RAINWATER UTILISATION FOR THE WORLD'S PEOPLE

Report onthe 7th International Rainwater Systems Conference
Beijing, China, 21-23 June 1995

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INTRODUCTION

This is a report on the 7th International Rainwater Catchment Systems Conference held in Beijing, People's Republic of China during 21 - 25 June 1995. An abstract of the paper presentations is given below. The full proceedings are available at the SOPAC Secretariat in Suva.

THE PROGRAMME

The conference programme can be found in Annex 1. The conference consisted of 4 days of paper presentations. A summary is given below. Poster and other material displays existed alongside the paper sessions. I presented a poster on rainwater catchment systems as they exist in a Fijian village in the Yasawas (abstract of the poster in Annex 6). People were interested and many requested a presentation of my poster in the paper session. However, paper sessions were tightly scheduled. A very wide range of subjects was presented.

The International Rainwater Catchment Association held a meeting during the conference where new officers were elected. The most important changes are: Prof Yu-Si Fok resigned as president, Dr Adhityan Appan replaced him. Dr GK Bambrah took over the post of Secretary-General from Mr John E Gould, John Gould became Director-at-large. Dr John Skoda has been replaced by Derrick Depledge as Regional Director for Pacific/Australasia.

The women at the conference held a meeting for the women's programme. A network of women involved in RWCS was proposed. A resolution to promote women's involvement in RWCS was passed. The text is to be presented at the oncoming International Women's Conference in Beijing and to the governments represented at this conference.

Before and after the conference several organised tours could be attended which did not interest me. Social tours during the conference were for all participants, and included a visit to the Great Wall, shopping in Beijing, and the Peking Opera.

Rain Water Catchment Systems

PAPER PRESENTATIONS

Session 1: Opening Session

Session 2: Institutional Aspects and Policy Matters

Yu-si Fok presented The role of RWCS in 21st century wafermanagement. He focussed on environmental aspects and institutional concerns where he says RWCS can be a viable alternative to existing public water supplies, even in urban areas. He proposed that guidelines be developed so that public-sectorwater management decision makers consider RWCS as a viable alternative.

A very interesting paper was presented by Zhu Qiang on Rainwafer Utilization in the Arid and Semi-arid Area in Gansu, China. In this province, with rainfall between 250-450 mm/year, RWCS are warmly welcomed by the population.

Session 3: Socio-economic and Policy Aspects

Session 3 started with SC Chu who highlighted how RWCS in Taiwan have been re-discovered after the 5th IRCSC was held in Taiwan in 1991. The Taiwan government has started promoting RWCS in towns and cities and integration of the efforts of public and private sectors is the ultimate goal. Taiwan is a densely populated country with high rainfall and could therefore be an example to some of the Pacific Island Countries.

Two interesting papers came from East Africa. Datius G Rutashobya gave a very nice overview of all aspects of RWCS and community involvement. He mentioned willingness to pay, community affordability, skills, local technology, community participation, service level, ownership, long-term sustainability and role of women as important issues to be dealt with in the planning and implementation of RWCS. Tanzania has the policy that half the members of a water committee are women, as they are the key users of the water systems. Johnson Akoko Ouko presented a paper on community participation in water harvesting experiences in Kenya. This included water harvesting for crops, livestock and domestic use.

Session 4: Ecological and Environmental Aspects

Nirmal Sengupta presented the paper Environmental contributions ofsome traditional techniques. He describes how traditional irrigation techniques and rainwater harvesting have

survived for hundreds of years in high-salinity prone areas in India. His conclusion is that modern irrigation techniques should not underestimate the contribution of rainwater harvesting, and it should be considered when designing irrigation systems.

SHC De Silva gave an overview of environmental constraints in the implementation of RWCS in Sri Lanka.

GK Bambrah presented Urban rainwater harvesting problems and constraints. This included the results from a UNCHS-habitat study in Kenya which also forms the basis of a information database held in the IRCSA Africa Region Office.

Session 5: Country or Regional Experience (1)

John Gould gave an overview of the Developments in Rainwater Catchment Systems in Eastern and Southern Africa. Of vital importance for the success of any are:

> Involving the community at every stage of the project,
> thoroughly field testing new designs before widespread construction and promotion,
> proper training and supervision and
> proper design, maintenance and repair of gutters and downpipes.

The number of RWCS is growing rapidly, especially in Kenya. Hemispherical sub-surface tanks (50-120 m) have become popular. Inefficiently designed gutters cause great losses, optimum collection could be 80-90% of rainfall. Improvements in design include proper-sloping gutters and introduction of splash guards.

Rainwater harvesting has a long tradition in Iran. Jamal Ghoddousi presented traditional methods and how the introduction of small dams can improve rainwater collection and artificial recharge of groundwater. He mentioned the importance of those techniques for farmers and rehabilitation of environmental resources.

Liang Haiteng presented a case-study on the Islands in the Haizhou Bay, China. Those islands depend on rainfall and water form the mainland, either piped or shipped. She recommends that rainfall collection be considered as a significant contribution to the water supply in the islands.

Mrs Brown, from TE Brown, Inc. USA, presented their range of storage containers. These include Redwood, Polyethylene, collapsible rubber and steel tanks (Price List Annex 6). She also presented 2 other products: an epoxy glue which repairs all leaking tanks, hardens in water and is safe for drinking water, and a coating which stops rust and corrosion.

Session 6: Country or Regional Experience (II)

Hui Shibo presented Research of Flood Rainwater Utilization in Beijing Municipality. Beijing has a serious water shortage and groundwater resources have been depleted due to overpumping. The study focuses on groundwater recharge using flood rainwater and roof collection systems. Especially the quality of flood water has been looked at.

Abutar Md Ziaudin presented Rainwater Harvesting and Storage Techniques from Bangladesh. In this country with high rainfall many people depend on contaminated surface water for cooking and drinking. Rainwater harvesting could solve those problems. Many people however feel that it is government's responsibility to provide clean water and are not able or willing to build their own systems. Cost comparison found that RWCS are slightly cheaper than sand-filter systems.

MS Abu-Sharekh, from Palestine presented Rainwater Roof Catchment Systems for Domestic Water Supply in South of West Bank and Cistern Water Quality. Roof catchment systems in the West Bank are usually from flat roofs and have underground tanks. Gutters are an important component of the RWCS. Water quality was generally better in rain tanks than from municipal supplies and springs. (WRAP, 1994)

Session 7: Domestic Use of Rainwater

Yang Xijin presented the Courtyard model of Catchment and Storage Water in the Arid Areas. He proves that rainwater collection is the best way to solve domestic and livestock water problems for areas in Western and Northern China with rainfall above 150mm/year. Collection from concrete courtyard surfaces and construction of cisterns can provide drinking water for humans and animals.

Niemi Tapio presented his experiences with a Forestry Extension Project in Kenya. Primary schools where one of the major targets of the project and water was one of the major

problems at these schools. Therefore the project started to develop a rainwater collection system that could both serve the drinking water needs of the students as well as the school nurseries. The final result was a highly appropriate design using corrugated iron sheets to make gutters (9m)and downpipes at 9m intervals. The advantage of the corrugated iron gutters is that they are very large and therefore losses are limited. (Niemi, 1994)

Session 8: Agricultural Sector

Johann Gnadlinger presented Cisterns for Rural Low income Communities in Northeast Brazil. The Regional Institute of Appropriate Smallholder Farming (IRPAA) works on improvement of cisterns. The paper showed especially how to construct hand-dug rock cisterns and cisterns made of brick and lime-mortar. The use of lime-mortar is well accepted by the rural population and as a result of local research they now have achieved a plaster impervious to water.

Session 9: Rainwater Utilization in Urban Area

Wolfgang F Geiger explained how water management supported economic growth in industrialised countries and how this has resulted in environmental degradation. As an example he referred to the Emscher River Basin in the Ruhr area in Germany, the most highly industrialised and densely populated area in Europe. To revive a devastated system takes as much time as it took to establish the bad condition (60 -90 years for the Emscher). He therefore urged industrialising countries not to follow the same path but consider sustainable development instead of short-term economic gain.

Adhityan Appan from Singapore presented a Total Approach Towards the Design of RWCS in Airports Subjected to Tidal Effects. To design an optimum rainwater catchment system, supplying the airport with sufficient non-potable water for fire fighting etc, a simple computer model has been developed (in GWBasic). The model can be used in any airport.

Session 10: Women's Role in Rainwater Utilization

Jessica Calfoforo Salas presented Women's Issues in Rainwater Collection Projects as they were discussed on the 6th IRCSC in Nairobi, 1993. Rainwater collection projects could promote gender sensitivity. This does not exclude positive discrimination of women as women-specific activities can help women to find the strength and identity needed to create gender balance and cooperation. The challenge is how to make participants in the rainwater

collection project, and the community as well, become aware of gender roles with the hope that change could be facilitated, even gradually, as a result of the awareness.

Jiang Tiebing presented a case-study from Central Hunan, China. Rainwater harvesting from hill slopes has become a success in this area where women do most of the work as many men migrate to urban areas.

Michael B Onyango from Kenya presented the Role of Rural Women in Rainwater Catchment Projects. He highlighted women's participation, ownership and maintenance, He explained why rainwater initiatives should target women in implementation of their activities (and not just as cheap labour) and promote the work of women 's groups and associations.

Session 11 and 12 : Beijing City Tour

Session 13 : Rainwater Quality Conservation

Adhityan Appan gave an overview of Water Quality Issues in Rainwater Cistern Systems in some South East Asian Countries. He discussed the need for water quality monitoring as an integral part of RWCS programmes. Water quality levels were generally found to be within WHO guidelines, except for industrialised areas in Malaysia and Singapore where acidic rain affected the quality. Bacteriological quality exceeded WHO standards in quite a number of cases, the source of contamination was often of animal origin. As already discussed at the 6th IRCSC in Nairobi, guidelines for faecal coliform should perhaps be less stringent: a number of 10 faecal coliform per 100 ml could be acceptable. Simple methods of disinfection should be promoted. Boiling of drinking water could be a solution.

Roger Fujioka from Hawaii presented A solar-powered UV System to disinfect Cistern Wafer and a homeowners test for bacteria. According to him, chlorine to disinfect water in the tank does not work and only disinfecting water for drinking can reduce costs. The homeowners test is an HS test and only involves two bottles with filter paper. White paper indicates no contamination, when the paper turns black it indicates contamination. The test is now commercially produced by HACH.

Session 14: Techniques and Systems Design

Alan Fewkes from the UK presented The Field Testing of a Rainwater Collector. He explained how a test site for rainwater collection had been set-up at a household in England. About 30% of drinking-quality water is used for toilet flushing in the UK. The aim of this research is to develop a collection system that can cater for this need and therefore save on the use of treated water.

John Gould presented the results of a test site in Botswana. A roof catchment was set up near the university to simulate RWCS in remote areas.

Jure Margeta presented a Simple Model for Rain Harvesting Systems Designing. It is a spread-sheet model applied for the islands in Croatia and can be easily used on a personal computer. With a spread-sheet model many alternatives can be calculated within a short time.

Session 15 : Methodology and Modelling

Richard Heggen explained the relation between Rainfall Intensity and Rainwater Catchment. The purpose of this study is to be able to optimise rainfall collection. A proper gutter design significantly improves the collection. If further knowledge is lacking he suggestee 15% spill of intercepted rainfall should be assumed.

Chen Zhongquan presented A Model for System making Use of Rain in Arid Area. The model focuses on Agriculture and Irrigation, arid Urban-village use.

Session 16 : Closing Ceremony

REFERENCES

Bambrah, G.K., Otieno F.O., Thomas D.B. (editors), 1994, Participation in Rainwater Collection for Low Income Communities and Sustainable Development, Proceedings of the 6th IRCSC, Nairobi, 1-6 August, 1993, Nairobi.

Haisheng Mou, Guoyou Zhang, Yanchun Gao (editors), 1995, Rainwater Utilization for the World's People, Proceedings of the 7th IRCSC, Abstracts, Proceedings Volume 1 and Proceedings Volume 2, Beijing.

Hapugoda K.D. (Deva), 1995, Action research study on rainwater harvesting, Community Water Supply and Sanitation Project, Ministry of Housing, Construction and Public Utilities, Sri Lanka.

Niemi, T, 1994, Technical Report No 8, Improved Roof Rainwater harvesting from large buildings, ENSO Forest Development Oy Ltd., Nakuru and Nyandarua intensified Forestry Extension Project, Kenya/Finland.

WRAP (The task force of the Water Resources Action Program - Palestine), 1994, Palestinian Water Resources, a rapid interdisciplinary sector review and issues paper, Jerusalem.