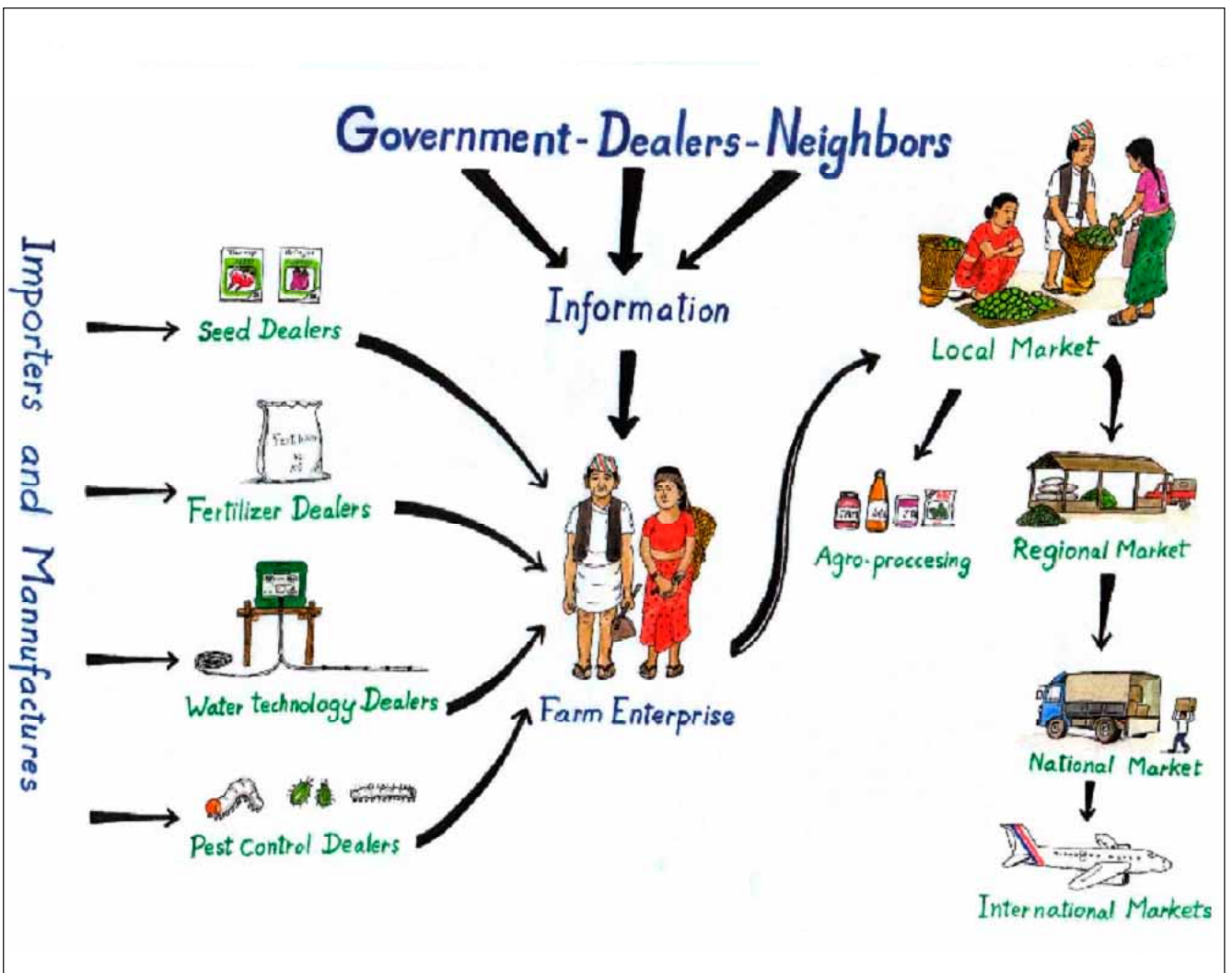
Infrastructure – the physical and institutional infrastructure that facilitates market access and communication.

Not all constraints can be addressed directly by the facilitator. If infrastructure is lacking, it is doubtful whether the facilitator should intervene directly, and for instance provide a storehouse. There are situations where direct involvement is the only way to resolve the problem, but normally it would be preferable to intervene in a way in which, for example, the Government provides the infrastructure, the farmers get themselves organised, or a link with a private enterprise can be established.

Generic steps to put the approach to action

How can a development agency start an intervention using the three pillar approach? This section outlines a series of interlinked steps to design such an intervention⁴⁸. Note that the steps do not necessarily follow each other, but will have to be undertaken in parallel and often in iterative cycles. Note also that all the steps should not be undertaken by consultants and development agencies on their own, but in a participatory, interactive way together with local stakeholders. During implementation, the design will continue to be constantly reviewed and the activities adapted to emerging learning and changing circumstances.

1. Boundary definition: Delineate the boundaries within which the work will take place and define the region to work in. A single area may comprise anything from several thousand to several hundred thousand smallholder households that share a degree of uniformity in hydrology, agro-ecology, socio-cultural characteristics, and/or potential market opportunities.



2. Identify smallholder constraints and opportunities:

The smallholder farmers' constraints and opportunities should be looked at from two points of view:

Look at the smallholders' livelihoods and identify constraints and opportunities for improvements, with a focus on water and land use systems including production as well as marketing.

Analyse different value chains and identify those which could offer good potential for smallholders. Find out what hinders smallholders to participate effectively in these value chains.

3. Determine high-value opportunities: By overlaying the constraints and opportunities identified in the livelihoods and in different value chains, determine the high-value opportunities to pursue in the intervention strategy.

4. Define water strategy: Define a water strategy that enables smallholders to get reliable access to and control over water for irrigation. Emphasis is placed on small-scale, low-cost systems for accessing, storing, distributing and controlling irrigation water. Apart from household-level technologies such as drip and sprinkler systems and treadle pumps, also community-level options such as micro-watersheds, large community tanks and medium sized storage tanks may be appropriate.

5. Assess supply chain options and define market creation strategy: Different options for the establishment of a viable supply chain for water control equipment need to be assessed and potential players at different levels (manufacturers, dealers, installers) identified. Whether local production or import is more appropriate, needs to be studied, and steps and activities for the market creation process need to be defined, from raising awareness and interest in the introduction phase to a strategy for the mainstreaming phase and the envisaged withdrawal, including an outline of a promotion strategy.

6. Social, gender and environmental considerations: In the whole intervention design process, an eye should be kept on any possible undesirable social, gender and environmental consequences of the planned activities.

7. Partnership development: Identify organisations that will be partners in the intervention. They may contribute expertise, services, and linkages. Two types of partners can be distinguished.

Direct service providers are market actors who are aligned with the objectives of the project and receive support to increase their efficiency and effectiveness in

performing their roles. These partners comprise primarily local stakeholders, including private enterprises, micro-finance institutions, business associations, farmer groups and government agencies.

Facilitators assist in the development of smallholder markets by supporting direct service providers. Support may take the form of training, research and development, establishing market and information linkages, awareness raising, demand creation, and policy advocacy, for example.

Based on these analyses an intervention can be designed and planned, in collaboration with the identified partners.

5.5 FACILITATION ONLY, OR CAN THERE BE A CASE FOR AN ACTIVE ROLE IN THE SUPPLY CHAIN?

In general, there is a view that development agencies with donor funds should only act as facilitators outside the supply chain. It is considered 'politically incorrect' to use public funds to support profit-making private units. However, under certain circumstances there may be a case for development agencies engaging as a commercial actor within the chain, as we can learn from the example of treadle pumps in Bangladesh⁴⁹.

IDE ran a programme to disseminate treadle pumps through supply chain development from 1983 onwards (see also pages 42/43). For a long time treadle pumps were extremely profitable for farmers (an investment of only US\$ 25 yielded additional revenues of US\$ 75-100 after 4-5 months), but they never became particularly profitable for the supply chain. Profit margins for manufacturers were minimal (only US\$ 0.5 per pump head), a little better for the dealers (US\$ 1-2 per unit) and substantially better for the installer (US\$ 3-5 for one installation). In the mid-1990s fierce competition arose from cheap diesel pumps and from low-quality but cheap treadle pumps that flooded the market, resulting in further erosion of the wafer-thin margins. Adding value to the product through branding and adding embedded services to the product was the strategy used by IDE at the time to compensate for the trend of declining profits and make the supply chain more profitable. As a wholesale agency promoting a branded product (KB, the 'Krishak Bandhu' brand, Bengali for 'Farmers' Friend'), it was providing much needed working capital to the supply chain, as the pump sales were seasonal and the producers could not afford to finance stocks with their thin margins.

At the time when the treadle pump gradually lost its competitiveness, IDE suggested to donors that they create a specialised Krishak Bandhu wholesale company with

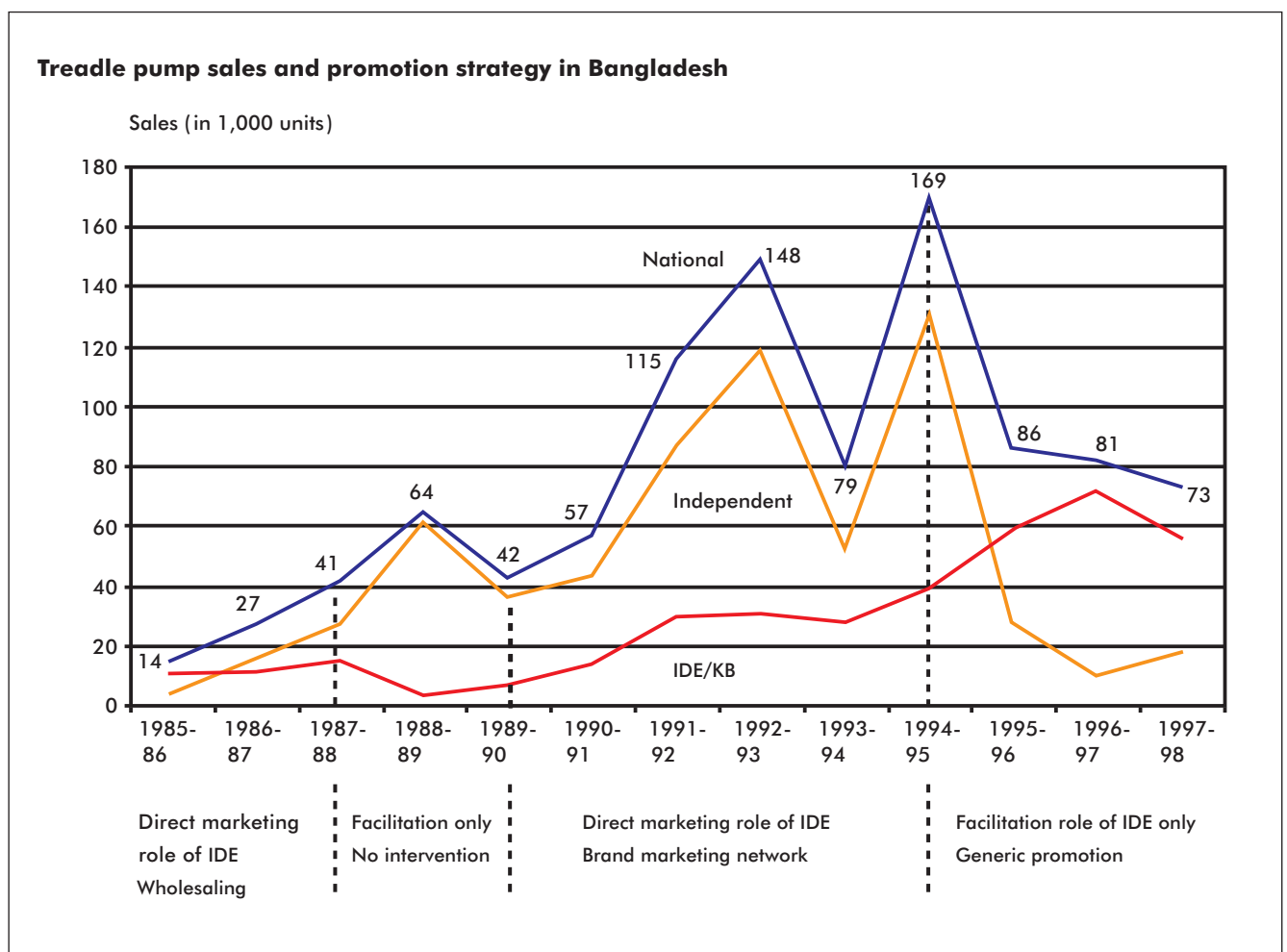
venture capital in order to regularise IDE's role in the supply chain and put it on sustainable footing. This company would have had three major objectives: **1)** to spearhead the market in the high-quality branded segment and to safeguard the notion of quality in the market, **2)** to fuel the supply chain with working capital and thus assure a steady supply, and **3)** to increase the profitability of the supply chain by enabling them to offer embedded services and high-value inputs such as quality seeds.

However, the proposal to set up a viable private company within the supply chain was rejected by the donors, who argued that this would favour an individual private company with public money. IDE then had no other choice than to accept again the role of facilitator and to go for generic promotion activities instead of pushing a branded product. The graph below shows the sales of treadle pumps over the 15 years from 1984 to 1999 in total and separate for independent, non-IDE, and for KB brand, IDE-related pumps in relation to the roles that IDE took in marketing and promotion. The striking observation was that a direct marketing role of IDE boosted the sales of non-IDE pumps more than those of KB pumps. When IDE played only a facilitation role, sales declined, aston-

ishingly even more for non-IDE pumps. When IDE stopped providing working capital and changed from a branded towards a generic promotion strategy, the market virtually collapsed, and sales dropped by half in just one year. The supply chain was left in total chaos, and more and more of the actors' earlier profits were eaten up. Due to limited profitability, the supply chain could not invest in upgrading the value of products and in branded promotion of their own products; the treadle pump was promoted as a 'commodity', and this was the 'kiss of death' to a sustainable supply chain. This was heavily accentuated by the fact that the treadle pump had lost its competitiveness in a liberalised emerging water market.

Although other factors have also probably played a role in determining the sales pattern, the importance of the presence of a strong marketing and promotion actor is evident.

The proposed but not realised Krishak Bandhu marketing company is, in hindsight, a missed opportunity to set up a profitable and sustainable delivery mechanism for affordable rural technologies and quality agro-inputs. This company could have served as a wholesale com-



pany procuring pumps and providing working capital to manufacturers throughout the year. Without this, most workshops did not produce pumps during the lean season, and when sales took off from October to March there were never enough pumps in the market. Another important function would have been to continue some important elements introduced by IDE such as to promote a branded pump that stands for quality. IDE had introduced quality marks for KB, a guarantee certificate and so provided distinction to the dealers committed to quality and service, raising considerably the profitability of the supply chain. In addition, IDE introduced quality seeds in the supply chain and added an enormous value to the product. The market was flooded with adulterated seeds which did not result in the promised profits from a TP because many of these seeds did not germinate.

This experience constitutes a strong case for the need in certain situations to set up sustainable commercial institutions as part of the supply chain using public funds, instead of taking on a facilitation role only. Such a step may be pragmatically the right solution even if it does not correspond to the rule book.

A carefully designed company is an option if it does not compete with existing private enterprises, but fills a gap in the market and results in benefits that are in the public interest and/or in the interest of all the stakeholders in a certain sector (such as all the treadle pump supply chain actors in Bangladesh). Its task may be spearheading the market, setting quality standards and conducting quality control, providing working capital to SMEs of the chain, or promotional activities.

Such a company should be set up along very commercial lines, and be financed with risk capital and not grant money. Grants may be needed for specific tasks in the public interest such as R&D, training or demonstrations to poor farmers, but the commercial operations should be financed by interest-bearing loans or serviced shares. Local private actors (manufacturers, dealers, producer groups) should take on partial ownership (as shareholders) as early as possible.

An example for a donor-induced private enterprise is for instance BYS, Balaju Yantra Shala, a mechanical workshop in Nepal created by Helvetas (a Swiss development NGO). No other company in Nepal was able to produce high-quality mechanical parts such as the steel parts for suspension bridges, and thus the establishment of BYS was considered a step in the public interest.

5.6. RECENT LESSONS FROM IMPLEMENTATION PRACTICE

Limits to 'wild' dissemination – learning from Nicaragua

In Nicaragua, and partly also in other countries in Central America, the introduction of micro-irrigation technologies has been booming⁵⁰. What can be learnt from the experiences there?

Several droughts and irregular rainfall have sensitised many farmers to the fact that water control is crucial, and modern farmers have adopted drip systems for high-value crops such as grapes and vegetables (tomato, cucumber, paprika, etc.).

Many NGOs promoted micro-irrigation kits (usually from 200 m² to 1,000 m²) as a means to fight poverty. They distributed kits to their target population, mostly as 'gifts' and sometimes on a loan basis. The kits were partly delivered with, but mostly without, proper technical assistance.

The results of this 'wild' and uncoordinated dissemination of drip irrigation equipment are not very encouraging. Far more than half of the systems are not functional or not optimally used. The equipment is imported and relatively expensive; a system for 900 m² costs some US\$ 180 (equalling around US\$ 2500/ha) and the supply chain of equipment, installation services and spare parts is very weak, although in the last two years the situation has significantly improved, and more and more private importers have become interested in smallholder farmers. Imported KB drip systems from India, for instance for coffee, would cost in the order of US\$ 800-1,000/ha, including margins for dealers. With sufficient volume of sales, local production could be envisaged which would probably bring the costs down further.

One of the key errors was the supply-driven approach. NGOs and government programmes used the systems as well-intended 'gifts' for their target population, without a thorough analysis of the constraints these farmers face in using the technologies productively. Many farmers did not have enough water, received the wrong advice or were simply not equipped for a radical change of their farming system. Many do not have access to markets and are not organised to cater to new procurement structures. For example, a new vegetable procurement organisation, Hortifruti, is interested in purchasing tomato and other vegetables, but its truck only passes by to collect produce on Mondays, Wednesdays and Fridays. A large, drip-irrigated farm in Chinandega regularly sells tomatoes to Hortifruti. Small farmers in the same area, however,

would first need to get organised and deliver the proper qualities and quantities regularly and freshly on the right days, before they can expect the truck to stop to take their products.

Overall, there is a huge potential to enhance rural incomes in Nicaragua, if small farms can raise their productivity and become competitive suppliers of high-value crops for local and foreign markets. Without such an improvement of competitiveness, the prospects for smallholders in Nicaragua are bleak. Even in local markets globalisation is not a future threat, it is already there. Drip irrigation is an important element of such competitiveness. However, a successful introduction of low-cost drip irrigation in a country like Nicaragua would need much more systematic and concerted efforts based on the SIMI approach:

1. Stimulate private supply chains for affordable equipment and embedded services. A first step would be that NGOs and government agencies do their institutional procurement through private local dealers and stop buying the equipment in bulk in Managua and transport it in their own vehicles to the field. This role of 'intermediaries' undermines the emergence of local supply chains. Farmers should buy the equipment on loan, or rental systems may be established.

2. Undertake efforts to explore and validate new profitable opportunities, to enable farmers with good potential to engage in promising clusters of high-value produce (such as irrigated premium coffee, meat and milk production, horticultural crops), and to link them with 'commercialisation routes' like the Hortifruti truck, and to provide the farmers with the necessary competent technical assistance.

3. Employ a differentiated approach that addresses separately very poor farmers with low commercial potential. These farmers may well benefit substantially from small drip kits for kitchen gardens, provided they get proper capacity building.

4. Build up a competence centre for market creation and low-cost water control technologies that can provide competent advice on all aspects and facilitate orchestrated efforts.

Another lesson from Nicaragua: low-cost drip irrigation is good for coffee farmers linked to the Nestlé supply chain

A very promising example is the introduction of low-cost water control technologies in coffee growing. In February 2006, a pilot project was launched that introduced low-

cost drip irrigation on twenty coffee farms in Nicaragua. This project is a joint operation of IDE and the ECOM Group, Exportadora Atlantica S.A., which is one of the largest coffee exporters and a supplier of high quality coffee to Nestlé; it is also part of the Sustainable Agriculture Initiative (SAI)⁵¹.

More than 90% of coffee farmers in Nicaragua are smallholders with land ranging from 1 to 10 manzanas (0.7-7 ha) and very low productivity. Typically, small producers harvest in the range of 5-12 quintals (1 quintal= 100 pounds), while the best coffee producers in the country achieve yields up to 45 quintals.

One hypothesis is that water stress during the flowering period is a major reason for the low productivity. The absence of rains after the various flowering cycles (3 cycles in six weeks; the first cycle accounts for around 25% of the production, the second cycle for around 40% and the third one again for 25%) causes the loss of at least one full flowering cycle. Farmers themselves assessed that if water was available after all flowering cycles, the average productivity may go up by at least 30 to 40%.

In February 2006, low-cost drip irrigation systems from India (KB drip) were installed on the 20 farms with technical support by experts. In November 2006, the first results showed almost unbelievable increases in yields: most farms reported up to 60% more coffee fruits than in the control group without drip irrigation. Soon, the coffee will be harvested and the definitive results will be available.

Although it is too early to draw final conclusions, it strongly appears that low-cost drip irrigation leads to substantial improvements in productivity and in quality. To validate these results further, a larger scale experiment with at least 500-1000 farmers with systematic recording of agronomic data will be needed.

For these farmers one problem is already solved: being part of the Nestlé supply chain, they have no problem with marketing their coffee. If they can produce premium quality or specialty coffee, they can fetch prices as good as with organic coffee. Moreover, as part of the Sustainable Agriculture Initiative, ECOM provides their coffee farmers with quality inputs (e.g. hybrid plants with much higher yields) and an excellent agricultural extension service giving them access to best practices in coffee growing and processing.

Low-cost water control technologies may not be the only answer to any future coffee crisis: if prices again drop below production cost, many farmers will again abandon

Micro-irrigation in Central America: what works



Mr Eric, an innovative farmer from Somoto, has experimented successfully with irrigated avocado – and found a market



Very skilled and innovative, he invented local sprinklers and is supported by a capable local NGO



Luís Angel is an engineer in Estelí selling drip equipment and providing embedded installation services



Luís Bravo from Chinandega sells drip equipment with embedded advice and has set up a farmers' training centre



One Don José has opted to grow tobacco using drip irrigation, doing contract farming for a local cigar factory



Another Don José (right) from the same village is happy with micro-irrigation. He gets good assistance from a local NGO

Micro-irrigation in Central America: what does not work



This farmer's new drip equipment for his 3,200m² of melon crop does not work. That's quite some frustration!



'Good stuff' but bad installation. The tank is too low and would require pumping water 8 hours a day with a rope pump



His neighbour uses furrow irrigation. He's postponing his trial of drip until the system works in the melon field



Supply chains are very weak. Good equipment is available, but mainly in the capital. Spare parts are often scarce



This farmer grows onions with furrow irrigation; he knows that drip would save water and yield better quality but...



... the market is poor. Middlemen buy onions as a standing crop, and do not pay more for good quality

their coffee plantations as they did from 1995 to 2004 when coffee prices reached an all time low and they could not afford to purchase inputs anymore. However, if they can achieve high productivity and above all, good quality, then they can at least improve their competitiveness for future crisis periods.

But to enable larger numbers of coffee farmers to profit from the potential that low-cost drip irrigation offers, another issue still remains to be solved: the establishment of an efficient and viable supply chain for low-cost water control technology. In Nicaragua commonly imported drip irrigation equipment costs USD 2000 per ha. At these costs no small farmer in Nicaragua can afford to purchase it. If the costs can be reduced to USD 800 or less per ha, it will look far more interesting for small farmers. But for this to happen, efforts to set up create a market with a supply chain with local manufacturers, distributors and dealers and sufficient demand volume need to be undertaken.

Nepal SIMI – successful application of the full three pillar approach

The Nepal SIMI programme is a collaborative effort involving IDE and Winrock International and several Nepali NGOs, as well as Nepali government institutions. It started in mid 2003 and works in nine districts of Nepal. Its main goal is to energise the horticultural sub-sector in order to create lasting opportunities for smallholders. The programme shows how to put the three pillar approach successfully into practice and achieve scale in impact within a short time.

The first pillar is used as entry point. Depending on the specific conditions of an area and people's demands, Nepal SIMI introduces treadle pumps, drip irrigation, low-cost sprinkler systems and water storage tanks, sometimes in combination with multi-use water source development (combining drinking water and micro-irrigation). The programme mobilises interested farmers to form micro-irrigation groups, mostly based on existing organisations, and provides them with technical and marketing capacity building support. It also established revolving micro-credit funds to facilitate acquisition of water control equipment by small farmers.

In the second pillar, the programme builds the capacity of manufacturers⁵², agro-vet stores, specialised micro-irrigation dealers and of installers to supply micro-irrigation technology and provide accompanying services. It also builds the capacity of input suppliers to provide information and advice together with their sales – embedded services – and has introduced a range of new input technologies (IPM products, organic fertilisers, micronu-

trients) and appropriate varieties through the supply chain.

The most effort goes into the third pillar. Here Nepal SIMI facilitates value chain analyses to identify profitable opportunities that are feasible for smallholders. It supports the establishment of village-level collection centres and the formation of local marketing committees that facilitate efficient product aggregation and links to traders and distant markets. Further, investments are mobilised for improving market infrastructures in rural towns and capacity is built to enhance the management of these markets. A very important aspect is the building of know-how about market systems, marketing, price mechanisms and post-harvest handling. Finally, the programme promotes an enabling policy environment for high-value agriculture, in particular on issues of trading in agricultural products and taxation.

With this approach Nepal SIMI has brought about a 2.5 fold increase in average annual income from USD 74 to 185 through increased sales of USD 7.7 million for over 30,000 households within two years (see page 63 for the programme's RoI). This is a remarkable achievement even though the programme does not work in the most remote and poor areas of the country.

Drip irrigation for coffee in Nicaragua



Experiments with low-cost drip irrigation on 20 farms have been testing whether avoiding water stress during the flowering period brings better yields



These experiments are a joint initiative by IDE and the ECOM group, one of the largest coffee exporters in Nicaragua, and part of the Nestle supply chain for high value coffee



Low-cost drip irrigation equipment imported from India is installed on one of the pilot farms



Preliminary observations report up to 60% more berries on the coffee trees compared to control plots without drip irrigation

SIMI (Smallholder Irrigation Market Initiative) in Nepal



This 50-year old woman farmer has a family of fourteen. With drip irrigation she earned more than US\$ 200 in one season



This family now sells US\$ 150 worth of vegetables a year. No need for the husband to migrate for work to India any more



Tanks for drip irrigation systems are moved from the local manufacturer to regional assemblers and retailers



This vegetable collection centre, headed by Ms Kamala, can sell larger quantities more regularly to traders



This agro-input dealer in Palpa supplies drip irrigation equipment, agro-inputs, and 'embedded' advisory services



Women's group producing hybrid tomato seeds with technical assistance from Nepali research institutions

6.1. ORCHESTRATION OF EFFORTS IS ESSENTIAL

The three pillar SIMI approach has the potential to contribute a step towards making poverty history.

Currently, development efforts in the three pillars (linking small farmers to markets) are widespread and often successful. Efforts in pillar I (affordable water control technologies) are also fairly popular but they often fail to have large-scale impact because nothing is undertaken regarding market creation and supply chain development. Efforts in pillar II (market creation/supply chain development for pro-poor technologies) have so far been rare, apart from a few organisations who specialise in such approaches such as IDE in Asia and Africa, Enterprise Works in West (and East) Africa, and KickStart (formerly Approtec) in East Africa.

Concerted efforts that move all three pillars ahead simultaneously have so far been rare, but they are the real key to success. The approach works only if the three pillars are in place; with just one of the three pillars missing, it does not work. Without water control, farmers cannot produce crops when they are needed and fetch high prices; without profitable supply chains the technologies will not be widely accessible and there will be no spare parts available when needed; and without market access it is futile to invest in water control and produce high-value crops.

Concerted efforts in all three pillars do not mean that one development agency has to engage in all three pillars. A more practical strategy is for like-minded organisations in an area to join forces and engage in a complementary way. The different activities are orchestrated and coordinated, much like a concert which only sounds good when all the musicians are playing their part at the same place and time, and when they are tuned in and guided by the conductor.

6.2. SIMI: THE SMALLHOLDER IRRIGATION AND MARKET INITIATIVE

SIMI, the 'Smallholder Irrigation and Market Initiative', is a plan for massive scaling up of the three pillar approach of water control, supply chains and market access, as described in this booklet. The initiative is proposed by like-minded organisations with an ambitious goal to make a dent in the UN Millennium Goals: to help at least 20 million small farm families move out of poverty by

2015, by supporting them in making their limited assets (land, water, family labour) more productive. SIMI is a coalition of like-minded organisations that subscribe to the same goal and is constructed from the bottom up.

The SIMI approach is different from conventional approaches as it introduces a new, market-driven delivery channel for development interventions. It does not believe in free gifts or subsidies for products and services. However, it firmly believes in affordable technologies and services. The approach aims at triggering substantial investments by farmers as well as the private sector.

Efforts which are based on replicating and adapting the SIMI approach are being made in various countries, often with the involvement of IDE (such as the joint project by IDE and Winrock in Nepal mentioned in section 5.1).

SIMI efforts can be implemented in a **project mode** (as in the above case) or as an orchestrated effort with multiple partners in a **programme mode**. Such a programme may be **geography-based**, targeting regions or countries, or **theme-based**, targeting, for example, the high-value coffee sector, or HIV/AIDS-affected people).

SIMI wants to act as a common orchestration platform of organisations engaging in efforts based on the SIMI approach in a country or a specific thematic area, and to join hands with complementary organisations to achieve the same ambitious goal: to make poverty history for millions of smallholder families in the coming decade or so. SIMI thinks globally but acts locally: the foundation of SIMI is envisaged to be formed by local initiatives in many countries.

In practice this could mean a group of organisations that want to engage in SIMI jointly planning a programme. One of the organisations would usually take the lead; an alternative is to form a consortium. The leadership function may include establishing a local resource centre with the capacity to arrange all support needed and to coordinate implementation and monitoring of the programme.

Since know-how and experiences with the full three pillar approach are still limited, these programmes will require different kinds of support (capacity building, technology blueprints, policy advice, agricultural innovations and marketing expertise). International resource structures to support the SIMI efforts on the ground will be helpful. Therefore, SIMI needs to engage at an international level.

el, with the following roles across countries and continents:

- coordinating knowledge management and experience capitalisation,
- facilitating mutual learning and technical assistance,
- advocacy and lobbying to muster support for the initiative with decision makers.

What could be a possible structure of SIMI? SIMI should not form new bureaucracies. A slim coordination and support structure is essential. It is not realistic to expect that things fall in place by themselves.

There will be no central legal entity at the global level of the coalition (rather an acknowledgment of a common charter); legally binding agreements are made at the level of the regional or thematic programmes.

The governance of SIMI is placed at two levels: a SIMI coalition is formed as a group of like-minded organisations (bi- and multilateral donors, International R&D and service providers, facilitators and implementers, private sector representatives). The coalition may include several hundred organisations in a loose association, while a small group, the 'SIMI board', will oversee policies and overall direction.

At the global level, a small coordination team, located within an existing SIMI partner organisation, will perform some central functions such as a common website, publication of key training materials, lobbying for and information about SIMI, and representation in key conferences. The coordination team will start small and may grow with the overall initiative.

6.3. SIMI AND THE MDGS: CAN WE REALLY PUT AN END TO POVERTY?

Although SIMI proposes an ambitious goal towards the MDGs (Millennium Development Goals), it is obvious that no programme or no initiative alone can really achieve the impact required to end poverty. What is known is that the approach has proven its ability to end poverty. If a coalition of like-minded agencies can put their resources together and scale up the approach, it has the potential to make a dent in the MDGs. If a critical mass of SIMI-approach programmes is implemented, it is hoped that the initiative can grow from a programme into a movement and thus reach even more people. While such an ambitious programme looks at a first glance like a dream, it looks more realistic if it is broken down into regional and/or thematic programmes: if five development agencies take the lead and come together to im-

plement SIMI in 15 countries and to launch the approach in one or two thematic programmes, it sounds much more feasible and realistic. Or, as John Lennon says: 'you may say I'm a dreamer... ..but I am not the only one'!

FOOTNOTES

- 1** Nagayets, Oksana: Small farms - current status and key trends, <http://www.ifpri.org/events/seminars/2005/small-farms/SFbgpaper.pdf>
- 2** See also: Farming systems and poverty – improving farmers' livelihoods in a changing world, FAO/World Bank, 2001
- 3** Horticulture for poverty alleviation – the unfunded revolution, AVRDC, World Vegetable Centre, Working Paper No.15
- 4** See Michael Lipton: Rural Poverty Report 2001, IFAD Rome, 2001
- 5** See Urs Heierli and Paul Polak: Poverty alleviation as a business – the market creation approach to development, Berne, SDC, 2000
- 6** Michael Lipton points out how important staple crop production is for the poorest farmers, mainly in terms of food security and thus reduction of vulnerability. To increase the productivity of staple crop for home-consumption is thus an important issue as well (see Michael Lipton, Rural Poverty Report, IFAD, Rome, 2001)
- 7** The proceedings of this conference are available at: <http://www.ifpri.org/events/seminars/2005/smallfarms/sfproc.asp>
- 8** See Tushaar Shah: Pedalling out of Poverty: Social Impact of a Manual Irrigation Technology in South Asia, IWMI 2000, www.iwmi.cgiar.org
- 9** See FAO/World Bank 2001, op. cit.
- 10** R. Barker, B. van Koppen, T. Shah: Water scarcity and poverty, International Water Management Institute (www.iwmi.cgiar.org)
- 11** See Christoph Studer: Wasser im Essen, Symposium 'Ohne Wasser keine Nahrung', Infoagrar, Zollikofen 2003 (http://www.infoagrar.ch/wasser-symposium/images/referat_studer.pdf)
- 12** Tushaar Shah: Water and welfare – critical issues in India's water future, IWMI-Tata, India 2004, <http://www.iwmi.cgiar.org/iwmi-tata>
- 13** Sandra Postel: Pillar of sand – can the irrigation miracle last? Norton, 1999
- 14** See www.wocat.org for a database on soil and water conservation technologies and www.pasolac.org.ni for information on micro-tanks in Central America
- 15** Paul Polak points out: 'To design products and services that meet the needs of three billion customers who earn less than two dollar a day requires a revolution in the way design is taught, both in western and developing countries, based on the ruthless pursuit of affordability' (in Water and the other three revolutions needed to end rural poverty, paper presented at the Stockholm Water Conference, August 2004)
- 16** This crop insurance scheme is implemented by BASIX (www.basixindia.com)
- 17** For more information on treadle pumps see www.ide-india.org and www.ide-international.org
- 18** For information on the rope pump see www.rwsn.ch
- 19** These technologies were developed by Practica Foundation (www.practicafoundation.nl)
- 20** The study was undertaken within the frame of the Aguasan programme (SDC in collaboration with CARE). More information is available in the study document (Simon Zbinden, Carmen Pong et al.: Agua contra la pobreza, COSUDE-Aguasan, Managua, 2005 (Spanish with a summary in English), www.siminet.org)
- 21** C.K. Prahalad: The fortune at the bottom of the pyramid - eradicating poverty through profits, Wharton School Publishing, 2005
- 22** Geoffrey Moore: Crossing the Chasm, Oxford 2000
- 23** Kotler PhilipKotler, Gary Armstrong: Principles of marketing, Prentice Hall, 2006
- 24** Kotler puts it this way: people do not want a mousetrap, they want a solution against mice, and this may also be a cat, a poison, a mouse catcher, etc. (Kotler op. cit.)
- 25** For more details see the presentation of Niraj Subrat 'IDE's promotion strategy and a conceptual input' at the workshop 'Smallholder irrigation and value chains', Aungmyetharaya, India, 2003 (workshop documentation available at www.siminet.org and on CD)

- 26** See the very thorough evaluation of 20 years of treadle pump marketing in Bangladesh by Roda Mehta: Final evaluation study of the marketing appropriate technology program for treadle pumps in Bangladesh, 1984-2003, SDC and IDE, 2004
- 27** See MAT Evaluation Study, Roda Mehta (op. cit.)
- 28** For a detailed description of the approaches used, see the presentation of Shivani Manaktala at the workshop 'Smallholder irrigation and value chains', Aurangabad, India, 2003 (workshop documentation available at www.simi-net.org and on CD)
- 29** The emergence of copy-cats cannot and should not be prevented; they are a good sign of market development. But to maintain quality standards and preserve profitability of higher quality products, it is essential to be present with a branded product and with certified producers in order to set a quality benchmark. Farmers can then choose between the branded product for a certain price and cheaper alternatives.
- 30** See Elisabeth Katz: Innovative approaches to financing extension for agriculture and natural resource management – conceptual considerations and analysis of experience to financing extension, LBL, Lindau, Switzerland, 2002
- 31** S.J. Phansalkar: Enhancing participation of smallholders of semi-arid regions of India in horticultural markets, IDE India, New Delhi, 2003
- 32** Oxfam International: Mugged: poverty in your coffee cup, 2002
- 33** See www.saipatform.org for more information
- 34** For more information see www.echoupal.com
- 35** Supported by SDC (Swiss Agency for Development and Co-operation)
- 36** IFAD: The adoption of organic agriculture among small farmers in Latin America and the Caribbean – thematic evaluation, Rome, 2003
- 37** IFAD: Organic agriculture and poverty reduction in Asia: China and India – thematic evaluation, Rome, 2005
- 38** Frank Eyhorn et al.: The impact of organic cotton farming on the livelihoods of smallholders – evidence from the Maikaal project in central India, FIBL (Research Institute of Organic Agriculture), Switzerland, 2005
- 39** More information on the Maikaal organic cotton project under www.remei.ch
- 40** Thomas Reardon et al: Supermarketization of the 'emerging markets of the Pacific Rim: development and trade implications, Journal of Food Distribution Research, Vol. 36, March 2005
- 41** Thomas Reardon et al. (op. cit.)
- 42** Celia Dugger reports of a sad example from Guatemala: The food chain: survival of the biggest - Supermarket giants crush Central American farmers, The New York Times, 28th December 2004
- 43** L. Flores: Small farmers, lettuce and supermarkets in Guatemala, Masters Thesis in Agricultural Economics, East Lansing, Michigan State University, 2004
- 44** Personal information from Michael Velten of the concerned SDC-funded and Swisscontact-implemented Agropyme project (www.agropyme.org)
- 45** An excellent publication describes the main problems and opportunities associated with contract farming. Charles Eaton et al: Contract farming – partnerships for growth, AGS Bulletin 145, FAO, Rome.
- 46** GTZ (German Agency for Technical Cooperation) has among others a range of experiences with such public-private partnerships ranging from sustainable cocoa production in Vietnam (PPP with Mars), tomato paste production in Ghana (PPP with Unilever), code of conduct for coffee production (PPP with coffee roasters and other stakeholders), marketing of branded agricultural products (PPP with Metro Cash & Carry in Vietnam), quality management for dates in Tunisia (PPP with Vitaterra)
- 47** More on the use of public funds can be found in 'Business Development Services for Small Enterprises: Guiding Principles for Donor Intervention', ILO, Geneva, 2001. These guiding principles – issued by the donor committee for small enterprise development – aim at preventing donor interventions for small enterprises that distort the market, and that use subsidies in a way that hampers the unfolding of private service providers, and they are valid also for market creation, supply chain and output value chain interventions.
- 48** The steps are derived from an approach developed by IDE and Poverty Reduction through Irrigation and Smallholder Markets (PRISM). A manual on PRISM is available at www.ideorg.org

49 All the information on this example including the graph is taken from Roda Mehta's treadle pump programme evaluation (op. cit.)

50 Urs Heierli and Fritz Kramer : Mercados y micro-riego – tecnologías para el uso productivo del agua, y mercados. Informe de una visita de campo, enero 2005

51 SAI is an initiative by the food industry to support the development of, and communicate about, sustainable agriculture involving all stakeholders of the food chain

52 Some manufacturers were already present before SIMI Nepal started, as a result of earlier efforts of IDE Nepal

POVERTY ALLEVIATION AS A BUSINESS - THE MARKET CREATION APPROACH TO DEVELOPMENT

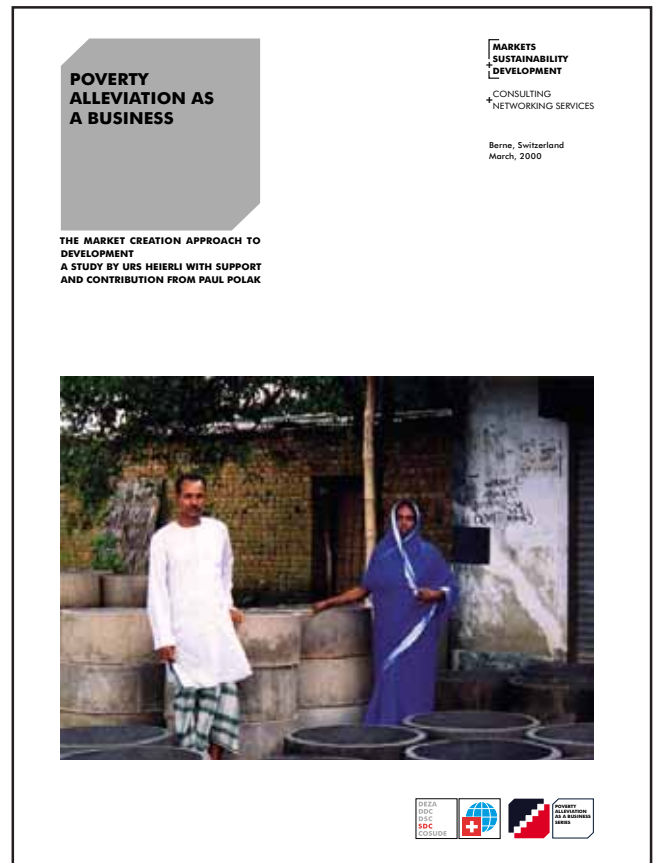
'Poverty alleviation as a business' is the title of the original study about the market creation approach by Urs Heierli, the author of this 2007 volume. Published in March 2000, it summarised the experiences of his 12 years working as country director of SDC in Bangladesh and India (1987-1999). It asked a question that deserves being posed more often.

Can poor people make a business with goods and services that are relevant for poverty alleviation?

The answer is 'Yes!', as shown by the six examples of the original study. To make it happen, markets should be created and technologies must be validated, tested and introduced. If a critical mass of demand is created, small private enterprises will emerge to respond to these new business opportunities.

In the original study, the following six examples are examined in detail. They are analysed according to the 4 Ps of marketing (Product, Price, Place and Promotion) and various performance parameters, especially in view of the potential for scaling them up and replicating them in other countries.

1. 'Hundred million trees as a social insurance scheme: the village and farm forestry programme in Bangladesh'
2. 'Pedalling out of poverty with the treadle pump in Bangladesh, India and Nepal'
3. '60 kilograms more maize per family with 'Postcosecha' silos in Central America'
4. '2,000 micro-concrete roofing workshops produce over 150,000 roofs per year'
5. '6,000 private workshops produce over one million latrines per year in Bangladesh'
6. 'The rope pump in Central America: the scope for private drinking water supply'



ORIGINAL PUBLICATION:

Poverty Alleviation as a Business – the Market Creation Approach to Development
by Urs Heierli, with contributions from Paul Polak
SDC Berne, March 2000

Hardcopies of the original publication can be ordered from SDC, Employment and Income Division, Freiburgstrasse 130, CH-3003 Berne Switzerland, email: e-i@deza.admin.ch

Electronic copies can be downloaded from:
www.povertyalleviationasabusiness.org

ENDING POVERTY WITH WATER CONTROL AND MARKET ACCESS

Small farmers often have lower production costs but they are still not competitive because their transaction costs are high and they cannot produce what the market wants at the right time. Alongside other inputs such as seeds, they need affordable water control technologies and access to profitable markets. As more and more agricultural goods are sold through supermarkets, they need to deliver the qualities and quantities as and when they are needed. In Nicaragua, the supermarket chain sends a truck every Monday, Wednesday and Friday. It stops at places where farmers will always have at least 20 boxes of tomatoes ready.

Small farmers can be competitive in the market provided that essentially three elements are in place at the same time:

- 1.** Smallholders have control over water with affordable irrigation, pumping and water storage technologies not only to irrigate but to be able to schedule the harvests of their crops to meet the market demand.
- 2.** Smallholders have access to affordable water control technologies and other inputs (seeds, know-how, plant protection, credit) not as one time donations but delivered through vibrant and sustainable private supply chains.
- 3.** Smallholders have access to the ever more demanding markets for high-value products. With the fast-growing process of 'supermarketisation' – also underway in many countries of the South – smallholders may be driven out of business if they fail to access these new marketing channels.



POVERTY ALLEVIATION AS A BUSINESS (NEW SERIES)

A new series of case studies will provide deeper insights into the 'Market Creation Approach to Development' as a follow-up to the original study (see inside back-cover).

Several case studies on supply chains or value chains are planned, such as:

Sustainable Approaches to Combat Malnutrition - Small-scale Production and Marketing of Spirulina

Ending Poverty with Water Control and Market Access

One Fly is Deadlier than 100 Tigers - Sanitation as a Business and Community Action in Bangladesh

Marketing Water Purification to the Poor (working title)

Connecting Fashion Designer and Farmer - the Organic Cotton Value Chain (working title)

Making Insecticide Treated Mosquito Nets Affordable without Destroying the Supply Chain (working title)

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