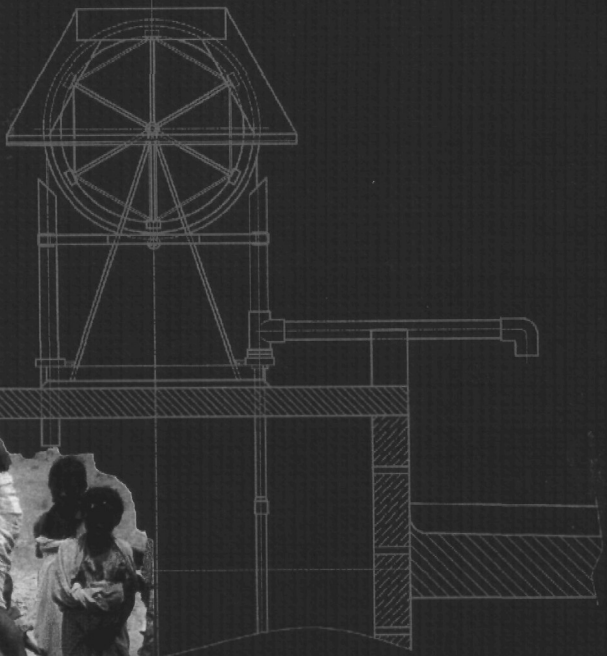
232.2 01FI

First International Rope Pump Policy Workshop

Managua, 2001

Proceedings



BOMBAS DE MECATE, S.A.
Technology Transfer Division

HTN Network for Cost-effective Technologies in Water Supply

RRASCA
Red Regional de Agua y Saneamiento de Centroamérica

IRC

SKAT

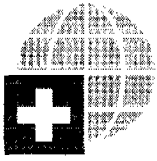
232.2-01Fi-17135-1

First International Rope Pump Policy Workshop

Managua, 2001

Proceedings

LIBRARY IRC
PO Box 93190, 2509 AD THE HAGUE
Tel.: +31 70 30 689 80
Fax: +31 70 35 899 64
BARCODE: 17135-1
O:
232.2 01F1



Author: John Keen
Layout: Catherine Ndiaye, SKAT
Printed and bound in Switzerland
Copies can be obtained from:
SKAT, Vadianstrasse 42,
CH-9000 St. Gallen, Switzerland

Table of Contents

1. Introduction and Context

This document reports the proceedings of the First International Rope Pump Policy Workshop held in Managua, Nicaragua from 14-19 May, 2001. The Workshop was jointly organised by Agencia Suiza para el Desarrollo y la Co-operación (COSUDE), the Regional Water and Sanitation Network for Central America (RWSN-CA), the Network for Cost-effective Technologies in Water Supply and Sanitation (HTN), the Technology Transfer Division of Bombas de Mecate SA, the World Bank Water and Sanitation Program (WSP) and the International Water and Sanitation Centre (IRC).

Section 1.1 gives background information on recent developments in the global water sector and ***Section 1.2*** describes the context in which the workshop was conceived and staged.

1.1 The Crisis Deepens

New ideas have emerged in the Rural Water Supply and Sanitation (RWSS) sector in recent years. Increasing recognition of the need for sustainable, demand-driven supply chains and the need for users and other stakeholders to be fully involved in choosing and managing resources has enabled new approaches to be identified. In particular, the private sector is increasingly seen as having a key role in RWSS provision.

But these initiatives have been overshadowed by some alarming developments. Probably the most significant of these are widespread deterioration in many parts of the world in the quality of water resources management and of the water resources themselves. Examples of such developments include:

- Falling water tables in many countries due to inappropriate or uncontrolled water abstraction for commercial purposes;
- Pollution of viable water resources due to poor water resources management;
- Damage to water resources by natural phenomena such as arsenic contamination;

- Global environmental changes and natural disasters which impact negatively on water resources.

Service provision levels are also causing concern. Some success in increasing RWSS coverage has been achieved, particularly in Asia. In Africa however the situation is becoming critical. Coverage is actually declining in some countries and the continent will need considerable extra resources if the trend is to be reversed.

Further, there is increasing recognition that some of the technology choices adopted in the nineteen-eighties have not proved sustainable. The reasons for this are still emerging but lack of affordability by poor rural communities is believed to be a significant factor.

1.2 A 200-Year-Old Technology Offers a New Solution

Against this gloomy background, the international water community is keen to examine new management approaches and technologies, which offer a prospect of alleviating these problems. Increasing commitment to the role of the private sector and to demand-driven supply chains has already been mentioned. Now, in the Rope Pump, a technology exists which could operate in conjunction with these new management approaches, and perhaps provide a solution to some of the developing world's rural water supply problems.

Certainly, experience in Central America with the Rope Pump has been positive. Based on the old chain pump design, a concept dating back at least two hundred years, the present-day Rope Pump has undergone considerable development in the last decade or so. The IRC Rope Pump Evaluation Mission in 1995 brought the technology to international attention. The Rope Pump's simplicity, low cost, easy maintenance and suitability for local manufacture are the attributes needed to enable users to achieve sustainable management of their handpumps and wells.

Although used in several Central American countries, it is in Nicaragua that the Rope Pump has achieved its greatest impact. This has been due to many factors, but the enthusiastic involvement of private sector manufacturers and NGOs has made an important contribution to its success.

This success has led to the installation of thousands of Rope Pumps, meeting the needs of rural families and communities. It has also enabled Nicaragua to provide technical assistance to other countries wanting to share in the Rope Pump technology.

By the turn of the century many people felt that development of the pump had reached a stage where it was desirable to bring the knowledge and experience gained in Nicaragua to a broader audience, and to examine ways of further exploiting this promising technology for the benefit of the world's poor. It was this widely felt need that led to the First International Rope Pump Policy Workshop, which these Proceedings now describe.

2. Workshop Fundamentals

Section 2.1 summarises the theme and objectives set for the Workshop. ***Section 2.2*** outlines the Workshop's agenda and ***Section 2.3*** introduces its participants. ***Section 2.4*** describes the languages used during the Workshop and the arrangements for translating participants' contributions.

2.1 Workshop Theme and Objectives

The Rope Pump Technology has already been successfully disseminated in Nicaragua and interest in the potential of the technology to meet the needs of other countries has been steadily increasing. An international Workshop offered an opportunity for decision-makers and water supply professionals to familiarise themselves with the Rope Pump technology and to agree methodologies for promoting and disseminating it. Nicaragua was the natural choice for the Workshop venue.

Accordingly, a Workshop was organised with the theme 'Rope Pump Technology Transfer', to take place in Managua. The Workshop's objectives were set as follows:

- To place the Rope Pump on the international RWSS agenda;
- To inform countries' national water supply policy makers on the Rope Pump technology;
- To define structured options to support the Rope Pump technology transfer process;
- To use technology transfer expertise as a tool to promote cost-effective rural water supply technologies.

The intended outputs of the Workshop were set as follows:

- Agreement on the basic principles and guidelines for information sharing in the technology transfer process;
- Agreements with representatives of interested countries on introducing the Rope Pump technology;
- Recommended criteria for defining the interfaces between the private and public sectors;

- Agreement on structural support for technology transfer agencies;
- Definition of future roles and tasks for the exchange of information on impact assessment, and on lessons learned from choosing Rope Pump technology.

2.2 Workshop Agenda

The above theme and objectives were reflected in the Workshop agenda which featured a wide range of activities including:

- Introductory and keynote speeches by invited dignitaries;
- Presentations by international experts on RWSS, technology transfer and rural business development;
- Question and answer sessions at the end of each presentation
- Working group discussions and presentations;
- Plenary sessions to debate and finalise conclusions and recommendations;
- Visits to RWSS project sites and manufacturing premises.

The full Workshop agenda appears in ***Appendix 1.***

2.3 Workshop Participants

The Workshop drew together around 60 RWSS specialists from 22 countries. Participants included representatives from national water sector agencies, bilateral donors, multilateral agencies, external support agencies, NGOs and the private sector. A full list of Workshop participants appears in ***Appendix 2.***

2.4 Languages of Workshop and Translation Arrangements

Addresses from the platform, presentations of papers and contributions from the floor were made in English and Spanish. Workshop participants were equipped with radio headsets with English and Spanish channels, with simultaneous translation provided by personnel located in the Workshop venue. Roving radio microphones facilitated contributions from the platform and floor.

Important documents provided during the Workshop for circulation among participants were available in both languages. The Workshop Proceedings and other important Workshop outputs will be available in English and Spanish.

3. Workshop Addresses and Presentations of Papers

3.1 Inaugural Session

Day 1/Session 1

Inaugural address by Mr Anthony Brand, UNICEF, El Salvador

Words of Desperation and Hope

Mr Brand, the Workshop facilitator, opened the proceedings by addressing individuals on the platform. These included esteemed persons from the Nicaraguan government's Water and Sewerage Company and the Nicaraguan Institute of Water and Sanitation, and distinguished persons from the global water sector. (See list at end of Proceedings). He then addressed the audience of distinguished participants from 22 countries.

'Some words of desperation and some words of hope'. This was the haunting phrase that introduced Mr Brand's theme. He continued by reminding participants of the 1 billion people worldwide without safe water, of the 3 billion without access to sanitation, and of UNICEF's estimate of 4 million child deaths worldwide from preventable water-related disease every year.

Despite global efforts, universal coverage remains a distant goal, leaving the poor, and especially their children, at particular risk. According to UNICEF, the 1.5 billion dollars spent every year is but a fifth of the amount needed annually to offer a prospect of solving the world's water and sanitation problems. Mr Brand described this as a bitter fruit, which the world is harvesting from our history of inequality and exclusion.

No one disputes the right of the child to health, clean water and sanitation, and opportunities for a productive life, yet unequal

distribution of wealth and resources prevent us from guaranteeing these rights to future generations.

Having highlighted the grave challenges faced in addressing global water and sanitation issues, Mr Brand then offered his 'words of hope', mentioning the goodwill and dedication of the Workshop participants and the optimism surrounding the Rope Pump. In Central America, this 200-year-old technology is widely seen as offering the prospect of solving many of the problems of providing safe water to rural areas.

It was the sharing of this conviction and commitment which would underpin the Workshop's goals: the Rope Pump would be placed on the international agenda, actions would be defined to support transfer of the Rope Pump technology and information sharing, and the optimum roles of the public and private sectors would be explored.

Mr Brand drew his address to a close by thanking the government of Nicaragua, Bombas de Mecate SA, SDC, SKAT/HTN, IRC, WSP, UNICEF and RWSNCA for their combined faith in the Workshop – the embodiment of a new effort to transfer an old technology. He concluded with a powerful message to participants – that the Workshop's opening day marked the start of an important new commitment to the world's children and to the future.

* * * * * * * * * *

Mr Brand then introduced Mr Oscar Tablada and invited him to make the Workshop's Keynote address.

Day 1/Session I

Keynote Address by Mr Oscar Tablada, Gerencia Acueductos Rurales (GAR), Nicaragua

The Rope Pump: A Hope for the Future

Mr Tablada was representing the Honourable Minister Roger Solórzano of ENACAL who was unable to attend the Workshop. He opened by welcoming Workshop participants, greeting them all as friends – some local, and others who had travelled great distances to attend the meeting.

He recalled discussions at COSUDE/AGUASAN in which the Minister had supported the proposal for the Rope Pump Workshop, and earlier events in the history of the Rope Pump in Nicaragua. Even in 1992, it had been clear that the technology had an important role to play in the country's rural water supplies. In a programme of 2,240 drilled wells in rural areas, to date 1,750 had been fitted with a Rope Pump. The low cost of the pump had been an important attribute in areas where poverty reduction is a vital task.

Furthermore, the Rope Pump has provided an answer to the question – 'who will install and operate the pump?' Training of users to carry out operation and maintenance has proved straightforward. Evaluations of both old and new pump installations have underlined the sustainability of the technology, although more work is needed to overcome some minor problems, which have been identified. User feedback will play a vital role in this process.

The people and government were proud that the Rope Pump had been developed in Nicaragua. Much hard work had been done in collaboration with COSUDE/AGUASAN, and this had resulted in Nicaragua being able to export the Rope Pump technology to other countries – another proud achievement.

Mr Tablada expressed thanks to Bombas de Mecate SA. ENACAL were always keen to support such initiatives, particularly those benefiting rural areas. He further extended his welcome to participants on behalf of the Nicaraguan government and rural communities, and hoped that participants' expectations would be fulfilled.

* * * * * * * * * *

Mr Brand then introduced the chairperson of the Inaugural session of the Workshop, Mr Moses Gava, Directorate of Water Development, Uganda.

Mr Gava welcomed Workshop participants and introduced the distinguished guests and participants on the platform. He then reviewed the successful dissemination of the Rope Pump technology in Nicaragua and other Central American countries, and looked forward to a successful Workshop in which participants would share in these positive experiences.

He then invited Mr Juerg Benz to address the Workshop.

Day 1/Session I

Introductory address by Mr Juerg Benz, COSUDE, Nicaragua

The Rope Pump: A COSUDE Perspective

Mr Benz extended his welcome to all participants and paid tribute to the organisation and effort, which had gone into arranging the Workshop.

For COSUDE and SDC, rural water supplies had been a long-standing priority extending over two decades. They had welcomed the appearance of an improved Rope Pump which clearly offered new opportunities to meet the needs of rural areas, and had decided to support Bombas de Mecate SA to carry out manufacture, training and dissemination of the technology. They had demonstrated that

the Rope Pump is a good example of how technologies can be successfully blended in a private sector environment.

But technology alone cannot answer all the questions about economic enhancement in rural areas and how government can help to facilitate sustainable water supplies. He welcomed the inclusion in the Workshop agenda of an exploration of the role of demand-driven supply chains in sustainable poverty reduction. Mr Benz also highlighted the important role of global partnerships in achieving mutual objectives.

He concluded by thanking the Workshop organisers and the private sector for extending their co-operation. He was pleased to note the diversity of the group, which made up the Workshop participants and stressed the importance of the Workshop's outputs to COSUDE and SDC while wishing the Workshop every success.

* * * * * * * * * *

Mr Gava then invited Mr Erich Baumann to address the Workshop.

Day 1/Session I

Introductory address by Mr Erich Baumann, SKAT/HTN, Switzerland

The Rope Pump: An HTN Perspective

Mr Baumann addressed the platform and participants and then opened by giving an overview of HTN.

HTN is a global network of organisations and individuals working in rural water supply and sanitation, and was established following the Kakamega Workshop in 1992. HTN has its secretariat at the Swiss Centre for Development Co-operation in Technology and Management (SKAT) in Switzerland and has been largely funded by the Swiss Agency for Development and Co-operation (SDC).

Its main objective is the promotion of cost-effective, affordable technologies such as handpumps.

Mr Baumann pointed out that at present funding levels it will take decades to provide the unserved with access to even basic water and sanitation facilities. High cost solutions tend to benefit the rich only and contradict an important maxim - *'some for all, rather than all for some'.*

The Rope Pump fulfils HTN's criteria for a cost-effective solution to pumping water from dug wells and boreholes. It is affordable, is ideal for local manufacture, and can be easily maintained by users. Naturally, HTN has supported the efforts of its Nicaraguan partners to transfer the Rope Pump technology outside Central America.

Mr Baumann continued by sharing his pleasure that the Rope Pump Workshop was finally under way. Lack of funding had delayed the start of a project for worldwide dissemination of the Rope Pump technology, and he expressed his thanks to COSUDE for financing the local Workshop costs. He also thanked the other local partners, the AGUASAN Project, Bombas de Mecate SA and ENACAL, for their hard work and for making the Managua Workshop possible. It would enable participants to learn from the success of the Rope Pump in Central America and to agree methods to disseminate the technology in other countries.

Mr Baumann concluded by inviting all participants to work together to bring the Rope Pump to many more users throughout the world, to enable them to enjoy safe water.

* * * * * * * * * *

Mr Gava remarked on the simplicity and ease of maintenance of the Rope Pump. He expressed his belief that it was simple solutions that would offer most hope to the one billion people who need safe water, and reminded participants of the dangers of 'donor

fatigue' in the RWSS sector. He then invited Mr Rene Meza to address the Workshop.

Day 1/Session I

Introductory address by Mr Rene Meza, Bombas de Mecate SA, Nicaragua

The Rope Pump: A Private Sector Perspective

Mr Meza greeted the platform and participants, and extended a warm welcome to all.

As director of Bombas de Mecate SA he felt it an honour to attend the First Rope Pump Policy Workshop in Nicaragua. He called upon participants to share their experiences over the next five days to give the Workshop the benefit of such comprehensive expertise, and wished them every success in this endeavour.

He looked forward to the Rope Pump technology being transferred to more countries in Africa and Asia, so they could benefit from this simple, low cost, easy-to-maintain technology.

With the combined efforts of participants poor people had a very real prospect of gaining access to 'the most important liquid in the world'. With this memorable phrase Mr Meza brought his address to a close. He concluded by thanking participants.

* * * * * * * * * *

Mr Gava then invited Ms Maria Aburto to address the Workshop.

Day 1/Session 1

Introductory address by Ms Maria Aburto, El Caimito Community, Nicaragua

The Rope Pump: A Women's Co-operative's Perspective

Ms Aburto greeted the platform and participants, welcoming brothers and sisters from other countries. As a rural mother Ms Aburto felt pleasure at having the opportunity to meet and exchange views in the forum of the Rope Pump Workshop.

As vice-president of the Women's Co-operative at El Caimito, Ms Aburto had seen first-hand the benefits the Rope Pump had brought in her community. A range of improvements had taken place and she expressed satisfaction with the work of Bombas de Mecate SA.

Among the benefits experienced by households, agriculture and children's education had both improved as a result of the enhancement of community life. An example of these improvements was the fact that, despite adverse weather conditions, vegetable production had increased.

Ms Aburto concluded by emphasising her faith in the Rope Pump technology for Nicaragua and extended a further warm welcome to participants.

* * * * * * * * * *

Mr Gava then invited Mr Jo Smet to address the Workshop.

Day 1/Session I

Introductory address by Mr Jo Smet, IRC, The Netherlands

The Rope Pump Workshop: An International Water and Sanitation Centre (IRC) Perspective

Mr Smet greeted honourable guests and participants and expressed his pleasure that the hopes and plans for the Workshop had finally reached fruition.

He traced IRC's involvement with the Rope Pump to 1990, those early contacts eventually leading to the 1995 evaluation mission. This had been an important landmark in the development of the pump. He gave credit to Bombas de Mecate SA for their work in promoting the Rope Pump, and SKAT for their support over many years. He also welcomed the financial support of SDC. Using slides, Mr Smet then summarised the aims and activities of IRC.

IRC facilitates the creation, sharing and use of knowledge, so that sector staff can better help the world's poor to obtain sustainable water and sanitation services. This is achieved by improving and sharing the knowledge base of the sector and by strengthening sector resource centres in the South.

Working in rural areas and small towns, IRC supports sustainable initiatives in the fields of RWS technology, water resource management, hygiene education, gender issues and resource centre development. It undertakes training, evaluation, and research, and is also a gateway to quality sector information through its database and electronic news services.

IRC regards the experience it gains from working in equal partnership with other countries as its key resource. It enables IRC to act as facilitators, stimulating dialogue and creating a learning environment, while enabling IRC to accomplish its main mandate – capacity building.

IRC has regional alliances with key sector organisations and networks, greatly facilitating the accomplishment of its mission objectives.

Mr Smet concluded his presentation by reiterating IRC's support for the Rope Pump as a sustainable technology and expressing his hope that the knowledge gained during the Workshop would lead to enhanced safe water provision in rural areas.

* * * * * * * * * *

Mr Gava then invited Mr François Muenger to address the Workshop.

Day 1/Session I

Introductory Address by Mr François Muenger, World Bank Water and Sanitation Program (WSP), USA

The Rope Pump Workshop: A WSP Perspective

Mr Muenger greeted participants and welcomed the fact that the Workshop was taking place. He then described how WSP is supported by multilateral and bilateral donors and is implemented through regional centres in collaboration with partners in Asia, Africa and South America.

WSP promotes access to safe water and sanitation services. Despite the achievements of the last few decades, large inequalities still exist between urban and rural services and increasing the coverage in rural areas remains a huge challenge. The often scattered nature of rural populations tends to exacerbate the problems faced.

WSP tackles this challenge by promoting:

- Sustainable, demand-driven supply chains for goods and services in rural areas;
- Access to small credit schemes;
- Low-cost technology, including handpumps as one option;

- Coherent management strategies which produce synergy between the public and private sectors – the Rope Pump project is an excellent example

Mr Muenger reflected that in the water sector the nineteen-seventies had been the era of technology, while the nineteen-eighties had focused on coverage. In the nineteen-nineties the spotlight had been on demand-driven initiatives. Now, even greater emphasis was being placed on the roles of stakeholders –users, the private sector and NGOs being seen as particularly important.

WSP is committed to supporting South-South initiatives to transfer the Rope Pump technology. Mr Muenger encouraged participants to join in this exciting task and to overcome problems through shared knowledge and experience.

* * * * * * * * *

Mr Brand thanked Mr Gava for presiding over the Inaugural session. He then mentioned organisations and individuals who had contributed towards making the Workshop possible and proposed a vote of thanks to all. Workshop participants then introduced themselves to other participants and said a few words about their hopes for the Workshop.

Mr Gava then closed the Inaugural session, again reminding participants of the Rope Pump's simplicity and urging everyone to resist any temptation to make it more complicated!

In reply, Mr Brand expressed his belief that the Workshop would mark 'The Beginning of a Wave' for the Rope Pump, and thanked participants.

3.2 The Rope Pump in Nicaragua

Mr Brand opened the afternoon by introducing Mr Rolf Winberg, RELMA, Kenya – the chairperson for session II.

Mr Winberg greeted participants and invited Mr Juan Gago to present his paper.

Day 1/Session II

Presentation by Mr Juan Gago, Bombas de Mecate SA, Nicaragua

Bombas de Mecate SA's Involvement with the Rope Pump

Mr Gago greeted participants and started his presentation by anticipating the week ahead. He urged participants to learn from past events and experience, which had led to the current state of knowledge of Rope Pump technology.

Bombas de Mecata SA's involvement with the Rope Pump now extended over more than ten years, starting in 1990 when the pump was in its early stages of development. The IRC evaluation in 1995 provided an important boost for the pump, and, as social acceptance of the pump increased, NGOs and donors became convinced of the pump's merits. This led to the endorsement of the pump by ENACAL.

The pump has been vigorously promoted by the company and marketing activities have included appearances at fairs and TV advertising. Initially they experienced resistance to the pump in some quarters where it was considered too 'rustic'. This perception was soon overcome. The pump continues to be promoted at a national level in Nicaragua, information being directed at users and government agencies. Mr Gago said that his company had now consolidated itself as the leading manufacturer of Rope Pumps and they expected to produce 3,500 units in 2001. Interestingly, Mr Gago

said that private buyers now formed a predominant market for the Rope Pump.

The company has gained considerable experience in Rope Pump manufacture and production processes are kept under review. Currently, all parts are made in-house with assembly also in-house. Some quality improvements are still needed however, together with rationalisation of certain design aspects.

Bombas de Mecate SA has become increasingly involved in Rope Pump feasibility studies and technology transfer during the last five years, and has provided support to several other countries including Honduras, Angola and Ghana.

* * * * * * * * *

Mr Winberg then invited Mr Ricardo Guzmán to present his paper.

Day 1/Session II

Presentation by Mr Ricardo Guzmán, Bombas de Mecate SA, Nicaragua

Rope Pump Attributes: A Manufacturer's View

Mr Guzmán began by describing to participants the key social and economic attributes of the Rope Pump. He followed this with an examination of important technical and performance aspects of the pump based on his experience since joining the technology transfer section of Bombas de Mecate SA in 1997. The main points of his presentation are summarised below.

Key attributes include:

- The Rope Pump is low cost, easy to maintain and readily accepted by users;
- No special tools are needed – users can install the pump using their own equipment;
- Users can do their own repairs using locally available materials.

Technical features include:

- Two versions of the pump are available – one for families and a more robust model for community use;
- Various design options are available depending on operating parameters. For example different piston and rising main diameters are used according to pumping depth. Also stronger rope and other upgraded components are used for greater pumping depths;
- The pump is generally straightforward to manufacture although piston tolerances are important – these components, made from HDPE, must be accurately produced. The guide box also requires careful quality control;
- The pump must be protected from the effects of abrasion;
- The conical piston form has been shown to reduce downtime;
- Mr Guzmán estimated the overall mechanical efficiency of the pump, on average, at 80 per cent;
- The pump should be greased once a week and the above-ground structure repainted as required;
- The rope should be replaced at least every two years (estimated cost US$ 4.00);
- Further standardisation of the pump together with quality improvements are required.

* * * * * * * * *

Mr Winberg then invited Mr Henk Alberts to present his paper.

Day 1/Session II

Presentation by Mr Henk Alberts, Bombas de Mecate SA, Nicaragua

The Efficiency of the Rope Pump: Theory and Practice

Mr Alberts' presentation focused on the efficiency of the Rope Pump and he provided participants with his analysis of energy losses at various points in the pump. He started by contrasting the mode

of operation of the Rope Pump with traditional reciprocating piston pumps.

In the Rope Pump a steady work input is applied by turning a handle and water discharge is continuous. Pumping pressure loads are distributed throughout the height of the pump pipe, pistons normally being spaced at a standard distance of one metre. Although at discharge level the rope is subject to the full dynamic load of the water column, this force is estimated by practical experience at a maximum of only about 10 kgf.

Mr Alberts summarised energy losses in the pump as follows:

- Losses in the plain axle bushings of the handle/wheel assembly. These are estimated by calculation at a maximum of 3 per cent of input work
- Friction of the rope where it passes through the guide box. These losses are considered negligible
- Friction of the pistons against the inside of the pumping pipe. Again, these losses are considered negligible except in deep installations
- Losses due to water leakage past pistons. These losses are significant and are affected by the number of pistons and their spacing. Estimated hydraulic efficiencies are in the range 80 to 90 per cent
- Energy losses represented by the kinetic energy, which is dissipated as water is discharged from the pump. This is estimated by calculation at less than 1 per cent of input work
- Overall mechanical efficiency of a Rope Pump in good condition is estimated at 80 to 85 per cent and this figure is considered a prime factor in the social acceptance of the pump

Mr Alberts concluded his presentation by inviting participants to consider these efficiency issues while inspecting Rope Pump installations during the forthcoming workshop field trip.

* * * * * * * * *

Mr Winberg then invited Mr Erich Baumann to present his paper.

Day 1/Session II

Presentation by Mr Erich Baumann, SKAT/HTN, Switzerland

Handpumps: Impact on Rural Water Supplies and a Review of the Standardisation Process

In his second presentation Mr Baumann expanded on the role of HTN - the Network for Cost-effective Technologies in Water Supply and Sanitation. He estimated that 1.9 billion of the world's poor are without a safe water supply. The aim of HTN is to ensure that all people enjoy access to this basic human necessity and this is reflected in its mission statement.

HTN is not an executing agency as such but encourages technical co-operation and local capacity building by working through partners and networks to facilitate South-South contact and North-South dialogue. HTN's secretariat is at SKAT in Switzerland.

HTN is a global network of partners. Membership is free and is open to all interested organisations and individuals. Much progress has been made since its foundation in 1992 and having achieved notable success promoting handpump technology in Asia, HTN is now shifting its focus to Africa where, with coverage at 39 per cent and declining, there is an urgent need for safe water. Also, well drilling costs in Africa are generally many times higher than Asia and HTN will have a role in promoting more cost-effective drilling operations.

HTN will also promote other initiatives in Africa. It is believed that overall, less than 50 per cent of pumps in Africa are working. This is partly due to poor matching of handpumps to wells, but a key problem is thought to be lack of handpump standardisation, leading to inefficient and unsustainable water supplies. In one small country with 8,000 installed handpumps, there are estimated to be 40 different types.

Working closely with the private sector and national and international standards organisations, HTN has already undertaken significant standardisation of public domain handpump designs such as Afridev, Malda, Tara and Jibon, and this should provide a sound basis for further rationalisation of handpump types in Africa. In addition to simplifying training and avoiding a multiplicity of spare parts, standardisation has important economic benefits, driving down the cost of handpumps and spares and enhancing prospects for local manufacture.

HTN acts as a clearinghouse for global handpump research and development, co-ordinating the work and disseminating results. Once again, HTN works closely with the private sector. Notable successes achieved include the development of GRP pumprods for a range of applications. Despite a lack of resources, HTN research and development has underpinned the tremendous progress in public domain handpumps in recent years, leading to reliable, easy-to-maintain designs covering a wide range of needs.

HTN recognises the need for efficient service delivery through sustainable, demand-based supply chains, and the important role of the private sector. HTN can help define the interfaces between the public and private sectors and in this way work with its partners to achieve poverty alleviation and safe water for all.

* * * * * * * * *

Mr Winberg remarked on the importance of the Workshop keeping the right balance between software and hardware considerations during its deliberations. He then invited Mr Sobhan Abdus to present his paper.

Day 1/Session II

Presentation by Mr Sobhan Abdus, International Development Enterprises (IDE), Bangladesh

The Jibon Handpump

Mr Abdus began with a brief introduction to Bangladesh, a country of 130 million people where 80 per cent of the population are agriculture-based. Groundwater is readily available in most areas and 10 million tubewells are in use. Established handpumps such as the Tara and Number Six deepset pumps cost between US$ 400.00 – 500.00 for a complete installation including borehole, pump and accessories.

International Development Enterprises was formed in Bangladesh as an NGO in 1982 and seeks to use entrepreneurial, market-based techniques, allied to mass marketing, to solve development problems. Fundamental to this approach is the treatment of low-income groups as customers, and pricing products affordably, while providing purchasers with a return of at least 100 per cent after one year. Products must also provide a fair return for manufacturer, dealer and retailer, and be easy to produce, maintain and repair.

In 1996 IDE collaborated with the Department for Public Health Engineering (DPHE), UNICEF, UNDP-World Bank and HTN in a planning mission for the Jibon handpump which produced the following design criteria:

- Able to lift water from a maximum depth of 15 metres;
- Locally produced, distributed and sold through the private sector, including spares;
- Easy to maintain;
- At US$ 100.00 retail, to be cheaper than comparable deepset handpumps.

Successful completion of research and development, marketing, and monitoring and evaluation phases has resulted in:

- Five manufacturers each producing around 250 Jibons per month, with 14 dealers and 441 installers;
- 1,500 pumps sold to date;
- Previously existing NGO subsidies to users on pump purchase price have been able to be removed;
- Monitoring mechanism is in place;
- 212 NGO staff and 638 village committees have been trained on the pump;
- Supply chain is largely independent of IDE with effective marketing tools in place;
- Jibon is now also being used in drip irrigation for vegetable production.

Some issues remain however. The manufacturing quality of pumps and boreholes needs improving, while pumprod corrosion and arsenic contamination are causing problems. Also, lowering water tables and women's and children's difficulties with operating and maintaining the pump due to its heavy pumprods are both causing concern.

The Jibon has considerable potential for use in non-arsenic areas and for the technology to be transferred to other countries, particularly Africa, where its low cost should make it attractive.

* * * * * * * * *

Mr Winberg then invited Mr Henk Alberts to present his paper.

Day 1/Session II

Presentation by Mr Henk Alberts, Bombas de Mecate SA, Nicaragua

Community and Family Use: The Rope Pump's Impact

Mr Alberts' second presentation focused on social, institutional and economic aspects in RWS, to examine how the Rope Pump could provide optimum coverage for communities and families. The main points are summarised below.

- Some researchers have found that increasing water quantity rather than quality has the bigger impact on reducing water borne disease. It is thought that interventions in water quality and quantity are compounded - a 15 per cent improvement in each leading to an overall 40 per cent improvement;
- Definitions of 'coverage' and handpump 'functionality' varybetween organisations and countries, are constantly changing, and are often not comparable. They need to be used with caution;
- In Nicaragua, early interventions using the Rope Pump focused on improving water quantity;
- Experience has shown that the Rope Pump is used for water provision for drinking, animal watering and irrigation by families, communities and farmers. Apart from community installations which tend to be supported by NGOs and agencies, the market is largely a private one;
- Different levels of pump robustness are required to fulfil the requirements of these different user groups;
- Workshops in Nicaragua currently produce about 5,000 Rope Pumps per annum;
- SINAS figures indicate that there are 22,000 Rope Pumps installed in Nicaragua. An estimated 10 per cent of borehole installations and 20 per cent of dug well installations are non-functional;
- SINAS figures also indicate around 80 users for community pumps. NGO- supported and privately owned family pumps are thought to range from six to 20 users, with a mean of 10;
- The data show that NGO projects account for more than half of water rural water supply coverage in Nicaragua. The private sector accounts for 14 per cent, the figure being influenced by the comparatively small number of users per pump;
- Larger projects are likely to place emphasis on water quality, with smaller projects focusing on quantity;
- Since 1991, where coverage increases have occurred in Africa, Asia and Latin America, they have generally been less than 10 per cent. In Nicaragua in 1995 rural area coverage was actually decreasing despite the use of piped schemes in heavily populated areas. In 2001 the trend has been reversed: overall

coverage in rural areas is now increasing, with the Rope Pump accounting for 25 per cent of rural coverage and a yearly coverage increase of between three and four per cent;

- In the last ten years Nicaragua has expanded its rural water supply provision and has demonstrated how strong government policies combined with private sector initiative can contribute to improved coverage. The Rope Pump has made an important contribution to this process.

* * * * * * * * *

Mr Winberg then thanked contributors and closed the Session.

3.3 The Role of the Actors in the Implementation of Rope Pump Technology

Session III began with a visit. Workshop participants were the guests of ENACAL at the Managua office. After welcoming participants, Ms Damaris Zepeda, GAR introduced Mr Francisco Baltodano, GAR who then presented his paper.

Day 3/Session III

Presentation by Mr Francisco Baltodano,GAR, Nicaragua

The Role of ENACAL

Mr Baltodano addressed the workshop in place of Mr Oscar Tablada who was unavoidably engaged.

In a rural context ENACAL's objectives are increased water and sanitation coverage and improved health and environmental conditions. Its principal functions are planning, standardisation, monitoring, co-ordination and execution. From 1998 regulation in rural areas has been the responsibility of INAA.

Within this overall structure ENACAL, through municipal governments and ESAs, also undertakes training and education of

communities and directs government and ESA funding. ENACAL's co-ordinating role avoids duplication of effort between the various actors. Of these actors the most important are the individual communities whose activities are channelled through the Committee de Agua Portable (CAP).

ENACAL believes communities, as stakeholders, should be the owners of their water supply assets. The various legal and business implications of this approach are currently being explored in a bid to better define the structure on which the new system will be based.

Geographically, the Pacific region of Nicaragua is the focus of development programmes. The Atlantic region of the country has a scattered population and in the past has not been prioritised. However, there are ample water resources available and in recent years some donor-funded projects have started. ENECAL is keen to expand its activities in the area.

* * * * * * * * *

Ms Zepeda then introduced Messrs Ulises Rivera and José Pineda, SINAS/GAR, who gave a joint paper.

Day 3/Session III

Presentation by Messrs Ulises Rivera and José Pineda, SINAS/GAR, Nicaragua

Messr Rivera and Pineda presented the SINAS database, which covers Nicaragua's rural water and sanitation resources. Using a computer-generated slide show they gave an overview of the system and a demonstration of its capabilities.

The SINAS database is a comprehensive system for capturing, accessing, analysing, reporting and displaying water and sanitation data in a wide range of formats. The system includes a geographical

and hydrogeological model of Nicaragua and demographic data from the government census.

* * * * * * * * *

Participants then returned to the main Workshop venue for the remainder of the morning's session.

Mr Brand introduced Mr Mark Henderson, UNICEF, New York, the chairperson for the session. Mr Henderson then invited Mr David Tijerino to make his presentation.

Day 3/Session III

Presentation by Mr David Tijerino, Plan International, Nicaragua

Plan International's Work in Rural Water and Sanitation in Nicaragua

Mr Tijerino opened with an overview of Plan International. Founded in 1937, the organisation works in 40 countries with funding raised in 14 industrialised countries. It works principally with children and has a wide portfolio of interests and activities.

He then gave details of Nicaragua's total population of around 5 million. Around 3 million live in the Pacific region with 34 per cent living in rural areas, and around 1.5 million live in the Central region, of which 66 per cent are rural dwellers.

Plan International's RWS activities in Nicaragua are based in the central plateau area and in the north west Pacific region. It collaborates with several other organisations involved in RWS including CARE, SDC, Swissaid, UNICEF and Save the Children Fund. It also works closely with ENACAL.

In RWS, Plan International's priorities include:

- Active community participation through voluntary local committees;
- Facilitating capacity building within the community;
- Careful technology choice;
- Affordable operation and maintenance at community level;
- Project monitoring and technical assistance, provided through ENACAL.

At Villa el Carmen, the project which workshop participants had visited the previous afternoon, Plan International has undertaken 517 well enhancements. 600 latrines have been installed in Masaya-Carazo and 121 in Chontales. Well enhancements have included the installation of Rope Pumps. The organisation regards the pump's low cost operation and maintenance and ease of manufacture using locally available materials as key to its success in community programmes.

* * * * * * * * *

Mr Henderson then invited Mr José Toruño to make his presentation.

Day 3/Session III

Presentation by Mr José Toruño, CARE, Nicaragua

The Work of CARE in Rural Water and Sanitation in Nicaragua

Mr Toruño opened by referring to the previous day's field visit by workshop participants to a CARE water and sanitation project near León. This was begun in 1995 and covers six municipalities in the León area. It is jointly executed by CARE and the government. Funding is through SDC, CARE and additional funds from the USA. 1998 marked the inception of a further three-year project named PALESA.

CARE's objective is to expand access to water and sanitation services, leading to full coverage. Under current projects a total of

5,000 families will benefit. CARE's work in RWS prioritises the following requirements:

- Long term sustainability;
- Participation and implementation by users;
- User driven;
- Effective training;
- Users choose the service level they require;
- Promotion of soundly-based legal structures;
- Private projects directed by a community unit;
- Health education for communities and schools.

CARE's experience in Nicaragua has demonstrated that families are willing to contribute in cash to RWS services – usually by instalments. This has led to sustainable projects in which pumps have continued working. The technology and management approaches used have proved particularly suitable for scattered communities.

* * * * * * * * *

Mr Henderson then invited Ms Brenda López Pérez to present her paper.

Day 3/Session III

Presentation by Ms Brenda López Pérez, Save the Children, Nicaragua

The Work of Save the Children in Rural Water and Sanitation in Nicaragua

Ms López Pérez described the work of Save the Children in Western Province – an area badly affected by Hurricane Mitch. Over a sixteen-month period 2,000 latrines have been installed and 800 collecting ponds constructed. 935 wells have been rehabilitated and equipped with Rope Pumps. This has involved a total of 23 user communities, mostly in low-income groups, and it is through these that the project has been implemented.

The Rope Pump has worked well with good user acceptance. Ms López Pérez attributed this success to the following factors:

- Close involvement of communities in the installation of facilities – for example users were supplied with food in exchange for constructional work on wells and latrines. Many users have provided additional facilities themselves – for example some have installed small pipelines from their water point for irrigation purposes;
- Full training was given to users on the installation and operation and maintenance (O & M) of the Rope Pump;
- The pump can easily be operated by men, women and children
- The pump is low cost and can be managed by families;
- The pump is safe – contamination of the well is avoided and children are not at risk of physical injury;
- Careful bacteriological analysis of pumped water has ensured that water quality targets have been quickly met and maintained.

* * * * * * * * *

Mr Henderson then invited Mr Luis Guerrero to present his paper.

Day 3/Session III

Presentation by Mr Luis Guerrero, Ministry of Health, El Salvador

The Rope Pump in Rural Water and Sanitation Projects in El Salvador

Mr Guerrero gave details of El Salvador's approximately 6 million population and 21, 000 persons per square kilometre. Around 30 per cent live in rural areas. Many problems have been caused in the rural water sector following the recent earthquake. RWS projects are implemented by the Ministry of Health, working closely with ESAs, NGOs and the private sector.

In 1986 the country initiated a major programme to improve water wells. Existing pumps made largely from uPVC fittings had proved

fragile and efforts were made to improve the design. Since 1990 the Rope Pump has been widely used and it enjoys good acceptance by communities. A total of around 2,000 are now installed, 1,000 of these under a UNICEF programme post-1997. Installation, through the Ministry of Health, continues at a rate of around 500 per annum, with additional pumps being installed by ESAs and NGOs.

The appearance of a second Rope Pump manufacturer in El Salvador has improved the supply position, overcoming the monopoly situation, driving down prices and resulting in an improved pump that is better protected against contamination.

In some cases there was a reluctance by users to disinfect wells due to perceived tainting of water. This problem was overcome by using the pump to raise water to an overhead tank from which water is supplied to users via taps. Tanks can be disinfected without problems and delivery by taps is effective in preventing contamination of the supply.

Problems experienced with the pump have included difficulties obtaining suitable rope in the local market place – in the short term it has been necessary to obtain supplies direct from the manufacturer. Guide boxes have proved troublesome and there remains a need to improve the pump's efficiency. However, overall experience with the Rope Pump has been good.

* * * * * * * * *

Mr Henderson then invited Ms Rachel Blackman to present her paper.

Day 3/Session III

Presentation by Ms Rachel Blackman,
Poverty Research Unit, University of Sussex, UK

Recent Evaluation Studies of the Rope Pump

The paper described two evaluation studies carried out in Nicaragua and El Salvador in 1999 and 2000. One study examined financing methods for the Rope Pump. The other examined its use as a family pump. Sample sizes were small but the studies give an understanding of the issues and will be useful in designing future evaluations.

1. The financing study indicated that:

- Users paid the recurrent costs of their Rope Pump, whether donated or purchased by themselves;
- Regardless of capital financing methods, if the pump has social acceptance users had a positive attitude towards the use, maintenance and repair of the pump, and wanted to keep it functioning;
- People in the lower-income groups tended to purchase their Rope Pump using savings or credit;
- Flexible payment mechanisms reduced the payment default rate;
- Some people felt that they could not afford to purchase their own Rope Pump even with the availability of credit – in these cases donation would still be an option. It is necessary to determine what people are willing and able to pay;
- The government's policy of financing capital costs for very low income groups is sensible, although there is scope for increasing the numbers of people purchasing their own pump because of its high social acceptance;
- A range of payment mechanisms should be explored when considering transfer of the Rope Pump technology.

2. **The second study, aimed at assessing community water supply provision through ownership of Rope Pumps by individual families, indicated that:**

   - Family interventions were considered successful by users and development organisations - people preferred family pumps to communal ones;
   - Users had a sense of ownership – this tends to confirm the financial study results;
   - In one project the Rope Pump was used to boost agricultural production, resulting in increased incomes;
   - Only around 7 per cent of Rope Pumps were out of order
   - The Rope Pump was cheaper than other pumps and met the requirements of Village Level Operation and Maintenance (VLOM).

* * * * * * * * *

Mr Henderson then invited Mr Urs Heierli to present his paper.

Day 3/Session III

Presentation by Mr Urs Heierli, SDC, Switzerland

Poverty Alleviation as a Business: the Market Creation Approach to Development

The underlying theme of the title of Mr Heierli's presentation was explored by examining successful ongoing projects in various countries:

- In Bangladesh tree growing is a good investment. Tree saplings now cost around US$ 0.10 and have a net present value of US$ 6.00. Today there are 2,500 nurseries in the country producing around 100 million saplings per annum;
- Small farmers in India and Bangladesh find that locally produced Treadle Pumps used for irrigation recover their cost quickly by greatly increasing production. Manufacturing, distributing and installing Treadle Pumps is now a highly successful operation.

In Bangladesh 1.3 million have been sold and installed providing increased farm production and sustaining thousands of small private sector businesses;

- Other examples of successful small private sector businesses include the Rope Pump and maize silos in Central America, micro-concrete roofing tiles - now successful in many countries, and private-sector-installed sanitation in Bangladesh.

The role of agencies and NGOs who can identify market opportunities and provide initial support to small businesses is all-important. Using low cost micro-irrigation as an example business opportunity, their role can be summarised in the following steps:

- Establish feasibility;
- Adapt technology;
- Develop the supply chain;
- Rural mass marketing;
- Agricultural integration;
- Monitoring and impact measurement.

Using graphics Mr Heierli demonstrated how successful market creation initiatives influence a wide range of business parameters and social indicators throughout the project cycle.

Mr Heierli concluded his presentation by saying that profitable supply chains usually only appear after several years of effort. However by building on small beginnings success will ultimately be achieved.

* * * * * * * * *

Mr Henderson thanked the morning's contributors and closed the session.

3.4 The Technology Transfer Process

Session IV was also chaired by Mr Henderson. The afternoon was given over to group discussions on demand and capacity in the Rope Pump technology transfer process.

The group arrangements and outputs of the discussions are reported in ***Section 4.***

Session III was extended into the evening to allow additional presentations to be included.
Mr Brand acted as chairperson during this part of the session, and gave the first paper.

Day 3/Session III - Evening

Presentation by Mr Anthony Brand, UNICEF, El Salvador

The Rope Pump in Central America: An Overview

Mr Brand described how the modern-day Rope Pump, based on a 200-year-old chain pump design, was re-introduced to Central America by a Danish engineer in the nineteen-sixties. In Nicaragua in 1988 interest in the pump re-emerged, and Bombas de Mecate SA started their manufacturing programme.

INAA, together with ESAs and NGOs were impressed with the pump and by 1995 demand was increasing rapidly. In that year the IRC Rope Pump evaluation took place and this stimulated interest and demand in other countries as well. During 1996-98 several new Rope Pump manufacturers entered the market in Nicaragua. There are now around 8 companies manufacturing the pump although some of these produce only small numbers.

In 1999 around 12,000 wells were lost in Honduras and El Salvador due to Hurricane Mitch. With its low cost and easy maintenance the Rope Pump was internationally recognised as a solution to the problem of quickly providing new water supplies. For El Salvador, pumps were imported from Nicaragua as they were cheaper than locally produced pumps.

Bombas de Mecate SA now produces 3,000 Rope Pumps per annum, and has 25 permanent staff plus temporary staff. A total of

28,000 Rope Pumps are now installed in Nicaragua. In addition to its Managua factory, Bombas de Mecate SA also has a factory in León and another in Honduras.

In Nicaragua changes are being made in government taxation and under present proposals the Rope Pump, officially categorised as agricultural equipment, will be subject to sales tax. This would inevitably have major implications for RWS schemes in Nicaragua and representations are being made by interested parties in an effort to obtain exemption for the Rope Pump and similar products.

In concluding Mr Brand put forward the suggestion that for many poor people in Central America ownership of a Rope Pump might be regarded as both a political and a philosophical act.

* * * * * * * * *

Mr Brand then invited Mr Louis Roman to present his paper.

Day 3/Session III - Evening

Presentation by Mr Louis Roman, Aerobomba de Mecate (AMEC), Nicaragua

Aerobomba de Mecate: An Overview of Manufacture

Mr Roman described how AMEC's involvement with the Rope Pump started some time after Bombas de Mecate SA. Initially, AMEC produced a wind-powered version of the pump, intended mainly for irrigation and cattle watering. The flexibility of the design enables a generator and battery to be coupled to the unit so that it can function as a power supply as well as a pump. One version is capable of pumping to an overhead tank built of local materials and with a storage capacity of 72 cubic metres.

Another design based on the Rope Pump uses animal draft and can lift water from 70 metres. For irrigation purposes depths of 20 metres are feasible. Other designs use a small internal combustion engine

or electric motor to supply power. Yet another Rope Pump design is bicycle-driven and has the cranks directly coupled to the rope. This design can pump to an overhead tank 4 metres high.

All designs undergo five months continuous testing to prove durability. Each of the various pumps is specifically designed to meet the needs of different markets. In general, AMEC focuses on the market for irrigation pumps for small and medium sized farms, supplying different flow capacities according to farmers' individual needs.

AMEC has an on-going research programme in which it field tests new designs based on the Rope Pump technology. Performance is monitored and feedback obtained from users. Currently AMEC is exploring micro-irrigation systems.

* * * * * * * * *

Mr Brand then invited Mr Urs Heierli to make his presentation.

Day 3/Session III - Evening

Presentation by Mr Urs Heierli, SDC, Switzerland

El Malpaisillo Community Women's Co-operative: A Study Visit

Mr Heierli described his visit to the women's co-operative at Malpaisillo – a community of around 700 families linked to a local NGO.

The co-operative is closely involved in health education, in particular for ovarian cancer. The aim is to promote early diagnosis to improve survivability of the disease and many lives have been saved in this way.

The co-operative was also involved in cotton processing. After experiencing a decline in this industry its members decided to try

product manufacturing. Now they produce Rope Pumps instead of having to purchase them, gaining considerable confidence and respect as a result. They also produce ceramic water filters, and various sheet metal items. Product quality is good and the co-operative reports that its manufacturing operation is covering its costs.

The co-operative has been able to clearly see the benefits to communities of Rope Pump ownership. The pump has saved time on water collection and this time has been used for more productive activities such as agriculture and keeping cows and goats. Other examples of new initiatives are house improvements and the construction of a silo for grain storage.

After initial scepticism the local men in the community are now impressed with the achievements of the co-operative and are seeking to become involved!

Mr Heierli was also impressed with what he saw during his visit and was able to obtain a holistic view. He spoke of the remarkable commitment and optimism, which he found among the women of the co-operative.

* * * * * * * * *

Mr Brand then closed the evening's proceedings.

3.5 Rope Pump Technology Transfer: Experience from Other Countries

Session V was devoted to sharing experiences from countries, which have already initiated Rope Pump technology transfer initiatives. Mr Brand introduced the chairperson for the session, Mr Oscar Chillin, INFOM, Guatemala.

Mr Chillin then invited Mr Khongkham Miboun to present his paper.

Day 4/Session V

Presentation by Mr Khongkham Miboun, NCEHW, Laos PDR

Rope Pump Technology Transfer: Experience from Laos PDR

Mr Khongkham described the Rope Pump programme in Laos PDR. Currently in Laos there are about 5,000 dug wells and 4,000 boreholes, some equipped with handpumps. Several pump types are in use, mainly Afridevs and various shallow well pumps. Water coverage in rural areas is 56 per cent. Upgrading of dug wells is a high priority in the Laos RWS programme.

The Rope Pump technology was introduced in collaboration with UNICEF. Promotion of the Rope Pump by the government has included a First National Workshop to disseminate the technology. Pumps have been tested for community use, serving 150 people for drinking and domestic water with a daily allowance of 45 litres. Private sector manufacture is under way with two companies producing about 50 Rope Pumps per week. All pump materials are available in Laos with spare part materials such as rope available locally in rural provinces. Pump cost is around US$ 70.00, with most pumps being installed on dug wells.

Currently, government staff installs pumps and provides spare part materials. It is planned to transfer operation and maintenance to village volunteers working in conjunction with local WATSAN committees.

Mr Khongkham summarised the main outputs from the Laos Rope Pump monitoring programme:

- When used on shallow dug wells the pump has been well received by communities. Users like its good discharge, simple maintenance and ease of use by women and children;
- On boreholes the pump has not been successful, suffering rope breakages and guide box failures;

- Users find the borehole-installed Rope Pumps difficult to maintain;
- Communities have complained about the noise from the pump's non-return brake mechanism during early morning time;
- Unlike compact direct-action pumps such as the Tara, the Rope Pump is bulky and vulnerable to damage;
- Project staff have concluded that the existing Rope Pump is suitable for shallow lift applications only;
- Staff are keen to upgrade the pump to improve its performance so that it can be used on boreholes at SWLs greater than 20 metres;
- To achieve this goal, further collaboration with UNICEF is sought, together with an expanded role for the private sector.

Mr Khongkham concluded by saying the Laos team was keen to use the experience gained from the Workshop in the Laos Rope Pump programme.

* * * * * * * * *

Mr Chillin then invited Messrs Arsène Raveloson and Alexis Randrianasolo to present their joint paper.

Day 4/Session V

Presentation by Messrs Arsène Raveloson and Alexis Randrianasolo, TARATRA, Madagascar

Rope Pump Technology Transfer: Experience from Madagascar

TARATRA is an NGO working mainly in rural development in four provinces in the south of Madagascar. Its main partners are SDC, EU, UNICEF, WaterAid and the World Bank. It also works with ANAE, another local NGO.

Dug wells equipped with handpumps are the most affordable option in the south of Madagascar. Local communities, working

with TARATRA, have constructed 500 dug wells with depths ranging from 8 to 15 metres. Communities fund the full pump costs of around US$ 230.00, with training on O & M and hygiene education provided under an agreement with TARATRA. Communities appoint a caretaker to carry out routine maintenance on the pump. TARATRA is collaborating with SKAT/HTN under an ongoing SDC-supported programme dating from 1998. This has involved field evaluation of a range of pumps and also manufacturing support. The Rope Pump was chosen for its simplicity and good potential for local manufacture.

TARATRA have set up a factory and the pump is now produced locally in small numbers. Under the SKAT/HTN programme plans are in hand to expand production, improve quality, train factory staff, and finalise a Madagascar Rope Pump Specification which includes design modifications to suit local conditions and materials. TARATRA is also planning a nationwide promotion campaign for the Rope Pump.

Messrs Raveloson and Randrianasolo summarised Madagascar's two-year experience with the Rope Pump as follows:

- The Rope Pump is simple, easy to manufacture locally, affordable by local communities and easy to maintain;
- Users are generally pleased with the pump's performance but were unhappy about the risk of contamination with the standard design. Madagascar Rope Pumps are therefore fitted with a special cover which totally encloses the above ground parts;
- Pumps are made so that the non-return brake mechanism is permanently engaged;
- Communities are encouraged to carry out preventative maintenance of the pump to avoid breakdowns. This includes greasing axle bearings and regular painting of the above ground parts. Ropes can last up to two years before breakage, however changing on a yearly basis is recommended since the cost is nominal and replacement is easier while the rope is still intact.

* * * * * * * * *

Mr Chillin then invited Mr Ian Thorpe to present his paper.

Day 4/Session V

Presentation by Mr Ian Thorpe, Pump Aid, Zimbabwe

Pump Aid and the Elephant Pump

Mr Thorpe traced the Rope Pump technology back to China, 2,000 years ago. The concept was introduced into Zimbabwe in the early eighties. Over 1,000 poor quality pumps were produced, mainly for irrigation, and most failed.

In 1996 Pump Aid was founded as an indigenous NGO to evaluate and develop appropriate water lifting technology. Despite the Rope Pump's inauspicious start in Zimbabwe the concept was considered to have potential for further development and refinement. A sample of 50 pumps installed in the field was intensively monitored for two years. Using techniques such as 'reactive evolution' and 'weakest link analysis', and setting component design life targets at fifty years, a new, Pump Aid version of the Rope Pump gradually evolved.

A second field trial of 100 pumps of the new design started in 1998. A figure of 99 per cent operational pumps has been achieved, exceeding the target of 95 per cent. Yield at 12 metres was recorded at around 60 litres per minute, falling to 32 litres at 25 metres SWL. Based on the test results, actual life of the rope guide is now estimated at 12 years and the pump pistons 9 years. Further design modifications are in hand to improve durability and ease of maintenance.

Now known as 'The Elephant Pump', around 30 pumps per month are currently being locally manufactured by Pump Aid, with a total target production of 2,000 pumps. The design differs considerably from the Nicaragua version of the Rope Pump. For example, the above ground parts are completely enclosed in a brick housing with a padlocked lid.

Installed pumps are closely monitored during construction and use. Pump Aid has initiated a 'randomised incremental recruitment survey' with 'step wedge controls' to investigate health impacts. The project stresses that it is not only technology driven and emphasises the importance of hygiene education through extension and other interventions.

Average cost for a well installation including digging, lining, capping and pump is currently around US$ 300.00, although some areas require expensive blasting to excavate a well. Such an installation serves around 50 people. Economies of scale should reduce costs over the next few years.

Mr Thorpe looked to the future of Pump Aid, anticipating expansion of its involvement in Mozambique and elsewhere in the region. He also expressed interest in drip irrigation and wind power.

* * * * * * * * *

Mr Chillin then invited Mr Urs Heierli to present his paper.

Day 4/Session V

Presentation by Mr Urs Heierli, SDC, Switzerland

SDC's Experiences in the Technology Transfer Process

By examining SDC's experiences from a range of projects in various countries, Mr Heierli produced a critique of 'traditional' technology projects.

These have often been characterised by the 'market-creation' approach leading to the following shortcomings:

- Projects are technology and supply driven;
- Projects have been 'pushed' from the supply side;
- Handover to the private sector has been incomplete;
- The demand side has been neglected.

A new approach is needed to avoid these problems. Instead of emphasising the supply side, facilitators need to inject new energy by promoting demand-driven approaches. This would entail:

- Looking at market needs in a more holistic way;
- Listening to clients;
- Asking – 'What are peoples' existing buying patterns?';
- Promoting fully developed supply chains with the necessary intermediaries;
- Applying appropriate lessons learned from successful, developed markets in western economies.

A slide demonstration followed showing how a careful analysis of a typical household's economic needs could lead to a better appreciation of how marketing a product like the Rope Pump could be successfully transferred to the private sector. Standard business analysis and marketing techniques should be applied and the tendency of donors to distort markets by subsidies or other interventions in the private sector should be avoided. Such interventions, if any, should be applied at the user level where necessary. A clear differentiation between public and private domain intellectual property is essential, and the role of generics needs defining.

Mr Heierli concluded by noting that the Rope Pump was in its 'take-off' phase in Central America and urged participants to build on the success achieved. This can be accomplished by applying the new approaches to marketing technology transfer, promoting demand-driven initiatives, and using innovation to meet the challenges that lie ahead.

* * * * * * * * *

3.6 The Role of Institutions in Technology Transfer

The second part of Session V was given over to an examination of institutional issues in technology transfer.

Mr Chillin invited Mr François Muenger to present his paper.

Day 4/Session V

Presentation by Mr François Muenger, World Bank WSP, USA

Supply Chain Initiatives

The World Bank Water and Sanitation Program (WSP) is an international partnership working at rural level to accelerate access to potable water and sanitation facilities. In his second presentation Mr Muenger focused on WSP's work on developing practical tools to set up and promote sustainable supply chains.

The basic supply chain consists of service providers, distributors and users. Experience has shown that sustainable supply chains depend on the following factors:

- Adequate demand;
- Viable incentives for entrepreneurs;
- Efficient flow of information throughout the chain;
- Efficient management;
- Facilitating Environment.

Mr Muenger expanded on these requirements:

- Long term demand should be measured – users' perspectives may be short term! Donor roles should be minimised – they mustn't be 'customers'. User decision making processes must be analysed;
- Business people regard handpump manufacture as a high-investment, high-return activity. Handpump spares however offer low return. Agency procurement frequently leads to artificial price inflation. Properly managed, agency involvement can enhance commercial viability by improving quality and encouraging competition. Support of generic advertising and promotion is another potential role. Any subsidies must be strictly defined and of limited duration. The role of distribution and retail techniques such as franchising must be considered;

- Efficient management and information flow cover a broad field of activities embracing human and technical skills, training, accurate measurement and dissemination of market parameters, advertising and promotion, and events such as workshops;
- All these activities can be adversely affected by shortcomings in local and national infrastructure and excessive or poorly designed fiscal and regulatory systems. Access to suitable financing mechanisms for both entrepreneurs and users is essential for viable supply chains. Local banks should be encouraged to become involved and the necessary incentives put in place and promoted. Micro-credit schemes may be appropriate for users.

* * * * * * * * *

Mr Chillin then invited Mr Henk Alberts to present his paper.

Day 4/Session V

Presentation by Mr Henk Alberts, Bombas de Mecate SA, Nicaragua

The Rope Pump and the Technology Transfer Process

Mr Alberts' third presentation traced the evolution of the Rope Pump in Nicaragua since the nineteen-eighties and the experience gained to date in disseminating the technology. He stressed that despite Bombas de Mecate SA's close involvement in Rope Pump development, the Nicaraguan Rope Pump design and all related data are in the public domain.

The successful IRC Rope Pump Evaluation in 1995 was followed by an agreement in 1996 between the National Water and Sanitation Institute, SDC/COSUDE and Bombas de Mecate SA. This covered further financial support for a new phase of technology documentation and dissemination, and also a training centre.

These new initiatives excited interest in the Rope Pump in several countries. Small numbers of Rope Pumps were exported to Angola, Zambia and Madagascar for evaluation and demonstration programmes.

For Laos the Technology Transfer Section of Bombas de Mecate SA sent a comprehensive package of technology transfer documentation to assist with the start up of their Rope Pump project. In the case of Ghana a full technology transfer programme was initiated, including exchange visits of project staff and technicians, and training on installation, quality control and business promotion. The Ghana technology transfer programme was successful and 100 locally manufactured Rope Pumps had been installed in Ghana within a year of the programme's inception, with costs comparable to those in Nicaragua.

Mr Alberts stressed that despite the involvement of the private sector in Rope Pump manufacture in several countries, it would be some time before the Rope Pump became a mass-marketed consumer product. For the foreseeable future intermediaries will be needed to promote the pump to the private sector. Of the various players involved, NGOs are ideally placed to fulfil this role. They can act as effective intermediaries, providing short-term financial support where necessary and overseeing the start-up phase until the private sector operation becomes commercially viable.

In closing Mr Alberts urged participants to consider the benefits that the Rope Pump might bring in African countries where conventional imported handpumps are often five or ten times more expensive.

* * * * * * * * *

Mr Chillin then invited Mr Jo Smet to present his paper.

Day 4/Session V

Presentation by Mr Jo Smet, IRC, The Netherlands

From Technology Transfer to Technology Sharing

Mr Smet's second presentation explored the role of different institutions in the technology transfer process, and identified the desirable features of suitable technology and of the transfer process itself.

Sustainable technologies should meet four criteria – Functioning, Use, Autonomy and Environment, and under these criteria will:

- Continuously provide an efficient and reliable service at the desired level;
- Be used by all user groups;
- Be managed and financed by users with limited external support and technical assistance;
- Have no lasting adverse effects on the environment.

Traditional approaches to technology transfer tend to be paternalistic and see the process as simply transferring knowledge and documentation without recognising that it is a human process with social and institutional implications. Mr Smet argued that technology transfer should be a non-linear process using a holistic approach, and should be termed 'technology sharing'. He identified five key elements to underpin successful technology sharing:

- A leading organisation;
- A platform for stakeholder discussion and decision making;
- Participatory problem analysis with users/clients and institutions;
- Informed decision making on, and testing of, solutions;
- Participatory evaluation and focused information exchange.

A demonstration followed showing how these elements can be applied to the task of transferring the Rope Pump technology, with an exploration of the various stages of the process and the actors involved. The independence of the leading organisation is vital and outputs of the process must be presented in a neutral manner. An

approach must be adopted in which all stakeholders feel fully involved and 'clients remain on top'. It should be possible to voice criticism freely.

The presentation concluded with a demonstration of a matrix for Rope Pump technology sharing. This identifies likely actors and tasks in the process and indicates desirable ways for the various roles to be allocated.

* * * * * * * * *

Mr Chillin then invited Mr Abdulai Salifu to present his paper.

Day 4/Session V

Presentation by Mr Abdulai Salifu, Community Water and Sanitation Agency (CWSA), Ghana

The Ghanaian Rope Pump Experience

The paper described recent initiatives made by CWSA to transfer the Rope Pump technology to the private sector in Ghana, and to assess the pump's performance in rural areas.

CWSA considers the Rope Pump could have the potential to address many of the problems experienced with Ghana's existing handpump programme. In particular, if the Rope Pump can be manufactured and distributed locally by the private sector, it might offer the prospect of sustainable water supplies for Ghana's dispersed rural population.

Bombas de Mecate SA were contracted by CWSA to provide technology transfer consultancy. The World Bank funded this work.

The technology transfer was successfully completed and led to the manufacture of 100 Rope Pumps by two private sector companies in Ghana. These were installed and monitored in pilot projects in four regions of the country.

From the experience gained to date on Rope Pump technology transfer and field monitoring, CWSA have concluded the following:

- Rope Pump technology transfer to the private sector generally went smoothly;
- The private sector has shown enthusiasm for the technology;
- Most raw materials for the Rope Pump are available in-country;
- The Rope Pump is low cost;
- Monitoring of installed pumps is proceeding as planned;
- Problems have been experienced with installed pumps – failures of various components have occurred with rope breakage the most common – in one project this accounted for 56 per cent of pumps being out of use;
- These problems have led to a loss of user confidence in the pump in some cases;
- Despite these frustrations users like the pump's discharge and feel the pump is user friendly and easy to maintain;
- Modifications are needed to the rope and other pump components;
- Quality control in manufacture and maintenance needs improving;
- Caretaker training and local capacity building need improving;
- Urgent action is needed to ensure that modifications can be monitored during the planned pilot timescale;
- Overall it is too early to reach conclusions about the Rope Pump in Ghana – a clearer picture will emerge when monitoring is complete;
- CWSA looks forward to a situation where the Rope Pump effectively 'sells itself'.

* * * * * * * * *

Mr Chillin then invited Mr Sam Quaye to present his paper.

Day 4/Session V

Presentation by Mr Sam Quaye, ENTESEL, Ghana

A Ghanaian Manufacturer's Experience

Mr Quaye described how his company's involvement with the Rope Pump had started in 1999 after contacts with CWSA and the World Bank. ENTESEL was one of two companies identified to manufacture a batch of 50 Rope Pumps, and to install them in villages in four regions of Ghana for monitoring in conjunction with CWSA. Mr Quaye then discussed ENTESEL's experience of installation, training of communities and monitoring of the pumps.

The main points are summarised below:

- During installation ENTESEL worked closely with local government officials, village chiefs and communities, who were fully involved in well-head preparation;
- Installed pumps were tested followed by training of communities on pump maintenance, including preventative measures such as rope repair and replacement;
- In early monitoring of four pumps installed in Greater Accra, the below-ground parts of one fell into the well, one wore rapidly, and two remained in reasonable condition;
- In Western region three pumps failed due to seized rope and pistons. Installation of the pump too close to the muddy well bottom had caused particles to be drawn in resulting in abrasion between pistons and pipe walls. The pump guide boxes were raised by placing stones on the well bottom to avoid recurrence of this problem;
- Too high rope tension caused failures in some pumps, while the rope material itself also caused problems. By the end of the first phase of monitoring it emerged that locally sourced polyethylene rope had been used instead of polypropylene which is tougher and more abrasion resistant;
- Accordingly, polypropylene, and other locally sourced rope materials were tried. In an effort to eliminate the effect on rope wear rates of variables such as community size and pump

usage rates, pieces of rope of different materials were spliced together to make a single length and then installed on the pumps. This ensured truly comparative results for each material;

- The testing of these composite ropes is still in its early stages and no failure has occurred to date. However, inspection has shown that polypropylene rope is showing virtually no wear, while other materials are wearing to varying degrees.

Mr Quaye concluded his presentation by affirming his confidence in the Rope Pump project in Ghana, and his company's commitment to the pump's future.

* * * * * * *

This presentation concluded the morning and Mr Chillin closed session V.

3.7 Technology Transfer Implementation: the Institutional and Commercial Challenge

Session VI was chaired by Mr Alberto Cumbane, DNA-DAR, Mozambique. The afternoon was given over to group discussions on implementation strategies for Rope Pump technology transfer.

The group arrangements and outputs of the discussions are reported in ***Section 4.***

4. Working Groups

The working groups met during sessions IV and VI. Workshop participants divided into three groups and appointed a chairperson and rapporteur. Each group then spent around 90 minutes discussing the set topics. After discussions were concluded the rapporteurs presented each group's findings in the plenary session which followed.

4.1 Rope Pump Technology Transfer: Demand and Capacity

- **Demand and Technology Needs**
- **Steps Towards Capacity Building**

These topics for the session IV working groups explored the preliminary stages of the Rope Pump technology process in a simulated country-based operation. Groups were required to identify and discuss the key parameters they would consider in assessing the potential for transferring Rope Pump technology to a new country. ***Section 4.1.1*** summarises the conclusions presented by the groups in session IV.

4.1.1 Group Presentations for Session IV

- Measuring demand for the Rope Pump is a key first step. The technology offers many advantages in a rural context but any assessment would take account of the likely cost and availability of spare parts, communities' resources to carry out maintenance and whether water quality targets can be achieved;
- The necessary infrastructure should be in place to support minimum quality standards for locally produced pumps;
- Suitable financing mechanisms should be available or able to be set up;
- Initially, a pilot project should be undertaken. This will provide answers to many unknowns, provide an opportunity to demonstrate the technology and highlight possible pitfalls;

- The Rope Pump's potential to meet the needs of families and small communities at shallow settings has been demonstrated. More research is needed to assess its performance at deeper settings and with larger communities;
- The experience gained to date on Rope Pump technology transfer in Ghana, Madagascar, Laos and elsewhere provides valuable lessons for technology transfer in other countries and should be exploited.

4.2 Rope Pump Technology Transfer: the Planning Model

- **Strategies for Implementation**

This topic for the session VI working groups explored planning and implementing Rope Pump technology transfer in a new country. Groups were required to identify and discuss the key steps involved, and to consider likely obstacles, which would need overcoming. ***Section 4.2.1*** summarises the conclusions presented by the groups in session VI.

4.2.1 Group Presentations for Session VI

- A promotional campaign for the Rope Pump should be undertaken. This will generate interest and motivation in private sector manufacturers and raise awareness among other actors and stakeholders. The private sector should become involved in the campaign as soon as possible;
- The banking and finance community should also be involved at any early stage so that suitable loan schemes are available;
- Outputs from the pilot study should form part of the promotional campaign, enhancing credibility and maximising involvement of participants;
- Full generic product specifications and other manufacturing and O & M data should be readily available to interested parties. Some flexibility is needed to allow for minor modifications to suit local needs and conditions;
- Systems should be in place to ensure minimum quality standards for manufacture and installation are maintained. Certification

by an independent agency or national standards body is preferable;

- Sharing of experience through South-South contacts and other mechanisms should continue after technology transfer programmes have been initiated and local production is under way.

5. Workshop Conclusions and Recommendations

The final Workshop sessions were chaired by Ms Ivone de Jesus Amaral. During session VII participants discussed and agreed the conclusions and recommendations, which had emerged from the week's deliberations. These summarise the findings of the Workshop and are shown in full below.

Section 5.1 lists the Workshop Conclusions and ***Section 5.2*** lists the Workshop Recommendations.

5.1 Workshop Conclusions

- On-going problems in rural water supply are caused by expensive technologies, which are often difficult to maintain at the community level and by inadequate supply chains. There was agreement in all the countries represented that there is a great demand to increase access to safe water through sustainable, low cost technologies.

- The Rope Pump has the potential to address many of these problems as an effective response to the needs of families and communities in many countries for low cost, sustainable water supply.

- In Nicaragua the Rope Pump has been demonstrated to reliably pump water from depths up to 50 metres for families, farms and communities. The workshop participants agreed that the Rope Pump needs to be demonstrated in other countries so that its performance, benefits and social acceptance can be verified under a range of conditions.

- The Rope Pump has several very strong attributes such as:
  - Low cost
    Ease of operation

- Easy to understand
- Family-based maintenance
- Ease of manufacture
- Use of local materials for manufacture and repair.

- With low start-up costs the Rope Pump has considerable potential for local manufacture. Locally available materials can be used for manufacture and repair in most countries.

- The process to transfer the technology and establish local manufacturing capacity requires initiation, or continuation where it has started.

- Basic standards and specifications are required to ensure quality.

- Local production near the user is a condition for having a successful supply chain of goods and services.

- Several examples of Rope Pump technology transfer from Nicaragua to other countries in Central America, Africa and Asia have been initiated.

- To achieve the maximum benefits from the technology it is essential to match low cost water sources such as hand dug wells and manually driven boreholes with low cost pumping devices.

5.2 Workshop Recommendations

- It is important that the Rope Pump technology is disseminated to explore its viability under varying conditions in other countries. Given its cost-benefits and sustainability, funding agencies are called upon to support the technology transfer process. The Rope Pump's potential for use with micro-irrigation schemes should also be explored.

- Countries planning Rope Pump technology transfer need to establish the feasibility and economic viability of introducing the new technology before initiating the process.

- The feasibility appraisal should include comparative evaluation of different pumps. An independent assessment of performance, reliability, maintainability and water quality should be carried out. Results of such studies should be made freely available through publications and web sites of HTN and others.

- The sharing of experience among all stakeholders in each country is important, focusing on opinions from users. Their participation and support is key to the success of technology transfer.

- To have an impact on health and living conditions, it is essential to supplement the promotion of hand pump technology with strong elements of hygiene and environmental sanitation education.

- At the international level the sharing of experience through networks will facilitate efficient rope pump development and help to avoid pitfalls.

- A strong element of the technology transfer process should be direct South-South contacts.

- In technology transfer, the private sector has an important role to play in the development, promotion and provision of goods and services to users.

- Procurement and supply mechanisms need to be adapted to enable users to select and purchase their handpumps and take over full ownership.

- The Workshop recognises the pivotal roles that the Rope Pump Technology Transfer Division in Nicaragua and other Central American manufacturers and NGOs have played in technology transfer. It recommends that, in conjunction with funding agencies, they take steps to ensure their long term capability to provide equitable support for technology sharing.

6. The Managua Declaration and Valedictory Remarks

Section 6.1 introduces and describes the Managua Declaration and ***Section 6.2*** summarises the Workshop's Valedictory remarks.

6.1 A Call to Further Explore a Promising Technology

The Workshop had started with participants experiencing a mix of emotions. Everyone was moved by speakers who described the grave problems faced by the water sector. And yet the Workshop had also started with a message of hope and, as the week progressed, the mood of participants reflected confidence and determination. Confidence in the commitment and skills of fellow participants. And determination to explore and share the opportunities offered by the Rope Pump technology.

During session VII participants turned their attention to producing a text which would reflect this mood of optimism and encapsulate the outputs of the Workshop.

The resulting **Managua Declaration** is sub-titled 'Exploring Opportunities by Sharing Knowledge', the phrase reflecting the aspirations of participants as the Workshop neared its end. The Declaration itself symbolises the Workshop's wider vision and it is hoped that it will serve as an inspiration to participants and the international community in addressing the challenges that the Workshop has presented.

6.2 Summary of Valedictory Remarks

With the Conclusions, Recommendations and **Managua Declaration** now agreed, the Workshop moved to the concluding session VIII. Ms Amaral invited Ms Beatrix Meyer of COSUDE/SDC to make her valedictory remarks.

Ms Meyer said the Rope Pump had a considerable potential role in the provision of safe water and in alleviating poverty - key aims of SDC. She expressed her belief that the Workshop would prove to be a crucial step in South-South co-operation on Rope Pump technology sharing. Ms Meyer noted that institutional contexts differ from country to country and welcomed the diversity of representation among participants. Such diversity would lead to better understanding and collaboration in tackling tasks and facilitate the dissemination of knowledge gained.

Ms Meyer ended by welcoming the commitment and motivation of the Workshop and expressed her confidence in the successful outcome, which would result from participants' efforts.

Following an invitation from the chair, Mr Erich Baumann proposed a vote of thanks to individuals and organisations who had worked hard to make the Workshop such a success, and presented gifts to the support team.

Ms Amaral then invited Mr Anthony Brand to sum up the Workshop for the benefit of participants.

Mr Brand welcomed the amenable atmosphere and smooth running of the Workshop. He mentioned the important part played by the field visits earlier in the week and expressed pleasure at the positive effects the Workshop would have on RWSS programmes in Central America and far beyond. Mr Brand also proposed votes of thanks to hard working organisers and individuals and further gifts were presented.

Ms Amaral then invited valedictory remarks from the floor. Participants welcomed the success of the Workshop, thanked all those who had made it possible and reaffirmed their commitment to realising the goals of the Workshop.

Mr Juan Gago gave the concluding valedictory remarks. Mr Gago thanked everyone on behalf of his company, and expressed his pleasure at the presence of friends and colleagues from 22 coun-

tries at the Workshop. He also expressed his thanks to SDC for their trust and supportive staff.

Mr Gago closed the valedictory session by congratulating participants on achieving the aims of the Workshop and looking forward to the Rope Pump technology being disseminated in the spirit of warm friendship which had prevailed throughout the Workshop.

The Managua Declaration, 18 May, 2001

Exploring Opportunities by Sharing Knowledge

Almost 2 billion people worldwide are without access to safe water. Advances in coverage have masked limitations of project-based approaches that result in unsustainable supply chains for technologies, which are often difficult to maintain at user level.

The First International Rope Pump Policy Workshop was jointly organised by COSUDE, RWSN-CA, HTN, the Technology Transfer Division of Bombas de Mecate SA, WSP and IRC, and was held in Managua, Nicaragua, from 14-19 May, 2001.

This venue was chosen in recognition of the successful dissemination of the Rope Pump technology in Nicaragua. Representatives of governments, external support agencies, NGOs and private sector enterprises from 22 countries attended the workshop. It offered an opportunity for the participants to familiarise themselves with Rope Pump technology, to assess the feasibility of its application in their countries, and to consider methodologies for sharing the technology. The participants felt that the Rope Pump technology can have a significant potential in many countries, due to these key attributes:

- Affordability and accessibility to families and communities
- Ease of use
- User-level maintenance and repair
- Potential for local manufacture
- Use of local materials for manufacture and repair
- Adaptability
- Likely social acceptance

As a potentially feasible water supply technology option, the Rope Pump technology warrants the initiation of technology transfer processes to explore its viability under the varied conditions in other countries.

Effective technology transfer to establish local production was recognised as being central to launching the Rope Pump in other countries. This involves sharing knowledge and experience already gained in introducing the Rope Pump.

The Technology Transfer Division of Bombas de Mecate SA and other Central American manufacturers and NGOs play a pivotal role in providing support for the technology sharing process through direct South-South contacts. Structured action should be taken to ensure that these organisations can continue to provide equitable technical assistance to all stakeholders.

Additional structured initiatives to support technology transfer must include the definition of clear roles and responsibilities for the public sector, private sector, external support agencies, NGOs and the users themselves. Procurement and supply mechanisms need to be changed to enable users to select and purchase their handpumps themselves. This will ensure that the Rope Pump technology is demand-driven and that effective and sustainable supply chains exist.

The participants pledged to work towards the goal of placing the Rope Pump technology on the international agenda through established networks such as HTN and others, and by the sharing of experience among all stakeholders. The introduction, evaluation and promotion of the technology require commitment from international technical assistance and financing agencies.

Abbreviations

AGUASAN	Programa de Agua y Saneamiento para Nicaragua
CARE	Co-operative for American Relief Everywhere
COSUDE	Agencia Suiza para el Desarrollo y la Co-operación
CWSA	Community Water and Sanitation Agency
DPHE	Department for Public Health Engineering
ENACAL	Empresa Nicaragüense de Acueductos y Alcanterillados
ESA	External Support Agency
EU	European Union
GRP	Glass Reinforced Plastic
HTN	Network for Cost-effective Technologies in Water Supply and Sanitation
IRC	International Water and Sanitation Centre
INAA	Instituto Nicaragüense de Acueductos y Alcanterillados
O & M	Operation and Maintenance
NGO	Non-Governmental Organisation
RWS	Rural Water Supply
RWSN-CA	Regional Water and Sanitation Network for Central America
RWSS	Rural Water Supply and Sanitation
SKAT	Swiss Centre for Development Co-operation in Technology and Management
SDC	Swiss Agency for Development and Co-operation
SINAS	Sistema Nacional de Información de Agua y Saneamiento
SWL	Static Water Level
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UPVC	Unplasticised Polyvinyl Chloride
WATSAN	Water and Sanitation
WSP	Water and Sanitation Program

Platform Panel for Inaugural Session

(listed in order of addresses)

Mr Anthony Brand (UNICEF)
Mr Oscar Tablada (GAR)
Mr Juerg Benz (COSUDE)
Mr Erich Baumann (SKAT/HTN)
Mr Rene Meza (Bombas de Mecate SA)
Ms Maria Aburto (El Caimito Community)
Mr Jo Smet (IRC)
Mr Moses Gava (Chairperson)

Appendices

Appendix 1	Workshop Agenda
Appendix 2	List of Registered Participants
Appendix 3	List of Papers Presented
Appendix 4	List of Websites *(giving information on RWS networks and information sharing, including web-site with full-length versions of workshop papers in English and Spanish, Proceedings, Appendices, etc)*

Appendices can be obtained separately from:

HTN-SKAT
Vadianstrasse 42
CH-9000 St. Gallen
Switzerland

Tel: +41 71 228 54 54
Fax: +41 71 228 54 55
E-mail: info@skat.ch