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Human Resources Development, Education and Training

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Human Resources Development in the Water Sector - A Proposed Strategy

DISCUSSION PAPER

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Background

In October, 1995, at a meeting of the Water Supply and Sanitation Collaborative Council, a Task Force was created on Human Resources Development (HRD), coordinated by the United Nations Development Programme (UNDP). Further strong interest in HRD was expressed by the ACC Subcommittee on Water Resources during its September, 1995, meeting. At the meeting of the Second UNDP Symposium on Water Sector Capacity Building held in Delft, the Netherlands, in December, 1996, Human Resources Development was one of the major areas of attention.

An initial issue paper for discussion and review was prepared by the Water, Waste Management and Aquatic Environment Programme located in the Sustainable Energy and Environment Directorate (SEED) at UNDP in order to facilitate development of a strategy for human resources development in developing countries. Particular attention was paid to the needs and requirements of two major water subsectors, water supply and sanitation as well as irrigation and drainage. This paper and the proposed strategy is meant to be of assistance to developing countries, UNDP, UN specialized agencies, development banks, bilaterals and others to address the critical issue of human resources development in developing countries.

The initial issue paper was written and widely distributed in September, 1996. Numerous comments were received both verbally and in writing. This led to a working group of reviewers listed in Appendix 1.¹ While the authors organized the paper, the resulting proposed strategy contains recommendations from twenty-seven water professionals and the various global organizations they represent. The comments received were both thoughtful and invaluable. Hopefully they have been included in a reflective and useful manner.

Any omissions are solely the responsibility of the authors. This proposed strategy is not meant to be the final word; indeed it is meant as a beginning to a serious concerted effort.

Towards a General Strategy

It is important to note that this proposed strategy, by necessity, viewed HRD, on a global level. However, as all would readily acknowledge, there is no "one size fits all" approach that can be taken. This strategy proposes an overall framework for both regional and country use in order to develop specific actions and programs. The recommendation section further elaborates on this concept.

¹ The original distribution list is found in Appendix 2.

Introduction

A number of international meetings, organizations and individuals have noted the need for human resources development. With the growing number of people globally and the finite amount of available water, the need for sustainable approaches which involve and address all stake holders becomes increasingly important. The importance of delivering good quality water supply and sanitation to the developing countries is self evident if the health and socio-economic development of countries is to progress.

Delivering good quality water means increased partnerships, particularly with the agricultural sector. Growing scarcities means a renewed focus on utilization of wastewater reuse and other methods for increasing food production. Since agricultural practices traditionally use the vast majority of water (70% to 90%), meaningful change requires increased collaboration and problem solving. It is important that the different water and related sectors (e.g., agriculture, industry, energy and household) understand and interact with each other concerning the best solutions through education and training.

To work towards water management that will lead to water savings, reduced pollution and increased productivity of water, we need individuals with cross disciplinary skills which combine science, engineering, management, communication, diplomacy, economics and community outreach. Effective water professionals must be given learning skills and resources to deal with new and evolving complex issues and perspectives. The importance of success can not be overstated. This means that water professionals must become more inclusive across gender and socioeconomic groupings.

The World Conference on Women concluded that the education of girls is an essential step towards empowerment of women which is the primary condition for population control and public health. It is also believed that education and empowerment of women is an important condition for sustainable and wise use of resources and preservation of a solid resource base for future generations.

Some of the issues currently facing water professionals are how to ensure both men and women are recruited into water sector professions, how to increase the ability of all professionals to deal with water sustainably and holistically, how to address the multiple skills needed professionally, how to address the vast recruitment and adaptive training needs that exist now and in the future, and how to include human resources development as a fundamental action, not as a side issue.

Additionally there is a clear need for dissemination of education and information about water to the general public so that there is public support and understanding of what all of us must do to be sure this generation and future ones have a reliable water supply. Consequently this paper covers the formative primary and secondary school years, vocational training, professional (university) training and ongoing continuous learning.

Formative Years

Waiting to address these issues until an individual is in college or vocational school is not sufficient to make meaningful change. Encouragement of water literacy, gender roles and involvement with the environment in the primary and secondary school years is critical. Water resource and environmental issues should be incorporated into science and non-science classes alike in order to guarantee all are reached. For example this can be done in simple ways such as game playing around the theme of watershed protection or a social science debate over how much water should be used for irrigation, industrial and domestic use.

Reaching children in a broad manner allows for numerous objectives to be met. Teaching the importance of water and the environment from various perspectives helps to ensure a public that is supportive of sustainable policies. There is a need to create a new "water and environmental consciousness" so that society at large becomes aware of the necessity to use and manage water in a sustainable manner.

Teaching and knowledge of the entire water continuum and how it interconnects with the environment will assist in arriving at rational policies. A meaningful dialogue between water sector professionals and the affected communities is difficult, if not occasionally impossible, without an educated understanding of the issues from both a professional and community perspective.

If women and men are to be recruited into the water sector, as well as other environmental professions, they need to gain an understanding of water sector issues at an early age. Learning about water resources and the environment in a relevant manner through such activities as water testing, water basin protection and sustainable methods of irrigation will assist in lessening barriers and promoting the dialogue needed between all sectors of the population.

Fortunately a good number of educational materials already exist and for the most part, have been enthusiastically received in the schools where they have been used. One issue appears to be getting relevant materials to the many schools that do not currently have them and then helping the teachers shape and incorporate these materials in a way that is most useful for their communities.

A good environmental program in the primary and secondary schools should be reinforced by informal educational opportunities in the community. Water sector and environmental publicity campaigns via the mass media, distribution of educational materials outside of the schools, various training seminars and creation of ecological awareness centers are all additional tools. Partnerships between water utilities, the agricultural community and schools can vastly benefit all involved.

- *Water Professionals and Teachers Working Together*

The Water Environment Federation, a not for profit technical and scientific association whose goal is to preserve and enhance the global water environment, is comprised of more than 41,000 water quality professionals and specialists from around the world, including engineers, scientists, government officials, utility and industrial managers and operators, academics, educators and students, equipment manufacturers and distributors, and other environmental specialists. A special long term partnership with the National Science Teachers Association in North America has evolved in order to raise awareness of water quality issues. Members of WEF attend Teachers Association Conferences and present information on water issues. Concomitantly at their own very large WEF national conference, they host local teachers in the host city for a one day intensive workshop. The WEF knows the importance of educating youths. Since their resources are limited they feel that working with the teachers is the best way to leverage, to be sensitive to local conditions and to supply supplemental materials to teachers. A Water Source Book has been developed which allows a menu of activities from sampling water to looking at types of treatment be available. There is annual follow up with teachers at year end to see how they can improve their materials and outreach. They do not say what should be taught; they only show possibilities and let the teachers know they are a resource.

- *Stockholm Junior Water Prize*

The Stockholm Junior Water Prize, a scientific prize meant to stimulate interest and scientific research into clean water by high school students globally is promoted as a way to encourage children to take interest in the environment.

Vocational Training

For many vocational training rather than a university education is an attractive choice. It allows development of a trade or skill that is useful and should help to increase the individual's chances for employment. Vocational training is more accessible and requires shorter time invested than a university education. However, it still may not be accessible enough.

A particularly wide variety of vocational training must be available since trainees can range from graduates to illiterates, comprising both men and women. Among them there will be variations as to age, education, occupation, social background, etc. To the extent possible, vocational training should be linked to the extension of sites where water sector projects are being developed and operated. Addressing poverty and gender needs may necessitate more on site training be done since many trainees, particularly women, may not be able to leave their families to go to a remote school.

Even if the training is brought to the doorstep, it must be relevant. A major issue with the training of today's technicians is the lack of relevant training and the inability to update skills. Good technicians need specific training in practical technical work as well as in supervising and directing personnel which could later be their jobs.

Successful models exist such as one provided by Tanzania where technicians were interviewed by teachers to more accurately see what types of tasks needed to be performed, what they needed to know and do, and what tools they use. An interactive approach resulted in more responsive vocational training.

However, taking this one step further it is necessary to also allow growth into the future. How can technicians not only learn about what is needed today but how they can meet the needs of tomorrow. Presently a heavy top down system is usually in place which may frequently minimize effective solutions being enacted.

New partners need to be sought. Water resources needs are increasingly involving the private sector. It is important to bring them in as a partner in training. They have a vested interest in having well trained technicians that can meet their goals and may well be able to invest capital into reaching those needs. Training should be a long term commitment with envisaged job opportunities.

Increased use of trade associations and farmers groups in training provides insights into the vocation as a whole as well as allowing networking opportunities for the skilled technician. Being able to discuss issues with one's peers is a positive step towards problem solving. Isolation is usually not a productive alternative.

Lessons from utilities need to be incorporated. There are numerous types of utilities who have developed different on the job training modalities. These experiences and materials need to be shared and built upon. These lessons are not only important for vocational training but also need to be examined in the context of the university.

• *Operator Certification Short Courses*

Water Environment Federation has an extensive collection of technical, scientific and educational water related documents for use in the schools and the workplace, including short courses for operator certification. These resources can be accessed at their web site (<http://www.wef.org/>).

• *Vocational Training Student Placement and Staff Exchange*

TECHWARE, Technology for Water Resources, an international non profit making association within the European Union, regarding training, mobility and transfer of knowledge and technology have a number of programs in progress. One is a university enterprise with training partnerships of 200 members in 28 countries. There is experience in matters of vocational training, including student placements, staff exchange for training, short courses, and training tools such as computer conferencing. Specific European

professional programs exist in a number of projects dealing specifically with water. They maintain a helpful web page with additional information (<http://wwwtw.vub.ac.be/>).

University and Professional Training

The true challenge of the university is to create professionals that have the ability to understand water resources in its entirety. We must effectively provide relevant education for professional practitioners if water resources are to be managed sustainably.

The types of questions facing us today such as global trends in climate change and the concomitant impact on water, increasing pollution, aging of water resources facilities, less and less water available for irrigation, food security, risks of resource development and economic pressures facing limited resources can not be handled from a narrow educational approach.

Water sector professionals need to know how the topic they are focused upon (e.g., irrigation or sanitation) impacts other aspects of the water sector (e.g., drinking water, food supply, public health) or other media (e.g., water emissions impact on air quality or fisheries). The issue is to connect the ever widening needs of professionals in the water sector with relevant professional education and training. Reflecting current and future needs is the challenge.

Once university or pre-university students decide upon a profession in the water sector, they are usually routed into one of a number of educational paths that usually tend to treat water from a narrow single focus approach. While universities everywhere have difficulty keeping up with all of the new issues facing water sector professionals, the developing world has special challenges. These include reduced public funding, deteriorating facilities, lack of autonomy, insufficient and unresponsive research capacities, insufficient effort to incorporate indigenous knowledge and approaches, lack of opportunities for men and women and inadequate preparation of the entering student.

This can be still further compounded by underpaid and sometimes ill trained staff who lack career opportunities, incentives, academic freedom and access to the latest information. Often teaching is exclusively rote oriented where a set lesson is delivered by lecture and then tested on memorization of that lesson. Lessons may only cover a few narrow subjects that do not examine linkages. This can eliminate or minimize development of problem solving skills which are sorely needed in order to learn sustainable water sector approaches and problem solving for the future.

To accomplish meaningful change a number of steps are needed. Building the capabilities of universities as well as other learning institutions to meet the real needs of the water sector practitioners would greatly assist in giving the professional the skills and tools they need to meet challenges. Assessing needs of the country and then developing increasingly inclusive approaches would allow numerous relevant subjects to be learned and taught in the most responsive manner possible to the greatest diversity of people. Public service

should be emphasized during education by requiring volunteer service on water related projects for graduation.

New roles for teachers and researchers should be encouraged. One solution may be "job swaps" where selected practitioners may be brought into universities to teach while at the same time researchers are rewarded for working in the field and doing their research in conjunction with the practitioner in the water treatment plant or the farmers. An additional "job swap" approach could be tried between the developed and developing worlds in order to share ideas about needs, constraints and opportunities.

Different promotion criteria for teachers may need to be considered that would place the need of practitioners in a prominent position. Requirements of community outreach and projects as well as field work in several aspects of water sector management could be required.

Encouragement of alternative education such as long distance learning, increased use of the Internet, increased involvement of the private sector to fund university posts as well as field work, increased utilization and formation of professional societies, coop requirements for graduate school that involve community involvement, development of communication, financial and management skills all need prominence.

• *University Fellowships*

The UN University noted their focus on water sector needs in their two year fellowship program. On a short term basis they have directors' meetings on thematic or policy oriented workshops involving UNU fellows, directors of institutes, policy makers and others.

Ongoing Continuous Learning

To be an effective professional means continuous learning. It is not possible to view university degrees or continuous learning as the ending of one's education. It is more accurate to view it as the beginning. Information in today's world has increased dramatically as have the challenges facing us in the future. Ending education and training at graduation guarantees getting stuck in the present or even worse, in the past. Yet rare is the workplace that provides ongoing skills to their employees. This has to change.

Reimbursement of costs for continuous education has to be factored into the price of water. Training should be factored into promotion. Increased use and development of utilities or professionals should be encouraged and fostered as another means of developing and supplying pertinent training materials.

Through the years many good training programs have been developed which cover numerous aspects of water resources management. What is lacking is a good inventory of resources and availability. With the availability of the Internet, an international resources

training directory would be a step towards duplication of already useful materials and availability of information to the greatest numbers of people.

- *Training Materials Inventory*

An inventory of selected training materials in water supply and sanitation (English, Spanish and French) prepared by IRC and regional groups in 1991 (funded by UNDP) was referenced as a useful grouping of information.

- *Policies and Strategies Catalog*

OECD/Development Assistance Committee comprised of 26 bilateral and multilateral donor agencies in 1994 resulted in an IRC/SIDA catalogue of policies and strategies, "Towards Better Water Resources Management" which lists tools on training, including research and information support.

- *Current Awareness Bulletin*

IRC's current awareness bulletin "Highlights" which is available at cost carries a continuously updated Education and Training Section.

- *Internet Connections*

IRC Internet connection include references to 17 UN agencies, 16 universities, 30 agencies on water resources/hydrology, 48 on water supply, 8 on sanitation, 10 on emergencies and 22 on the environment. Most of these have information on training courses.

Recommendations

Pursuant to the numerous recommendations of international water conferences from Mar del Plata to the recent special session of the UN General Assembly, "Rio plus five", on human resources development, the proposed strategy highlights approaches and actions in four areas: formative years, vocational training, university and professional training and on-going continuous learning. Specific recommendations are as follows:

Linkages

One of the largest needs appears to be linkages. Numerous resources are available yet linking the user with existing materials and colleagues in other countries is an ongoing need. A network of capacity builders is being established as a follow up to the Second UNDP Symposium on Water Sector Capacity Building held in Delft. While this network

should have numerous functions, it is recommended that one key activity would be to link the human resources practitioners with people with similar interests in other countries as well as materials that can be used as is or modified. It is imperative that there are champions for human resources within countries and support be given to them.

Catalog Human Resources Needs

Considerable effort is needed to analyze the existing HRD sources but it is not a one time effort; it is an ongoing process. A number of sources exist but there does not appear to be an up to date list in one location. For this to happen systematically both cataloging and identifying new needs requires a "home", a budget and a solid plan to link the users and the products. (It should be noted that IRC did present a proposal to update training information.) It is recommended that both cataloging of the existing material as well as preparing a needs identification survey take place.

Prioritize target audiences

Target audiences should be prioritized within countries (i.e., consumers/users, regulatory personnel, key decision makers, educators). It is expected that this list would vary depending on the country. Effectiveness in human resources development would rely upon a country specific plan developed by those in country with assistance from the international community if desired.

Reaching the schools

Getting materials into the schools is critical. It is recommended that special outreach to educational institutions be conducted. This outreach would take various forms depending on the country. However there is a vast amount of educational programs and materials that could be much better utilized if they were to get in the hands of those who directly need them. Many teachers in the developing world have not been able to see the wealth of free material available to them.

Special consideration for children not in schools should be explored

When discussing children it is important to keep in mind that many in the developing world are not fortunate enough to be in school. They will need special outreach and specific discussion on this topic should be explored. Development of practical modalities to reach these children such as radio programs or other methodologies (e.g., story tellers) that would catch the interest of children and would convey the water/environmental message would be helpful. Additional modalities will also need to be examined.

Develop additional advocacy

The Advocacy Group of ACC has been active in their efforts to reach out on water issues. It is recommended that this report be discussed and disseminated within their network. Further approaches for bringing these needs to the attention of decision makers,

internationally, regionally and nationally need to be explored. There are certainly overlaps between advocacy and human resources development.

Increase the focus on water scarcity and transboundary issues in outreach

Human resources development needs to include training and materials that have an increasing focus on water conservation practices and transboundary issues. Both demand and supply need to be examined. These issues are increasingly rising to the forefront even in "water rich" countries. All countries have areas of water stress due to uneven distribution. Growing populations and unsustainable water practices will exacerbate this situation in the future. There is an urgent need to act now in being sure that education and training looks at ways to address this. Food supply, public health and national security can all be affected by this issue.

Develop methodologies to quickly assess personnel and trainer needs

Standards need to be set for professional training and certification where they do not exist. Trainers as well as materials need to be examined for their adequacy and relevancy to individual countries.

Organize focus groups in the communities

Water practitioners should encourage focus groups in countries as a way of doing business. This would allow all aspects of the community to be involved in ways to explore improving environmental quality, health and sanitation. This would allow for regional and country differences and to be sure approaches are tailor made for the situation, not imposed upon by others outside of the community. A guide to organizing focus groups and case studies from different countries would be helpful to guide this process.

Water assessments should include human resources needs

Human Resources Development needs to be seen as a fundamental action, not as a side issue. To accomplish this, it is recommended that all water assessments and projects not only define the need in terms of engineering and hydrology but also include an analysis and recommendation of HOW the goals are to be reached. This should include specific criteria and examples. Further there should be an analysis of how various types of programs and legislation can demand the skills of specific individuals. Studies should be carried out to determine the kind of personnel necessary to carry out laws passed.

Gender issues need special focus

While a number of steps have been taken, women's involvement in water projects is still lagging behind. Women need to be involved in all aspects of decision making. There are numerous mechanisms including small enterprises and community based businesses (and home), rural enterprises (agriculture and fisheries) where there could be more support and

emphasis. Additionally support should be given to groups such as the Gender Network now managed by IRC and UNIFEM in order that a concerted effort is made for all people to be involved in water resource issues.

Distance learning needs to be further developed for those with access to the Internet

It is recognized that nothing is better than hands on learning but this is not always possible. All tools need to be used. There are interesting efforts being made to encourage watershed academy classes online. While the medium still has to be perfected as a training tool it is one very cost effective way, particularly in rural areas, to reach many that might not otherwise be able to access reference tools and classes because of budget constraints.

New Partnerships

New partnerships among the water sector need to be explored. This should include outreach to the private sector since they are increasingly managing water utilities. Other new partnerships with community civic groups and non governmental organizations should be explored in the individual countries. More traditional existing partnerships should be evaluated and strengthened such as those with cooperative extension services and professional organizations.

Support job exchanges

To truly gain insight into different situations, it is always invaluable to have first hand understanding. Temporary job exchanges among water professionals is one way to do this. Recording and sharing lessons learned helps all. Human resources development means understanding a spectrum of water issues. This can be achieved by professional exchanges.

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