IN SUPPORT OF
Ghana Water and Sewerage Corporation's
Rural Water Division's Development Programme 1989

A **WaterAid** CONFERENCE ON RURAL WATER DELIVERY

HAND-DUG WELLS, POLICY AND OPTIONS.
13TH - 17TH JULY 1989
Mole, Northern Region, Ghana
WEST AFRICA.

CONFERENCE REPORT

CONTACT ADDRESSES

1. WATERAID
P.O. BOX 16185 AIRPORT
ACCRA

2. WATERAID
1 QUEEN ANNE'S GATE
LONDON SW1H 9BT
Telephone 01-222-8111
Telex 918518

3. GHANA WATER AND SEWERAGE CORPORATION (RWD)
P.O. BOX M194
ACCRA
Telephone 777389/774011

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GLOSSARY OF ABBREVIATIONS

ADRA	Adventist Development and Relief Agency
BACH	Binaba Area Community Health Project
CDR	Committee for the Defence of the Revolution
DCD	Department of Community Development
FAO	Food and Agriculture Organization
GWSC (RWD)	Ghana Water and Sewerage Corporation Rural Water Department
ICCC	International Christian Chamber of Commerce
ISODEC	Integrated Social Development Centre
ITTU	Intermediate Technology Transfer Unit
KfW	Kreditanstalt fur Wiederaufbau
MOH	Ministry of Health
NCWD	National Council on Women and Development
NGO	Non Governmental Organization
NORRIP	Northern Region Rural Integrated Programme
NSS	National Service Secretariat
NTC	Network Training Centre
PAMSCAD	Programme of Action to Mitigate the Social Costs of Adjustment
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
UST	University of Science and Technology
VORADEP	Volta Regional Development Programme
VSO	Voluntary Service Overseas
WHO	World Health Organization
WRRI	Water Resources Research Institute

LIST OF PARTICIPANTS

ADRA	Mr Yaw Appiah-Mensah Mr Godfrey Ntim
BACH	Mr Thomas Adagbana Ms Marion Bowl
CDR	Mr Michael Aryee Mr Kwadwo Owusu
CDS	Dr Edwin Amonoo
Catholic Relief Services	Mr Frank Doku
DCD	Mr L A Akantali Mr Paul Alimbey
31st December Women's Movement	Mrs Agnes Atoge
District Secretary, Akwapim North	Mr Okai
GWSC	Mr Alban Ananye Mr P O Sackey
Ghana National Commission on Children	Mr S S Nayina Mr E A Okrah
ICCC	Mr Kofi Forson
ISODEC	Mr Tay Awoosah Ms Sally Burrows Ms Judith Thompson
Intek Ltd	Mr Pinnock Casely-Hayford Mr Claude Sabutey
Intermediate Technology Transfer Unit, Cape Coast	Mr G H Ankrah
NCWD	Mrs Mary Apanayine
NORRIP	Mr E M Bawa
NSS	Ms Tina Asare Mr Boniface Gambilla Mr Steve Gear

	Mr Peter Kpordugbe Ms Gifty Mahama Ms Kate O'Malley Ms Nana Ekua Sangmuah Mr John Tagbor
NTC	Mr Isaac Adjei-Doku Dr G J Monney
Oxfam	Mr Jan Davies Mr Ben Pugansoa
Prakla-Seismos	Mr R R Bannerman
Science Workshop, University of Cape Coast	Mr W N A Hammond
UNICEF	Mr Chris Melifownu
VORADEP	Mr S K N Afari
VSO	Mr Tony Dogbe
WRRI	Dr Amuzu Mr S Dapaah
WaterAid	Ms E Bannerman-Williams Mr Ron Bannerman Mr Gani Tijani

FOREWORD

P O SACKEY, DIRECTOR
RURAL WATER DEV.
G W S C

A three-day conference organized by WaterAid, a UK charity of the water industry, at Mole Game Reserve, Damongo, brought together various actors in the rural water supply sector of our economy. The theme of the conference was "Hand-Dug Wells, Policy and Options", but the conference deliberated not only on hand-dug wells but on rural water supply strategy in the country, and areas of co-operation among the actors. The fact that the conference was organized by an NGO is in itself significant because it adds weight to the long time concern of GWSC in the area of co-ordination of activities of NGOs engaged in rural water supply development. Whilst showing appreciation of the efforts of the NGOs to help the rural poor, and in fact giving encouragement to them in various forms, GWSC wishes to see co-ordination of activities which will result in harmonious and planned development of the sector, devoid of wasteful duplication of efforts, conflicts and confusion. Several meetings have been held with NGOs out of which a set of guidelines for their operation was agreed upon.

The Mole conference has given opportunity for further debate on the guidelines as well as scrutinizing the modalities for their application. As said in my closing remarks, I found the conference an immense contribution to the formulation of ideas in the Rural Water Supply Department. Reading through the proceedings will not necessarily teach one how to construct hand-dug wells but will give one an exposure to all the problems involved in running rural water supply programmes in Ghana and similarly in a typical third world country; problems of planning, execution, co-ordination, monitoring and cost recovery. I should recommend these proceedings to the readership of those interested in rural water supply development in Ghana and in the goals of the UN Water and Sanitation Decade.

OPENING ADDRESS DELIVERED BY THE PNDC REGIONAL SECRETARY, MR JOHN E BAWA

Mr Chairman, PNDC District Secretary, distinguished consultants and resource personnel, representatives from various NGOs and research institutions, the regional manager, Ghana Water and Sewerage Corporation, the director NSS, participants, invited guests, ladies and gentlemen:

I consider myself greatly honoured to welcome you to the Mole National Park, Damongo and for that matter to the Northern Region. It is my wish that the salubrious conditions prevailing here will afford you this rare opportunity to tackle and accomplish the task you have assigned yourselves.

Mr Chairman, it is often said that after air, water/food is the next indispensable commodity contingent upon the survival of man. It is therefore reassuring to note that WaterAid is not only addressing itself to this basic need but has also found it fitting to hold this conference in a rural setting which is perennially bedevilled with water shortages.

Ladies and gentlemen, it might interest you to learn that there are presently 15 water systems operated by Ghana Water & Sewerage Corporation in the region which are supposed to serve a total population of 337,153 people. But most of the systems were constructed in the 1960s and the communities have since outgrown them both in size and population. Tamale, which is the third largest city in the country with a population of about 161,000 people, requires 3.5 million gallons per day (mgd). But due to power problems (it is anticipated that with the extension of the Akosombo grid to the region very soon, the situation will change for the better) and obsolete machinery, there is a suppressed demand of only 1.2 mgd. From this it can be seen that safe drinking water for the majority of people even within Tamale municipality is still an illusion. It is however gratifying to note that the Government of the PNDC through the Ghana Water and Sewerage Corporation has sought the support of bilateral and multilateral agencies in an attempt to undertake the rehabilitation and expansion of plant capacities of some water supply systems. However hand-dug wells, rain water catchment systems, dams and dug-outs tend to supplement the water requirements of the people. This unfortunate situation is even worse in the rural areas where the bulk of our people live and work. The incidence of guinea worm has militated against increased agricultural production and has brought in its wake undue hardship to families, not only in terms of seasonal food shortages, but also

physical defects and other forms of deformities. During the farming season in particular, it is common to see young virile men and women incapacitated by the guinea worm disease. The apparent result is that the guinea worm scourge has contributed in no small measure to reducing rural incomes through low agricultural productivity. Under these circumstances low incomes lead to low capital formation which in its turn leads to the rural income poverty syndrome.

Mr Chairman, this seemingly bleak picture of the rural economy should not throw one into a state of despair and despondency. It is heart warming to note that through education, the bulk of our rural communities are gradually improving upon their standard of living through the practice of simple health methods, improved sanitation and nutrition. More important however, increased education has also contributed to liberating the bulk of our rural dwellers from avoidable water-borne diseases like bilharzia, typhoid fever and so on. This positive response from the rural communities stems from the fact that the Government of the PNDC has succeeded in inculcating in the rural people the awareness to identify their needs and to satisfy these through their own resource mobilization and use. It is in this connection, fellow participants, that various communities have been marshalling resources to provide themselves with basic amenities and facilities of which water has always been a priority.

One area that can be explored to accelerate the provision of good drinking water for the rural people is to create a special fund by levying people enjoying good drinking water (cities, towns) provided virtually free of charge by the central government. Perhaps you will appreciate the issue better when one compares the circumstances under which water is procured and used in the urban centres as against the pains through which it is collected and conserved for use in our rural communities.

In addition, I wish to urge the various district assemblies in the country to consider taking over the construction of wells as was done by the district councils in the past. This suggestion will be even more feasible considering the enthusiasm of community participation in the initiation and implementation of projects.

Mr Chairman, the Government of the PNDC appreciates the positive role played by NGOs in the provision of health, education and other basic needs in our rural communities.

In the area of rural water supply however, I wish to suggest that the Ghana Water and Sewerage Corporation should provide prototype hand pumps which will serve as a standard against which their importation by NGOs and other philanthropic bodies engaged in rural water provision could be based. In addition, it should be made imperative for the local people to be taught how to do

routine servicing and maintenance of these pumps all by themselves whilst major repair works could be undertaken by central government agencies.

Ladies and gentlemen, without prejudice to the good work being carried out by NGOs in our rural communities, a cursory glance at their activities indicates overlapping of functions and duplication of resources in some areas whilst other areas requiring the same services tend to be left out. I wish to urge NGOs to liaise with government development agencies like NORRIP, the MOFED and Agriculture to advise them as to where to locate their projects. This will prevent duplication and also ensure an integrated and co-ordinated developmental strategy within the umbrella of national framework.

Mr Chairman, resource personnel, participants; because rural communities play a vital role in the national economy, your conference title - Hand-Dug Wells, Policy and Options - is not only appropriate but will give rise to new areas of co-operation between government and other rural development oriented bodies. With this understanding in the background, I wish to charge this conference to come out with health improvement programmes to begin from clean water supply. I also urge the conference to use this occasion to co-ordinate the exchange of ideas between organizations involved in hand-dug wells. It is my firm conviction that the outcome of this conference would take into consideration the importance of integrating health education and sanitation programmes into well construction. On this note I declare the conference duly opened.

Thank you.

DAY ONE
FRIDAY JULY, 4

Chairperson, Mr Tony Dogbe opened the conference by reiterating the aims:

- to co-ordinate efforts to provide decent water to rural people
- to exchange ideas about hand-dug wells
- to equip participants to educate others about hand-dug wells
- to look at other forms of providing water such as rain water catchments, boreholes and dams
- to assess the feasibility of achieving the government's target for the number of wells (10,000 hand-dug wells plus a further 2,500 through the PAMSCAD project) that need to be constructed
- to look at the level of community involvement in water provision and how to sustain it
- to make recommendations to GWSC.

SUMMARY OF SPEECH BY DR EDWIN AMONOO, CENTRE FOR DEVELOPMENT STUDIES, UNIVERSITY OF CAPE COAST

Much has been written about the problems of the rural water sector. The issues are not new, but solutions to them have still not been found. I hope this conference will come up with practical solutions and not just become a talking conference.

The importance of potable drinking water cannot be exaggerated. In Ghana where 70 per cent of the population is rural, the lack of potable water is life threatening. The absense of safe drinking water affects the lives of all Ghanaians. First of all, water-borne diseases reduce labour productivity. This in turn reduces the flow of food crops from rural to urban areas. Urban food prices increase, contributing to a poor food intake by the urban labour force. As a consequence the urban labour force's productivity weakens. The flow-on effect is to lessen export earnings. This example illustrates the umbilical chord between poor rural drinking water and the socio-economic life of Ghana as a whole. A gap of almost 60 per cent exists in rural water delivery. Most of the people affected live in settlements of 500 people or less.

Approximately 6,000 boreholes fitted with hand pumps have been installed throughout the country, the greatest concentration

being in the Upper Regions. The figure for hand-dug wells can only be estimated at 80-100,000.

INSTITUTIONAL FRAMEWORK

GWSC is responsible for the rural water sector through its Rural Water Division. Other government bodies involved are the Department of Community Development and the Environmental Health Division of the Ministry of Health. The link between GWSC and the district assemblies is GWSC representation on the utility and social services committee of the assemblies.

The institutional framework is weak due to:

i. inadequate guidelines
ii. GWSC's lack of co-ordination
iii. the presence of too many actors in the water sector
iv. interministerial rivalry
v. non harmonisation of policies and strategies
vi. over-emphasis on the engineering component of sector development
vii. the non resolution of the issue of whether water supply should be viewed as a commercial or partially commercial proposition.

The results of this weak institutional framework are:

- Fifty per cent of KfW's boreholes are defective.
- Until recently, 30 per cent of CIDA's boreholes were defective.
- Most hand-dug wells dry up for three months each year.
- About a third of all hand-dug wells are not lined. They cave in frequently and are death traps.
- Strategies for encouraging community participation are lacking.
- Prototype designs to standardise spare parts and equipment have yet to be formulated and local manufacture of spare parts is still a long way away.
- Technological considerations dominate while the sociological aspect of water provision is neglected.
- Average cost recovery rates by GWSC were below 40 per cent in 1985 and 1986.

The water decade ends in two years, yet the structures to run the sector properly are not in place.

The following improvements have to be made:

- The interministerial committee of the Ministries of Works and Housing, Health, Local Government and Rural Development must be strengthened.
- Engineers must liaise with the Department of Community Development, NGOs and other agencies to ensure beneficiary communities are fully consulted.
- Cost recovery must be made effective. A possible way is to make beneficiary communities responsible. Local committees could oversee the collection of tariffs and decide on how to use the money.

QUESTIONS AND COMMENTS:

- On costs, Dr Amonoo said hand-dug wells cost less than five per cent of the cost of boreholes which cost US$12,000 and ¢15,000 maintenance per year. Only three water systems are profitable - Accra/Tema, Sekondi/Takoradi and Kumasi.
- Mr Kofi Forson (ICCC) said GWSC had already come up with a prototype hand pump. The problem was the local manufacture of spare parts. Non-corrodible materials (stainless steel, aluminium, plastic or brass) must be used. There is no steel or brass in the country. However, Tema Steel Works may be able to come up with something close to stainless steel.
- Mr. S. Afari (VORADEP) cautioned against too much emphasis on ground level abstraction water. It could become environmentally dangerous. Dug-outs should also be considered.
- Mr. Pinnock Casely-Hayford (Intek Ltd) urged that the private sector not be ignored. His company had developed a windmill to pump water.

* Full text available on request from Prof. Amonoo or WaterAid

SUMMARY OF SPEECH BY MR P O SACKEY, DIRECTOR OF RURAL WATER DEVELOPMENT DEPARTMENT, GWSC

Until recently the policy was to provide free water to rural people. Two massive projects were launched with this philosophy - under CIDA, 2,600 boreholes were sunk in Upper East and Upper West Regions and under KfW 3,000 boreholes were sunk in central and southern Ghana.

In 1985 this changed, and communities were charged a monthly tariff towards hand pump maintenance. However villagers

saw the charge as arbitrary and huge arrears built up. The lesson learnt is the need for more dialogue with villagers. They also need to take part in projects so they feel they own the finished product.

GWSC policy can be summarised as follows:

1. Boreholes fitted with hand pumps should be provided to communities of 500-2,000 in population.
2. Communities below 500 are to be helped to construct hand-dug wells.
3. Where these technologies are not feasible, rain catchment, spring sources and simple ways of harnessing surface water from dams should be tried.
4. Before boreholes are provided, communities will be asked to contribute ¢60,000 which will be kept in the village account.
5. Responsibility for hand pump maintenance rests with the community. However, until village level mechanics are trained to repair standard models, institutions installing hand pumps must ensure adequate maintenance arrangements are made.
6. Communities must be guided in the construction of hand-dug wells. They will provide labour and locally available materials.
7. Sufficient community animation must be done. Responsibilities of both the water providing agency and the community must be spelt out and if possible a written agreement signed.
8. All organizations involved in water provision must make their plans known to GWSC.
9. Organizations providing water services must also promote sanitation services, especially the VIP latrine.

The following is a summary of guidelines for NGOs.

1. All NGOs wishing to operate in water supply must register with GWSC. The charge is ¢10,000.
2. The registration must state clearly the geographical area they wish to operate in.
3. The NGO must provide a project inception report stating the intended level of investment and the scope of the work to be undertaken for the next five years.
4. Any request from a community for help outside the NGO's area must be referred to GWSC.
5. Every NGO must submit an annual report to the director of Rural Water Development Department stating actual work accomplished in the year and the next year's programme.

6. Records of all boreholes drilled must be filed with GWSC. These must include depth of borehole, pump test records, water quality test record, type of pump and level of pump installation.
7. The type of hand pump on hand-dug wells or boreholes must be approved by GWSC.
8. For boreholes in all regions except Northern, Upper East and Upper West, stainless steel or other non-corrodible material must be used for the underground components of the hand pump, well casing and screens.
9. NGOs should request ¢60,000 as a community contribution towards the cost of every borehole drilled. It will partially cover the cost of drilling and the initial cost of pump maintenance.
10. NGOs must make adequate provision for the effective maintenance of hand pumps installed by them.
11. If NGOs wish to hand over their boreholes to GWSC they must provide for spare parts for three years, tools and transportation.
12. Before any installation, NGOs must carry out community animation to make the community accept full responsibility for maintenance.
13. NGOs providing water services must also consider adding sanitation facilities.
14. NGOs providing hand-dug wells must ensure the community participates in excavation or provision of materials.
15. Other appropriate technologies for water supply must also be approved by GWSC.
16. GWSC should co-ordinate research into appropriate technologies.
17. The criterion for installation of hand pumps shall remain at an average of 300 persons to a handpump but not more than 500 persons.
18. The minimum output of a borehole should be 2.2 gallons per minute.
19. The WHO water quality standards shall be adopted.
20. All installations must be carried out hygienically including adequate drainage for waste water and protection against pollution. Wells should be no closer than 50 metres from a toilet.

In answer to questions, Mr Sackey said a kind of subsidy from urban to rural exists since only the three city systems are profitable. However the rural system needs to stand on its own feet or else the urban system will run down from lack of cash.

He asked district assemblies to select people for water management roles. GWSC will train them.

Mr Sackey said siting of a hand-dug well is a matter of an educated guess based on the experience of the topography of the area. A geophysical study is often done before borehole provision, but for hand-dug wells it would prove more expensive than the facility itself.

DISCUSSION GROUPS

GROUP ONE: IDENTIFY THE PROBLEMS OF RURAL WATER DELIVERY AND RELATE THEM TO RURAL WATER POLICY AS OUTLINED BY MR P O SACKEY.

PROBLEMS:

- Criteria used for selection of needy communities is too restrictive
- Sparse settlement of Ghana's communities creates accessibility problems
- A lack of clarity in co-ordination
- Lack of funding especially for research
- Difficulty of cost recovery
- How to maintain and standardise systems
- Water quality
- Community taboos
- A lack of local manufacturing of parts
- Lack of training
- Lack of involvement of women in the whole process.

On the surface, the policy appears adequate to cater for these issues. However the difficulty is in implementing it. The importance of involving district assemblies and other revolutionary organs was stressed.

GROUP TWO: IDENTIFY THE COST IN RURAL WATER SUPPLY AND DISCUSS OPTIONS FOR COST RECOVERY AND CROSS-FUNDING FROM RURAL TO URBAN SUPPLY.

- A distinction needs to be made between capital and recurring costs.
- Cost depends a lot on choice (between systems).
- Area and geology can often dictate cost.
- Recurrent cost also depends on location and proximity to spare parts.
- Cost of community education should be taken into account.
- Cost depends on policy of donors (e.g. whether to import labour from outside).

OPTIONS ON COST RECOVERY

- Privatise it
- Sell water by bucket
- Provide facility first, wait for community to appreciate it, then tax
- Charge per household (creating a more certain income for GWSC per month)
- Let community decide on own method of tariff collection
- Encourage income-generation before taxing communities.

PROS AND CONS OF URBAN-RURAL FUNDING

PROS	CONS
- Rural areas create national wealth and deserve support.	- It is better for rural communities to stand on their own feet.
- A cross-funding exercise could be initiated then phased out.	- In some rural areas self-funding is viable.
	- It could create over-dependence on central government.
	- It could kill the urban systems gradually.

No consensus was reached in favour or against.

FURTHER COMMENTS:

Dr Amonoo (CDS) said people should understand the cost from the beginning. It does not work if people think it is free then suddenly they are expected to pay.

Mr Ron Bannerman (WaterAid) said it was unimaginative just to look at cash contributions. How about the levying of a goat, a chicken or so many dozen eggs?

Mr R R Bannerman (Prakla-Seismos) said boreholes with hand pumps cost ¢2 - ¢2.5 million. The ¢60,000 minimum contribution should maybe even increase. Every person should be able to contribute the price of a bottle of beer.

Dr Amuzu (WRRI) asked who were we when we have had three large meals today to ask communities who cannot even afford two proper meals to contribute ¢200.

GROUP THREE: WHO ARE THE ACTORS AND WHAT ARE THEIR ROLES IN RURAL WATER DELIVERY? HOW CAN THEY CO-OPERATE EFFECTIVELY?

ACTORS:

Beneficiary communities, local NGOs, foreign NGOs, Ministry of Works and Housing, GWSC, Department of Community Development, Ministry of Health, Ministry of Local Government, Ministry of Agriculture, National Service Secretariat, NORRIP, donor agencies, churches, chiefs and elders, private companies, research and development institutions, revolutionary organs.

ROLES:

- Planning
- Community education/animation
- Labour power
- Technical expertise
- Mobilization
- Cost recovery
- Research
- Documentation
- Dissemination of information
- Development and construction
- Training
- Provision of materials
- Monitoring
- Finance
- Co-ordination
- Consumption

CO-OPERATION:

- A detailed sector plan and guidelines must evolve from local levels (not be imposed from the top).
- GWSC should act as co-ordinator.
- Resources (financial and labour power) need to be mobilized.
- Targets and goals must be set.
- Roles and functions of different agencies must be delineated.

FURTHER COMMENTS:

Mr P O Sackey (GWSC) said GWSC already has a five-year plan. It could only be drawn up at a national level but of course the grass roots had to be fully consulted.

Mr Peter Kpordugbe (NSS) and Mr Pinnock Casely-Hayford (Intek Ltd) said the plan now needed implementation.

Dr Amuzu (WRRI) said a water resources commission is needed to oversee the whole spectrum of water needs. There are conflicts over its use (eg for hydroelectric power, for irrigation).

DAY TWO
SATURDAY JULY 15TH

Chairperson: Mr Peter Kpordugbe

SUMMARY OF AN ADDRESS BY MR JAN DAVIES (OXFAM) ON HAND-DUG WELLS.

Review of Options for Rural Water Supply.

1. Water treatment plants - usually too expensive
2. Rainwater collection - a good source of high quality water but only if there is a convenient collection surface and the rainfall pattern is appropriate
3. Surface water such as streams, rivers, lakes, ponds, dug-outs, dams - usually heavily polluted
4. Ground water (ie. taken from below ground) - usually higher quality because pathogens are filtered out by the soil.

Ground water can be obtained in various ways:

i	Springs:	Water is protected as it emerges from the ground and is led to a collection point. Where they exist, springs are the best options. Costs are low; no machinery or moving parts are involved. Maintenance is simple.
ii	Borehole:	Small diameter holes are drilled, hammered or jettered into the ground. Water is abstracted by a pump.
iii	Hand-dug wells:	Pass down into the lower water-bearing soils. In many rural communities, wells are the main source of water. However pollution can be a problem.

POLLUTION	PREVENTION
- Surface water run off into the well	- A head wall around the top of the well. A water seal
- Spilt water	- A head wall and apron to drain water away
- Polluted ground water	- Site well away from latrines and rubbish dumps

- Rubbish down wells, dust accumulation, dead leaves etc.	- Education, especially of children. Install a lockable cover.

CONSTRUCTION OF A HAND-DUG WELL:

Optimum shape and size is circular with an internal diameter of about 1.3m.

1. If the soil strata down to the water table is stable then the well can be dug to the bottom then lined with cast in-situ concrete, masonry, bricks etc., or with pre-cast concrete rings.
   To penetrate the aquifer, build up a caisson, (i.e. a circular column inside the lined shaft) and sink into the water by digging underneath the column. The caisson can be:
   i. *pre-cast concrete rings lowered from the surface*
   ii. in-situ reinforced concrete ring column
   iii. reinforced concrete blocks on a solid cutting ring.
2. If the soil strata is unstable then lining has to be done while digging. The caisson can be lowered through the soil by digging from the surface.
3. If digging through stable rock formations then lining may not be necessary except for the top 2 - 3 metres where a seepage seal will be required.

Rings or blocks below the water table can be perforated to allow water to enter the well more easily, or porous concrete can be used.

In order to penetrate the aquifer to get a sufficient yield, water must be extracted to allow deeper digging. The last of the digging should be left to the end of the dry season so that the lowest water level can be judged. The depth needed to be dug below the water table depends on how quickly water absorbs through the soil. Typically, it is 3 - 4 metres into the water table at the end of the dry season.

WATER QUALITY:

WHO standards are inappropriate and too strict. It is important that reasonable quality water is available in sufficient quantity. If standards are too strict and wells are closed down, the community will return to a worse source of water.

Oxfam has a test kit for bacteria analysis.

METHOD OF DRAWING WATER:

Much more research and development needs to be done. Apart from a pump, other methods include the windlass, rollers, pulley block, and double bucket pulley system.

CONCLUSION:

Hand-dug wells lend themselves to community participation. People involved in the construction of their own water source have a better understanding and sense of ownership.

A hand-dug well costs between ¢180,000 - ¢200,000, but this can be offset by community contributions towards the materials.

Hand-dug wells are not in competition with boreholes. Different situations are appropriate to each one. It is rare to go beyond 30m with a hand-dug well. There is therefore a need for greater co-ordination and delineation between hand-dug well and borehole programmes.

COMMENTS:

Mr P O Sackey (GWSC) said PAMSCAD undertakes to supply 10 bags of cement to any community building a well.

SUMMARY OF AN ADDRESS BY MR R R BANNERMAN (PRAKLA-SEISMOS) ON BOREHOLES.

- There are 7,000 boreholes in existence. Six thousand more are planned for the next five years. Prakla-Seismos came to Ghana in 1981 to drill 3,000 in six regions. The have also been drilling for other organizations.
- What is a borehole?
  It is a drilled diameter 4" - 6" wide, cased with PVC. Water passes through a filter, then a screen into the hole. A pump is put on top.
- Advantages:
  It can be drilled in all seasons and all terrains. Ghana is 90 per cent hard rock, the 10 per cent gravel and sand is around Keta and Axim. It is far faster than hand digging. A borehole can be drilled in four hours or at most three days. It goes deeper (15-100 metres) so the yield is better. A minimum yield is 10 litres per minute. It can produce as much as 1,000 litres per minute. A cement pad on top prevents pollution.

- How to locate water:
  Water is found in fractures or folds in hard rock. Fractures are demarcated by valleys or lines of trees. Plants such as Daniella olivieri (Twi - osanya, Ewe - lifutu, Gonja - kanyan, Konkomo - lipruga) are often a guide to the presence of water. If this detection method fails other geophysical or magnetic techniques can be used.
  The success rate is about 75 per cent.
- If a line is drawn from Bole to Kete Krachi, south of that line, a problem exists of too much iron causing water quality problems.
- A 4" diameter, 40m down with cement and pump costs ¢2-¢2.5 million. It will last approximately 50 years; therefore the capital cost can be said to be ¢40,000 per year.
- Drilling rigs are expensive and require foreign currency. Maintenance is always a problem. To recoup costs, rigs need to be used every day.
- If hand-dug wells strike rock a drilling rig can continue, producing a dug-cum-borehole. In a Senegal "contre puis" set-up, a borehole stands beside a hand-dug well. When a borehole is drilled the water level usually shoots up. This can be connected to the well.

COMMENTS AND QUESTIONS:

Mr Ron Bannerman, (WaterAid) asked whether Ghana could afford massive borehole programmes. Are they economically sustainable?

Mr Jan Davis (Oxfam) said although Ghana has 90 per cent hard rock, the first 15 metre layer which the borehole discards can be a good source for a hand-dug well.

Mr R R Bannerman (Prakla-Seismos) replied that anything from the ground down to 15 metres is water that has not been reabsorbed. Therefore bacteria is still present.

Dr Amonoo (CDS) asked if we should keep on expanding borehole programmes when there are obvious problems such as the non-functioning of many CIDA wells.

Mr R R Bannerman (Prakla-Seismos) replied that the main problem was that until 1974 there was not the technology to drill into hard rock, only soft rock.

Dr Monney (NTC) said 85 per cent of CIDA's wells are functioning at any one time. The problem is a maintenance one.

Mr Jan Davies (Oxfam) said research into Ghana's water balance (the amount of water going in and out of the earth) is of national importance.

Mr S Dappah (WRRI) was asked to briefly outline his organization's borehole programme.

- WRRI is under the Council for Scientific and Industrial Research. It submits its research proposals to the Ministry of Finance and Economic Planning for funding. This year they got ¢20 million.
- The ground water division sinks wells for data collection. They have drilled about 309 dwells mostly in the Accra and Winneba plains. Because of the expense they rely on GWSC for most of their data collection; WRRI then does the analysis.
- The cost of their boreholes is ¢1.1 - ¢2.2 million. Communities are asked to contribute ¢500,000.00
- WRRI has good laboratory facilities for water testing.
- WRRI publishes a quarterly report on all research done.

SUMMARY OF AN ADDRESS BY MR RON BANNERMAN (WATERAID) ON LEVELS OF COMMUNITY PARTICIPATION IN A HAND-DUG WELL PROGRAMME

WaterAid does not initiate its own projects internationally. It only gets involved in funding already existing NGOs. Support is given in cash and technical expertise. A criteria for funding is high levels of community participation. The main reason is WaterAid's belief in self determination - that regardless of their wealth or poverty, people should be able to make their own decisions about their community. It promotes a sense of ownership. Once a community believes a well or borehole is theirs, half the battle of ensuring the community maintains the facility is won. If a community has not been consulted fully, any problem with the well is the responsibility of the donor. The first question is, does the community even want a hand-dug well? If not, why not?

A high level of education and dialogue is needed. For Example, in the Afram Plains, up to six meetings are required before a decision to begin digging is made. You cannot rely solely on the consent of the chief or elders. They will not be the ones digging the well or the main users of it.

The failure rate of the average hand-dug well at finding water for the first time is probably about 40 per cent. This needs to be explained beforehand so a community will not feel demoralised if water is not struck the first time around.

The decision on siting a well should not just be left to technical people or the donor. It must be a joint decision between technicians and the community.

The community can be expected to provide labour, sand and gravel (broken up to the right size) and deliver it to the site.

If it is absolutely necessary to bring in compressors or rock breakers, the community is asked to pay for diesel and three individuals are trained to operate the machinery which is left with the community.

Conditions for community participation in a hand-dug well project need to be standardized. Problems are created when one organization asks for a high level of involvement and another organization working a few miles away provides food for community labour.

If community animation is done well enough, the community will honestly say how much they can contribute. They will also say what they expect from the water provider. E.g. in Bolgatanga the community do not want pumps because of previous difficulties maintaining them.

COMMENTS:

- Mr Tony Dobge (VSO) said many people expect community consultation to produce quick results. True community animation involves living with the people, discussing their problems in drinking bars etc. Community animators such as teachers, priests and pastors must be identified and supported.
- Dr Amonoo (CDS) said animators have to discover what people are talking and worrying about. It may not be water. People want to solve their problems from their own point of view not from a technical angle.
- Mr Peter Kpordugbe (NSS) said an organization can't just listen passively to what a community says, e.g. if they say they do not need a well. There needs to be interaction between animators and traditional village ideas. There is a place for guided democracy.

SUMMARY OF AN ADDRESS BY DR G J MONNEY, (NETWORK TRAINING CENTRE) UST, ON TRAINING AND PERSONNEL REQUIREMENTS.

NTC is funded by the World Bank and UNDP for at least three years. NTC's brief is to disseminate information on appropriate technology for water and sanitation.

Government targets for hand-dug wells are:

REGION	NUMBER OF COMMUNITIES BTN 100 and 500	TARGET OF WELLS
Ashanti	1,130	1,496
Brong Ahafo	662	884
Central	669	900
Eastern	1,423	1,887
Greater Accra	180	223
Northern	1,315	1,710
Upper East/Upper West	250	300
Western	685	904
Volta	1,225	1,450
TOTAL	7,539	9,754

GWSC is planning on at least one well per community of 500. However World Bank calculations are that one well should serve at most 125 people. This is based on a daily need of eight gallons of water per day per community of 500. To do this a water source would have to yield 200 gallons per hour if it could be operated for 20 hours per day. More realistically, this amount could be produced by four wells operating for less hours. So in effect GWSC's target would need to be quadrupled to 40,000 wells.

NATIONAL LEVEL NEEDS:

- Principal or senior engineer
- 2 engineer assistants (one could be a National Service personnel)
- Hydrogeologist.

REGIONAL LEVEL NEEDS:

- Middle level manpower. Preferably there should be engineers in the region.

DISTRICT LEVEL NEEDS:-

- Supervisors, foremen, well sinkers, Community Development officers, health inspectors.

A very optimistic assessment is that a hand-dug well team can dig a well in two weeks. Twelve weeks of the year are out because of the rainy season. Therefore in a year one team can dig 20 wells.

If the government's target of 10,000 wells is to be achieved in the next ten years then 1,000 wells must be dug each year. That would require 50 teams nationally. However if the target is set at 40,000 wells, 20 teams per region are necessary over ten years.

GWSC has trained 130 well sinkers. One sinker is needed in every team. Apart from the 130, there must be already trained well sinkers around who can be put to work.

Graduates from universities will need specialist orientation courses.

COMMENTS:

Ms Sally Burrows (ISODEC), expressed concern that the talk was about training technicians in isolation. It has to be integrated with the training of community workers.

Ms Judith Thompson (ISODEC) outlined her organization's training programme for digging hand-dug wells with a rope pump. It lasts eight weeks and involves National Service personnel (NSS is already doing well digging and community animation in 15 primary health care districts), NGOs and people from rural communities. The first two weeks cover community participation and basic principles of construction. In the middle four weeks the trainees actually construct a well in a community. The last two weeks are spent reviewing their efforts.

Mr Ron Bannerman (WaterAid) explained his organization's training programme. It lasts six months which is the time he believes it takes an individual with construction abilities to learn to dig a well. It begins with a three week rural orientation. Three day classroom sessions on construction techniques, community participation, KVIP construction and health education are interspersed with related practical projects in rural community.

Mr Peter Kpordugbe (NSS) said he was putting two National Service personnel into each programme to compare the effectiveness of each.

SUMMARY OF AN ADDRESS BY MS MARION BOWL, BINABA AREA COMMUNITY HEALTH PROJECT, ON HEALTH EDUCATION.

Everyone agrees it is a good idea to run health education programmes, but not everyone agrees it is their job. If you are

bringing water to people it is your responsibility to do health education whatever stage of the process you are working at.

WHY TEACH HEALTH EDUCATION?

1. We are not just in the business of making water available. If it is not healthy water then it is of no use.
2. Cost recovery - the need to ensure that what is invested pays dividends in terms of improved health.

   It is not good business sense for private companies providing water services to shirk responsibility for health education - that would be like selling a product and not explaining how to use it.

   The consumer will become dissatisfied.
3. Health education raises awareness about water-borne diseases.
4. Health education will ensure that people actually use the well which has been provided.
5. It enables the prevention and control of diseases across the board.

WHO NEEDS HEALTH EDUCATION?

- We do. Water providers/researchers/planners etc. need to learn about the community we are operating in. Educators must find out what the community needs to know.
- Well users, especially women and children
- Well committees who are responsible for the maintenance of the facility.

WHO SHOULD DO IT?

We are all involved. We should not leave it to a paid health educator. We can do it in a number of ways - through our own practice, through trained well committees or using people within the community such as traditional birth attendants, catechists, teachers and health staff.

WHEN SHOULD IT BE DONE?

It should take place throughout the whole process right from the initial discussions to well beyond the physical construction.

WHAT SHOULD IT COVER?

The cleanest ways of fetching and storing water

- Keeping the environment of the well clean and free from contamination
- How to organize funding to keep the well going
- How to control and prevent common diseases (diarrhoea in particular).

WHERE SHOULD IT TAKE PLACE?

It should take place everywhere including the construction site. Schools are an ideal place as children are a powerful source for change in the home. Community meetings where ideas are exchanged are another good forum. Home visits where the educator can learn how people are storing water are also useful.

HOW SHOULD IT BE DONE?

Methods are extremely varied. You can teach health education without even being aware you are doing it. E.g. talking to a neighbour. Often it is very informal. Methods include videos, slides, drawing in the sand, drama, talks and songs.

It is important that health educators are not condescending.

Mr Thomas Adagbana (BACH) talked about the use of drama in the health education process. It is very practical and allows community participation. Visual aids in comparison can be confusing. Drama is retained in the audience's mind for a much longer time. He gave an example of one drama that was so effective that the community passed a by-law that well users have the right to stop anybody from fetching water with their own bucket instead of the one provided by the community.

THE SANITATION LINK - DR MONNEY, (NTC)

Dr Monney said the link between sanitation and water provision had been missing for sometime. GWSC is expected to look at sewerage as well, but apart from Accra and Tema nothing has been done elsewhere in the country.

He showed a video on the link between water and sanitation and invited discussion from the floor.

The failure of the education system to orientate students towards finding solutions to Ghana's water and sanitation problems was deplored. University civil engineering courses are geared towards industrialized high tech options instead of small-scale appropriate technology designs needed in the villages. Ghana is exporting civil engineers while foreigners are brought in to tackle

problems here. Teaching students to find solutions to Ghana's construction needs can begin at the JSS level.

The role of the public and private sector was debated. It was agreed that there was room for both.

Mr Jan Davies (Oxfam) commented that relating sanitation to water services was a complex matter. You cannot just add on sanitation services to a water programme. The cost implications are tremendous.

DAY THREE
SUNDAY JULY 16

Chairperson: Ms Sally Burrows

TRIALS AND TRIBULATIONS IN THE RURAL WATER SECTOR-PROBLEMS AND SUCCESSES IN THE FIELD.

All organizations present were asked to outline their successes and difficulties.

ORGANIZATION	ACHIEVEMENTS	PROBLEMS
Oxfam	- good support from,and contact with,the community.	- finding right people for training
	- in the first year of the project 8 wells have been dug so far. The target is 10.	- standardization of equipment
GWSC	HAND-DUG WELLS	
	1988 - dug about 60 wells	- lack of funds. Government and foreign donors not meeting expectations
	so far this year 40 wells completed	- lacking basic equipment and transport - internal statistics not being reported
	BOREHOLES	- lack of funds; have had to farm out regions to foreign donors
		- maintenance of hand pumps - collection of tariffs.

	RAIN CATCHMENT	- cost of collection tanks (still looking for cheaper alternatives eg. ferrocement)
	GENERAL	- big problem with personnel; need more engineers, senior hydrogeo logists to train NSS personnel
WRRI	- set up consultancy house second to none in the country	- funding for equipment and vehicles - lack of reliable data
	- good in-house training	- lack of reliable data - dissemination of information
NCWD		- lack of consultation with women by water providers - design of hand pumps inappro-priate for women
UNICEF		- work too intensive, how to expand - technical problems - not understanding how GWSC operates
Prakla-Seismos		- under-used capacity - physical infrastructure not developed eg. access roads
WaterAid	- finished 40 wells, 19 under construction	- lack of technical support - cannot find well organized groups to fund

		- getting goods outs of the harbour - lack of personnel even at basic construction level - lack of information - lack of standardization of equipment - lack of communication between organizations
BACH	- dug seven wells, 2 in first year, 5 in second.	- sustainability.Gap after donor has left. - Not enough of a technical support system
NORRIP	- a lot of documentation on the needs of the northern sector	- co-ordination of programmes run by line agencies eg. GWSC - how to measure community participation
ISODEC		- funding to remunerate people for training - lack of networking
Intek	- can retrain university graduates in appropriate technology	- underutilized design capacity - lack of understanding of Intek's abilities by policy makers - lack of dialogue between people who have needs and those who have solutions

Cape Coast ITTU		- under-used machine tools.
CDS		- agencies give unrealistic timetable for research. - funding - underutilization of research capacity - not being used for implementation
VORADEP	- dug 246 wells in Volta Region since 1985	- siting of wells - scale of problem, therefore difficult to prioritize needy communities - lack of co-operation from community in maintaining installations probably due to poor community animation - sustainability
Aseakea (Kofi Forson)	- designed and developed filter cups for guinea worm eradication.	- lack of confidence in the private sector
Dept of Comm. Development	- with help from UNICEF completed 133 wells	- lack of staff, aging staff. - lack of transport - equipment broken down - lack of linkages with other agencies leading to over-funding of certain communities
ADRA	- dug 100 wells	- inadequate equip-

	- drilled 5 boreholes and fitted them with pumps	ment for borehole drilling - lack of linkages with other relevant agencies
	- constructed about 10 dug-outs for livestock and dry season farming	- food for work caused problems for other agencies, but is now under review
	- undertaking demonstration dam project at Wa	- ADRA wants projects be for all the community, but church members can be possessive
NSS		- resistance to doing National Service, lack of orientation towards doing rural service. - funding - need to generate own income - lack of recognition when contributes to projects - for other organizations, lack of information from NSS on when personnel arrive and lack of regular payment of allowances are problems
CDR		- lack of acceptance - possessiveness.
31st Dec. Women's Movement		- lack of transport - lack of linkages

Mr P O Sackey (GWSC) registered a plea for NGOs and private organizations not to operate in isolation. GWSC is the expert and must be consulted. This is especially important in the area of safety. If a serious accident occurs in the building of a well, a water provider will never be able to persuade the community to work on a well again.

The common problems were grouped together under eight headings and participants split into small groups to draw up recommendations.

RECOMMENDATIONS FOR ACTION

1. LOCATION:

- GWSC (RWD) should seek funding and support from FAO, CIDA and the University of Ghana's Department of Geography and UNDP for aerial mapping including satellite remote sensing facilities.
- GWSC (RWD) should also link in with the University of Ghana's Department of Geography, Meteorological Services and National Service Secretariat to get additional information including wind maps, solar maps, dug-out maps and spring locations.
- GWSC (RWD) together with Lands Survey Department and WRRI should co-ordinate the production of land maps which show the technologies suitable for each area. WRRI should act as custodians.
- Every project should provide prior and post well location maps to GWSC and WRRI. WRRI will store them. A map should have the following components - title, scale, date, key and northward direction.
- Mr Bannerman of Prakla Seismos will co-ordinate research into the geographical occurrence of water-indicating plants (eg. Daniella olivieri) in liaison with the University of Ghana's Department of Botany and National Service Secretariat.

2. COSTINGS:

(a) Maintenance costs:

- GWSC (RWD) should reconvene a series of meetings with
  i. A number of NGOs.
  ii. A number of private companies - eg. Prakla-Seismos, to arrive at:-
  -a minimum and maximum charge for borehole and hand pump maintenance.
  -a minimum and maximum charge for hand-dug well maintenance, considering different charges for those with and without hand pumps.

(b) Capital costs:

i. Boreholes:-

- ¢60,000.00 should be the standard minimum charge but it is recommended that in the case of state-sponsored

boreholes this now be retained by GWSC to be used as a revolving fund.

ii. Hand-dug wells:-

- The beneficiary should provide sand, stone and labour in lieu of cash as capital contribution.

3. MACRO-ECONOMIC SURVEYS:

- GWSC (RWD) should commission the Centre for Development Studies to carry out an economic, sociological and technological survey to decide the long term sustainability to the country as a whole of various rural water systems.
- Note will also be taken of a WRRI study already underway on geological maps. It will complement the macro-economic survey.
- Social surveys must be done by water providing agencies at the beginning of each project to determine the appropriate system and the best way to implement it.

4. STANDARDIZATION:

- Prakla-Seismos should convene and fund a meeting of GWSC, the National Standards Board, women's groups, NGOs, the Department of Mechanical Engineering UST, and private organizations to come up with a proposal for the standardization of equipment and spare parts for boreholes (excluding drilling rigs). A standing committee of GWSC should thereafter be formed.
- ISODEC should convene and fund a meeting of GWSC, the National Standards Board, women's groups and other interested groups to come up with a proposal for standardization of equipment and spare parts for the construction of hand-dug wells.
- The Department of Community Development should convene and ADRA should fund a meeting of GWSC (RWD), NGOs identified by WaterAid, Non-Formal Education, National Service Secretariat, women's groups, private organizations and district councils to come up with guidelines for the minimum levels of community participation.
- The Department of Community Development-convened meeting should also consider writing a checklist of stages in ensuring community participation to confirm that organizations have consulted with the relevant organizations and individuals.

- GWSC (RWD) should devise a system to monitor whether standards set for community participation and standardization of parts and equipment are being met. This should be done in collaboration with the CDRs and National Service Secretariat.

5. RESEARCH AND DEVELOPMENT:

- WRRI should be responsible for collecting for GWSC (RWD) all research materials available in the country as well as international material which could be relevant to Ghana. WRRI should make this available to GWSC who can then distribute it.
- WRRI should identify groups involved in research, and research done or about to be done. (N.B. WRRI is urged not to neglect informal research being done by practitioners in the field.)
- WRRI should act as a clearing house to match requests for research to researchers and direct researchers towards appropriate projects in the field.
- GWSC (RWD) should make sure there is a strong link with WRRI so that the information flow is facilitated.

6. ACTION:

- At a national level, GWSC (RWD) should co-ordinate the activities of both government agencies, NGOs and private organizations. It was noted that because of limited funds GWSC (RWD) could not be expected to do more than co-ordinate activities.
- At a local level the utility and social services committee of the district assembly should act as co-ordinator of interested parties. It should convene six-monthly district meetings of all agencies in the area.
- GWSC (RWD) should hold quarterly meetings with its district and regional officers to ensure that policy is being followed and data collected. If necessary outside funding should be sought.
- In addition, GWSC (RWD) should convene regional meetings with water delivery agencies twice a year.
- GWSC (RWD) should also liaise with NGOs to encourage one organization each year to take responsibility for organizing a sector conference such as WaterAid did at Mole.
- Annual reports to GWSC (RWD) from agencies in the field should include details of finance actually expended in the field and the balance remaining.

7. NETWORKING:

A rural water network should be established with Network Training Centre (NTC) as the co-ordinator.

POOLING OF INFORMATION:

- NTC should consider publishing a quarterly rural water newsletter which could include a calendar of workshops, meetings and activities in the sector.
- NTC should produce a list of publications and audio visual resources concerning water in Ghana, indicating where they are available and at what price.
- NTC should produce a guideline for data collection eg. design a format for a community questionnaire.

POOLING OF EQUIPMENT:

- NTC should compile a register of all major water resource equipment in Ghana using information provided by GWSC (it would be compulsory for agencies to register this equipment with GWSC). The register should include details of the age of equipment, its origin, its capabilities and conditions for lending.

POOLING OF EXPERTISE:

It was noted that WRRI already had a register of experts that was upgraded annually. However, it was felt that NTC should co-ordinate a wider register incorporating people with and without formal qualifications

- Agencies should be required to register with GWSC "experts" working for them or known to them. From this information, NTC should compile and publish a register.

GENERAL:

All raw data from the field should be sent first to GWSC who will then pass it on to the organization concerned (eg equipment lists to NTC, research findings to WRRI).

- Since NTC had already left the conference and could not be consulted as to its role in the networking proposal, Mr P O Sackey - (GWC), and Dr E Amonoo - (CDS) were delegated to discuss the proposal with NTC.

- A wider meeting of interested groups would then have to be called to draw up details of how the networking proposal will work.
- It was noted that in the long-term GWSC should ideally take over the role of network centre once it has more resources.

8.TRAINING:

- (NTC) should co-ordinate the setting up of a committee comprising GWSC (RWD), National Service Secretariat and Intek Ltd representatives to oversee the training needs of the rural water sector.
- NTC should compile a register of existing training institutions including both the formal and informal sectors. It would be compulsory for agencies to provide this information. All agencies should keep in mind the need to develop their training capacity.
- NTC should circulate information or the personnel needs of rural water organizations.
- The NTC - convened committee should consider ways to make the formal education system (especially university level engineering courses) more appropriate to Ghana's needs.
- GWSC (RWD) should consider the idea of certificating people who have attended training courses in water and sanitation.
- GWSC (RWD) should liaise with Department of Community Development and Ministry of Health to incorporate community education and participation training in its courses. It should include revolutionary organs in its training programme.
- GWSC (RWD) should undertake management training for its staff.

NB ALL THE FIRST MEETINGS OF NEW COMMITTEES MUST TAKE PLACE BY THE END OF OCTOBER, WITH THE EXCEPTION OF THE PRAKLA-SEISMOS - CONVENED STANDARDIZATION OF BOREHOLE EQUIPMENT AND SPARE PARTS MEETING WHICH MUST TAKE PLACE BEFORE THE END OF NOVEMBER.

CLOSING REMARKS:

Mr P O Sackey (GWSC) described the conference as of immense importance to the work of his department. It had been much more productive than he had anticipated. He knew it would address hand-dug wells but not that it would establish a workable system.

He hoped that everything decided could be implemented and that the next time participants met at a similar conference, Ghana would be well on the way towards achieving UN aims for the end of the water decade - safe drinking water for all.

Mr Ron Bannerman (WaterAid) thanked everyone for coming and those who worked to make the event possible. He said the conference had restored his belief that rural water was a viable proposition.

A lot of organizations had made commitments for the future and he urged them to fulfil them.

W.H.O./E.H.E./C.W.S. 1211 GENEVA 27
C.E.S.I. COUNTRY EXTERNAL SUPPORT INFORMATION

TYPE OF REPORT: 5 Number of projects: 34

COUNTRY REPORT (sorted by status/year/esa/proj)

COUNTRY = GHANA (GHA)

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
FRANCE/CCE	GHA 88 2	PROPOSED	Hydraulique Villageoise - Central Region Réalisation de points d'eau et mise en place d'un systéme de maintenance décentralisé, appui sur compétence artisanale et industrielle locale. Etude principale: factibilité en cours GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: GWSC - Ghana Water and Sewage Corporation CONSULTANT: Burgeap WHOM TO CONTACT: M.Jaujay tél.: (1) 40 06 34 85	88				0.0
WB/IDA	GHA 88 1	PROPOSED	Water Sector Rehabilitation. Rehabilitation and reinforcement of water supply systems in regional centres. Institutional development of GWSC. - PROJECT NO: 3GHAPA068 TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 66300.0 WHOM TO CONTACT: A. Pellegrini, WBHQ J-4203 TEL: 34564	88				20000.0
WB/IDA	GHA 88 3	PROPOSED	Water Supply Continuation of rehabilitation and reinforcement of water supply systems in regional centres. Institutional strengthening of GWSC, support for village level operation and maintenance of rural water supplies.	88				35000.0

COUNTRY = GHANA (GHA)

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
			- PROJECT NO: 3GHAPA091 TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 55000.0 WHOM TO CONTACT: A. Pellegrini, WBHQ J-4203 tel:34564 no description - PROJECT NO: GHA/86/002 WHOM TO CONTACT: ResRep, P.O. Box 1423, Accra, Ghana					
AFRICAN DB	GHA 85 1	PROPOSED	Accra-Tema Water Supply (Supplementary). Completion of the construction of a reservoir and minor outstanding works and engineering services. TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 2940.6 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation	85				2450.5
UNDP	GHA 86 4	PROPOSED	Rural Drinking Water & Sanitation (1030)	86				0.0
UNDP	GHA 84 6	PROPOSED	Hand-Dug Wells Programme no description PROJECT NO: GHA/84/002 WHOM TO CONTACT: ResRep, P.O. Box 1423, Accra, Ghana	84				0.0
CANADA/ CIDA	GHA 83 3	PROPOSED	GWSC Assistance Project (Upper East and West Northern Regions and the Weija Plant). To ensure sustained operation and maintenance of CIDA/GWSC financed water supply infrastructure, equipment components, technical assistance, support to O&M. - PROJECT NO: 12342 TOTAL PROJECT COST: US $ EQUIVALENT (x 1000): 2845.5 GOVERNMENT IMPLEMENTING/ NATIONAL EXECUTIVE AGENCY:	MAY 83			FEB 92	2845.5

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
			Ghana Water and Sewerage Corporation (GWSC) WHOM TO CONTACT: A. McCabe, CIDA, Ottawa, Hull. Tel: 997 1440 (Area East of Tamale to Bolgatanga Road, North Tamale to Yendi Road, West Tango). Part of a multipurpose integrated village development project involving dams, water supply, road transport and health services; borehole construction, hand pump installation; reports see: Norrip Strategy; W. Dolite 83; part of a multipurpose integrated village development project involving dams, supply, road transport and health services. -PROJECT NO:11449 NUMBER OF PEOPLE SERVED: 200000 incl. 5 urban sys. rehabilitation GOVERNMENT CONTRIBUTION: US $ EQUIVALENT (x 1000): 31584.0 TOTAL PROJECT COST: Total CANADA/CIDA contribution CAN$ 30,939,000 US $ EQUIVALENT (x1000): 42368.4 GOVERNMENT IMPLEMENTING/NATIONAL					
CANADA/CIDA	GHA 87 2	ONGOING	Norrip Community Infrastructure-Phase II EXECUTING AGENCY: Norrip Office Accra; Rafig Mahama, Project Manager. CONSULTANT: Hydrosult Inc.; I. Najjar, Project Manager (drilling); Stanley Associates Ltd (S.A) WHOM TO CONTACT: A. McCabe, CIDA, Ottawa, Hull. Tel. 9971440	MAY83	NOV85	OCT87	SEP91	3835.2
DUTCH/ DGIS	GHA 87 4	ONGOING	Village Water Supply Tamale (NGO/CEBEMO). Construction of water supply systems in Tamale - PROJECT NO: EG/87/011 CO-FUNDING/COOPERATING AGENCY: NGO/CEBEMO WHOM TO CONTACT: H.H.J. Van Schaik, DGIS, The Hague, Tel:485751			JAN87	90	1810..5

COUNTRY = GHANA (GHA)

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
UNICEF	GHA 87 3	ONGOING	Water and sanitation in small communities No description: - PROJECT NO: GHA/88/300 NUMBER OF PEOPLE SERVED: 1800000 CO-FUNDING/COOPERATING AGENCY: Canada			87	91	102.5
CANADA/ CIDA	GHA 86 2	ONGOING	Training Centre - Feasibility Study - SAE. Technical assistance to study the feasibility of developing a regional training centre at Kumasi. Request generated by IBRD in April 1986 in connection with annual Hand pump-testing project. - PROJECT NO: 14096 AGENCY: University of Science and Technology, Kumasi INTERNATIONAL/EXTERNAL EXECUTING AGENCY: WB/IBRD. Contracting CONSULTANT: Cowater International, M. McGarry WHOM TO CONTACT A. McCabe, CIDA, Ottawa, Hull. Tel. 997 1440 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTIVE (a) Establish multipurpose community centres to introduce group-based productive activities through mobilization & credit, establishing a resource centre for social services; (b) Facilitate delivery of development programs, health care, agricultural supply/storage, environmental protection; (c) Promote technology & clinics.	AUG86		SEP86	MAR88	50.8
UNDP	GHA 86 3	ONGOING	Pilot Project for Integrated RuralDev. Major study: Report on Institutional Capabilities in the Districts of West Akim and Birim. - PROJECT NO: GHA/85/009 NUMBER OF PEOPLE SERVED: 200000 GOVERNMENT CONTRIBUTION: Kind only. US $ EQUIVALENT (x1000): 40.5 TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 340.3 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY:		DEC86	SEP86	DEC87	299.8

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
			Ministry of Local Government & Rural Development INTERNATIONAL/EXTERNAL EXECUTING AGENCY: UNCHS No: CONSULTANT: M.C.C. WHOM TO CONTACT: ResRep, P.O. Box 1423, Accra, Ghana Waste and Faeces Disposal. Feasibility study and implementation waste disposal concept incl.low-cost sanitation, on-site dry disposal, appropriate technologies in central collection and treatment plants, reduction of transport and operating costs,; community participation and public awareness;					
GERMANY/GTZ	GHA 85 2	ONGOING	Advisory Services to the Accra City Council for hygiene education programme and training. - PROJECT NO: 80.2240.2 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Accra City Council WHOM TO CONTACT: Jost, GTZ, Tel: 6196/79-0		JUL81	SEP85	89	4582.1
CANADA/CIDA	GHA 84 3	ONGOING	UNDP/IBRD Hand pump Testing Programme Development of more dependable and less costly hand pumps; testing and monitoring of hand pumps; 140 Canadian type (Moyno and Monarch types); 60 VLOM type hand pumps purchased from developing countries; results are summarized in "Community Water Supply, the Hand pump Option" Arlosoroff et Al., 1987. Part of a global project administered by the UNDP/IBRD TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 962.8 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: WB/IBRD No: WHOM TO CONTACT: A. McCabe, CIDA, Ottawa, Hull. Tel. 997 1440	SEP82	FEB84	FEB84	MAR90	712.9

COUNTRY = GHANA (GHA)

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
CANADA/CIDA	GHA 84 4	ONGOING	Water Utilization Project - Phase II. 22 person-year of Canadian technical assistance for project management pump maintenance and community health education, spares for pumps, 110 person year of Ghanaian staff trained in pump maintenance and health education; project	MAY81	FEB84	DEC84	MAY89	3542.8
CANADA/CIDA	GHA 84 4	ONGOING	Water Utilization Project - Phase II. led to Phase II (No. 11499). - PROJECT NO: 10971 NUMBER OF PEOPLE SERVED: 800000 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: - PROJECT NO: 10969 GOVERNMENT CONTRIBUTION: US $ EQUIVALENT (x1000): 249.9 CO-FUNDING/COOPERATING AGENCY GWSC, Accra; John Nunoo, Project Manager. GOVERNMENT CONTRIBUTION: US $ EQUIVALENT (x1000): 2614.6 TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 6157.4 CONSULTANT: W.L. Wardrop and Ass. (W.L.W.); J. Paulson, Principal. WHOM TO CONTACT: A. McCabe, CIDA, Ottawa, Hull. Tel.997 1440.	MAY81	FEB84	DEC84	MAY89	3542.8
GERMANY/KFW	GHA 83 2	ONGOING	Well Drilling Programme II. Construction of 1000 wells equipped with hand pumps and supply of material for operation and maintenance for villages of 200 to 2000 inhabitants in southern and middle Ghana. - PROJECT NO: 8166118 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation, Accra CONSULTANT: IGIP, Darmstadt, FRG.		DEC81	MAR83		7200.0

			WHOM TO CONTACT: R.Schmidt/Reimers, KfW, Tel: 69/7431-1 Technical assistance will be provided to the Ghana Water & Sewerage Corporation for the purpose of improving its managerial, operational, & financial performance. Emergency rehabilitation of the Kpong-Tema Accra pipeline will also be undertaken.					
WB/IDA	GHA 83 1	ONGOING	Water Supply Engineering and Rehabilitation. - PROJECT NO: 3GHAPAO29 TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 22400.0 WHOM TO CONTACT: A.Pellegrini, WBHQ J-4203 tel:34564		MAR83	NOV83		13000.0
JAPAN/JICA	GHA 82 1	ONGOING	Equipment Supply for Expansion of Nat. Primary Health Care No description.			82		0.0
GERMANY/GTZ	GHA 80 1	ONGOING	Advisor to Ghana Water and Sewerage Corporation (GWSC). Technical Assistance to GWSC to improve water supply facilities in rural and urban areas of the country, incl. rehabilitation of selected water supply schemes, establishment of preventive maintenance systems and on-the-job training of waterworks personnel. - PROJECT NO: 78.2270.3 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: (GWSC) Ghana Water & Sewerage Corporation Accra CONSULTANT: RODECO Consulting Eng. WHOM TO CONTACT: Jost, GTZ, Tel: 6196/79-0		MAY79	JUN80	89	3227.3
CANADA/CIDA	GHA 79 2	ONGOING	Ghana Water and Sewerage Corporation (GWSC) Planning Advisers One Canadian cooperant stationed in Ghana since 1980, GWSC headquarters receives support, advice and training to middle management, planning and project engineers and technical staff.	JAN79	JAN79	JAN79	OCT88	690.8

COUNTRY = GHANA (GHA)

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
			- PROJECT NO: 10978 TOTAL PROJECT COST: US $ EQUIPMENT (x1000): 690.8 CONSULTANT: Independent Consultant WHOM TO CONTACT: A. McCabe, CIDA, Ottawa, Hull. Tel.997 1440					
GERMANY/KFW	GHA 76 1	ONGOING	Well Drilling Programme I (Invest.) Construction of 2000 wells equipped with hand pumps and supply of material for operation and maintenance for villages of 200 to 2000 inhabitants in Southern and Middle Ghana. - PROJECT NO: 7465339		MAR74	JUN76		14783.4
GERMANY/KFW	GHA 76 2	ONGOING	Well Drilling Programme (Complementary . KfW No 7465339; CESI No GHA/76/001). Planning and supervision to well drilling Programmes I and II (DM 8.9 mio). Training maintenance programmes for well drilling project in Southern and Middle Ghana GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation Accra CONSULTANT: IGIP, Darmstadt, FRG. WHOM TO CONTACT: R. Schmidt/Reimers, KfW, Tel: 69/7431-1		MAR74	JUN76	89	8393.3
GERMANY/KFW	GHA 76 4	ONGOING	Well Drilling Programme of (Complementary Activities to KFW No 7470016; CESI No GHA/76/002) Planning and supervision to well drilling Programmes I and II. Training and maintenance programmes for well drilling project in Southern and Middle Ghana. - PROJECT NO: 7421217 CONSULTANT: IGIP, Darmstadt, FRG WHOM TO CONTACT: R. Schmidt/Reimers, KfW, Tel: 69/7431-1		MAR 74	JUL76	89	8393.3
GERMANY/KFW	GHA 75 1	ONGOING	District Water Supplies - Cape Coast Sekondi-Takoradi. Expansion of water supply systems in		MAR71	MAR75	89	15504.0

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
			Cape Coast and Sekondi-Takoradi including construction works, supply of pipes, electrical and mechanical equipment, laying of pipes and consulting services. - PROJECT NO: 7165574 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation, Accra CONSULTANT: IGIP, Darmstadt, FRG. WHOM TO CONTACT: R. Schmidt/Reimers, KfW, Tel: 69/7431-1					
UNDP	GHA 84 5	COMPLETED	Improvement in Drinking Water Supply & Sanitation (a) Rehabilitate at least 15 of 17 non-operative WS systems; (b) Implement rural development program to construct 25 hand-dug wells; (c) Construct waterless sanitation facilities in at least 30 communities; (d) Develop health education program related to WS&S facilities. Major study: Rural Water Supply & Sanitation Program (1987-2001); UNDP/OPE Evaluation Report, etc. - PROJECT NO: GHA/82/004 NUMBER OF PEOPLE SERVED: 96000 GOVERNMENT CONTRIBUTION: Kind only. US $ EQUIVALENT (x1000): 87.2 TOTAL PROJECT COST: US $ EQUIVALENT (x1000): 1053.8 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water & Sewerage Corporation, Department of Community Development INTERNATIONAL/EXTERNAL EXECUTING AGENCY: WHO/AFRO No: WHOM TO CONTACT ResRep, P.O. Box 1423, Accra, Ghana		JUL84	JAN84	DEC87	966.6
CANADA/CIDA	GHA 81 2	COMPLETED	Upper Region Water - Phase III Training, maintenance of hand pumps,			81	85	6707.3

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
			installation of more reliable pumps, pump maintenance and operation. PROJECT NO: 10977 NUMBER OF PEOPLE SERVED: 40000 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation (GWSC)					
CANADA/CIDA	GHA 81 3	COMPLETED	Upper Region Programme Evaluation. Evaluation of four CIDA assisted water related projects in the Upper Region of Ghana between 1974-85; development of national evaluation and monitoring unit and information base to assist in programme planning for the Upper Region and other multi sector projects; six reports prepared by consultant 1985-86. "Technological Evaluation of Urban and Rural Water Supply Systems - Upper Region". - PROJECT NO: 10975 GOVERNMENT CONTRIBUTION US$ EQUIVALENT (x1000): 75.8 TOTAL PROJECT COST: US$ EQUIVALENT (x1000):687.7 Ghana Water and Sewerage Corporation (GWSC), M.J. Nunoo, Project Manager WHOM TO CONTACT: A. McCabe, CIDA, Ottawa, Hull. Tel. 997 1440	APR80	NOV81	NOV81	OCT87	611.9
CANADA/CIDA	GHA 81 4	COMPLETED	Norrip Community Infrastructure - Phase I. Drilling, TA, equipment and materials for boreholes and hand pumps, on site training in borehole location, drilling techniques and equipment maintenance; part of multipurpose project of over CAN $ 50 million. - PROJECT NO: 10974 NUMBER OF PEOPLE SERVED: 500000 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Norrip Office Accra			81	84	3069.6

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
CANADA/CIDA	GHA 78 1	COMPLETED	Water Supply Evaluation - Upper Region. Evaluation of social and economic impact of improved water supply in the Weija area (Upper Region). - PROJECT NO: 00804 WHOM TO CONTACT: CIDA, Ottawa, Hull.			78	79	38.6
CANADA/CIDA	GHA 78 2	COMPLETED	Rural Water Utilization (Upper Region) Phase I. 35 person years of Canadian cooperants for community development; 500 latrines, maintenance equipment for 2500 pumps, village hand pump caretakers trained, 50 volunteer village workers in health education, GWSC Headquarters staff training; project assessment carried out in 1985. - PROJECT NO: 10982 NUMBER OF PEOPLE SERVED: 800000 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation (GWSC)			78	84	1754.0
CANADA/CIDA	GHA 77 2	COMPLETED	Upper Region Water - Phase II. Drilling and construction of wells and water supply, 2500 boreholes filled with pumps, on-the-job training, fellowships. PROJECT NO: 10981 NUMBER OF PEOPLE SERVED: 800000 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation (GWSC)			77	81	8652.0
GERMANY/KFW	GHA 76 3	COMPLETED	Water Supply 3 Districts: Kpedze, Winneba Akim Oda Construction of water supply systems in Kpedze (Volta Region) and expansion of existing water supply systems in Winneba-Kwanyaku (Central Region) and Akim Swedru (Eastern Region) including supply of equipment, construction works and consulting services. - PROJECT NO: 7565674 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING		NOV75	JUL76	DEC87	1474.2

COUNTRY = GHANA (GHA)

EXT.SUPPORT AGENCY/GOVT.	C.E.S.I ID. NO:	STATUS	PROJECTS TITLE & DESCRIPTION	REQST DATE	AGREE DATE	START DATE	COMPL DATE	EXT-COMPONTS x 1000 US$
			AGENCY: Ghana Water and Sewerage Corporation, Accra CONSULTANT: IGIP, Darmstadt, FRG. WHOM TO CONTACT: R.Schmidt/Reimers, KfW, Tel: 69/7431-1					
CANADA/CIDA	GHA 74 1	COMPLETED	Accra/Tema Water Design and construction supervision of treatment plant, pumping station and 4 sewage pumps, equipment and materials for a 60 mgd water treatment plant; on-the-job training construction, O&M of sewage plant, 3 Canadian cooperants; part of larger project funded jointly by CIDA, IDA and ADB. - PROJECT NO: 10131 NUMBER OF PEOPLE SERVED: 1000000 CO-FUNDING/COOPERATING AGENCY: WB/IDA and ADB for larger project. WHOM TO CONTACT: CIDA, Ottawa, Hull.			74	84	14912.4
CANADA/CIDA	GHA 71 1	COMPLETED	Upper Region Water Supply - Phase I Hydrological mapping of Upper Region, 1100 wells with pumps for rural areas, drilling, mapping, water supply infrastructure for 3 urban centres, training in well construction and water supply installation/maintenance; this project led to project 10981. - PROJECT NO: 10132 NUMBER OF PEOPLE SERVED: 800,000 GOVERNMENT IMPLEMENTING/NATIONAL EXECUTING AGENCY: Ghana Water and Sewerage Corporation (GWSC)			71	78	8000.0

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