Water, food and environment: conflict or dialogue?

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Abstract Increased water conflicts are the result of the rapidly increasing relative water scarcity in many basins to which water institutions have not yet successfully adapted. The Dialogue on Water, Food and Environment is a program of activities that employs processes at international, national, basin and local scales to help build bridges between agriculture and the environment.

Keywords Dialogue on Water, Food and Environment (DWFE); institutional change; water conflicts; water scarcity

Dialogue in response to increasing relative scarcity

The world is rapidly taking the world water crisis more seriously. While the water experts that come to conferences such as the Stockholm water symposia have been speaking of a water crisis for some twenty years now, the public at large and the decision makers did not take that much notice. At the world summit in Rio for example, ten years ago, water was not a high priority, but in the preparation for Rio-plus-ten, the World Summit on Sustainable Development in Johannesburg, UN Secretary-General Kofi Annan named “water” as one of the five top priorities. At the same time there is clearly growing attention in the media for water issues.

But what is the nature of the world water crisis? While it is true that only a very small percentage of all water on earth is available for human use, water is not so scarce that we do not have enough for household use, for industry or to grow food for all people. The World Water Vision concluded that the world water crisis is not a crisis of resource scarcity but a crisis of management (Cosgrove and Rijsberman, 2000). The Global Water Partnership calls it a crisis of “governance” (Framework for Action, 2000).

It is true, however, that the abstraction and use of water from nature for human purposes has increased tremendously. During the 20th century the world population tripled and the use of water increased sixfold, with an increasingly high rate in the second half of the last century. As the total availability of water on the planet is essentially constant, the relative scarcity of water increases proportionally with the increase in use. This does mean that the relative scarcity of water has increased very rapidly in recent decades. It is this increase in relative scarcity that matters for water users and water managers.

In places where water scarcity is constant or changes slowly, systems of water use can adapt to those conditions. People living in the deserts of Rajasthan in North India, for example, have managed to have thriving civilisations for centuries with no more than 200 mm of rainfall. Generally speaking, water institutions have developed in response to local water scarcity conditions. This can be seen through the use of riparian rights, that attribute the right to water use to the landowners, in the humid US East, while the system of prior appropriation, essentially tradable water rights and better suited water scarcity, was adopted in the dry US West. Rapidly increasing relative water scarcity, then, requires water users and water institutions to adapt to new scarcity conditions. In many places we can conclude that the current system of water management is not yet adapted to the new scarcity.
As any economist can tell you, the relative scarcity of any resource also determines its value to the user, and rapidly increasing relative water scarcity therefore also means rapidly increasing water values. As the scarcity and value of water goes up, so does the competition for water among users. With increasing competition, and institutions that are not yet adapted to these new conditions, comes conflict. Conflicts between growing urban areas that take water from the agriculture as well as conflicts between agriculture and the environment. Conflicts among users over the allocation of water increase with increasing relative water scarcity.

This paper argues that where relative water scarcity has increased, and water institutions have not yet adapted to deal with the conflicts that arise out of this scarcity, a process of dialogue among users can reduce conflict and lead to more effective, efficient and equitable water use. In other words, dialogue offers a new way of dealing with increasing water scarcity, through reducing water conflict by bridging the gaps in perception on desirable water allocation. It has the potential to give rise to new institutions better equipped to deal with issues of water scarcity.

**Approaches to dealing with water scarcity**

Traditionally, engineers have dealt with increasing water scarcity by increasing the supply to people through building infrastructure suited to the local scarcity situation and the use made of the water. Low cost, simple solutions for low value uses and relatively plentiful water situations, and gradually more sophisticated, expensive solutions as scarcity and water values increase. It is not by accident that drip irrigation was developed in Israel. This is referred to as the engineering approach – or a supply side approach.

As water gets scarcer, technologies required get more sophisticated and the cost of supplying water to users increases, there comes a point where interest in managing use increases as well. The water literature in the 1980s, some 20 years ago, starts to show frequent references to demand management – culminating in the principle of “water as an economic good” at the Dublin conference, 10 years ago. Demand management does not have to rely on water pricing alone. The legal limit in the USA on maximum capacity of toilet reservoirs, or the near universal cards in hotels that encourage you to re-use your towel to save water, are also examples of demand management. Water pricing is the most well known, and also controversial, of the demand management measures, however. The market or economic approach to address water scarcity emphasises the use of water markets, water pricing, and the privatisation of water service delivery.

While the market or economic approach to dealing with water scarcity can handle most issues theoretically, it has not been easy in practice. It is difficult to deal with externalities, such as environmental impacts. It is difficult to price water because of very high transactions costs such as metering and charging for water. And market approaches also do not do very well in addressing equity issues.

Over time we may expect institutions to adapt to the new scarcity situations. Given the proliferation of countries that are changing or adapting their water laws, this process is definitely in motion. Institutions do not change overnight, however. It is a lengthy process that asks institutions to re-evaluate their purpose and the way they act. Water related institutions often originated to facilitate construction. They were designed to deal with issues of water and power, agriculture and dams, reservoirs, and electrical networks among others. Current institutional requirements necessitate a change in perspective and activity, from construction to management, and require once separate and exclusive institutions to interact with each other in an attempt to integrate various water-use sectors.

Dialogue, finally, is an exponent of what Roling and Woodhill (2001) refer to as the *interaction perspective*. This approach to dealing with increasing scarcity emphasises...
dealing with conflict explicitly through methods of conflict resolution, negotiated agreement, social learning, consensual arrangements and collective action.

The willingness to “sit around the table” and negotiate a way out of mutually inflicted constraints is the key to the concept of dialogue as discussed here. Growing scarcity and interdependence among stakeholders is leading to the realization that they must come to some agreement if anyone is to have satisfactory outcomes. Dialogue becomes necessary not only to assemble expertise in terms of technical or economic solutions, but to explore the room for consensus, compromise, agreement, and concerted action among widely diverging scenarios and futures that are being envisioned by the stakeholders. Dialogue, then, facilitates change processes.

Key water conflicts
As users experience the impacts of degraded, scarcer and further contested resources the likelihood of conflict increases, often adding new fuel to old divisions among sects, castes, genders, age-sets, etc. (Roling and Woodhill, 2001). Water dilemmas, in particular, make themselves felt everywhere. They emerge in degraded catchments that are unable to retain water for human use, in pollution that prevents other uses, in diversion of water that leaves riverbeds dry and lifeless. As people realize that their failing crops, dwindling fisheries, lack of clean drinking water, etc. are not a question of natural causes, but the result of other actors upon whom they have become dependent for their outcomes, this is likely to lead to increasing conflict (Roling and Woodhill, 2001).

Many conflicts on water resources have a link with agriculture – by far the largest water user worldwide and in most basins. Even though the world food production is high and food prices are relatively low, malnutrition persists, mostly in South Asia and sub-Saharan Africa. Much of this is in regions dubbed “economically water scarce”, meaning that while there is water available in nature, sometimes abundantly, it has not been developed for human use. Small farmers and the poor are particularly disadvantaged. They do not have access to land and water to satisfy their needs for food and sustainable livelihoods. For survival they are often obliged to damage irreversibly the land and water resources they depend on, thus creating a vicious circle of poverty and environmental degradation.

The agricultural community sees continued growth of irrigation as an imperative to achieve the goals adopted by the international community to reduce hunger and poverty. This would lead to an increase of renewable water resources withdrawn for use in agriculture by 15–20 percent over the next 25 years. Citing similar international commitments to maintain and improve environmental quality and biodiversity, many in the environmental community see it as imperative that water withdrawn for agriculture is reduced not increased. Targets of reducing water used for agriculture by some 10 percent are proposed from this group of stakeholders. The difference between a 15–20% increase and a 10% decrease is huge, and is leading to conflicts on how to develop and manage water resources. The Global Water Partnership, in its Framework for Action, has called this conflict one of the most critical problems to be tackled in the early 21st century (GWP, 2000, p 58). According to Lemly et al. (2000), the conflict between irrigated agriculture and wildlife conservation has reached a critical point on a global scale (for an example, see box 1).

Other key conflicts related to water resources development are, of course, those around dams. Large dams have become such controversial projects that international funding for dams has dropped significantly. Because of the unresolved conflicts even dams that would be beneficial to society are no longer built. The World Commission on Dams process was an effort initiated jointly by the World Bank and IUCN to improve dialogue among stakeholder groups (see box 2).
Box 1: Nature versus agriculture in the Sahel

Africa’s floodplains play a vital life-support role for a significant proportion of the continent’s population. Human populations have for centuries utilized the agricultural, fisheries, hunting, grazing, and water resources provided by floodplains. These wetlands have been termed “the heart of Sahelian life systems” (Drijver and Rodenburg, 1988, Drijver and Van Wetten 1992). However, the last 40 years have witnessed the development of many large-scale water management schemes, frequently associated with large-scale dams and irrigated agriculture. Drijver and Van Wetten (1992) stated that by the year 2020 all Sahelian wetlands will be subjected to the impacts associated with upstream dams – these impacts will have profound consequences for the human populations that depend on these floodplains.


Box 2: World Commission on Dams and the use of dialogue

In April 1997, with support from the World Bank and the IUCN – The World Conservation Union, representatives of diverse interests met in Gland, Switzerland to discuss the role of large dams in development in light of reactions to a report by the Operations Evaluation Department (OED) of the World Bank. The breakdown of dialogue on the construction of dams worldwide – between NGOs, the private sector, governments and international organizations such as the World Bank – was imposing considerable costs on all parties. The World Bank and the IUCN realized that no group involved in the conflict could resolve the stalemate alone.

The Gland workshop brought together 39 participants from governments, the private sector, international financial institutions, civil society organizations and affected people. The consensus proposal that came out of the meeting was for all parties to work together in establishing the World Commission on Dams (WCD) with a mandate to review the development effectiveness of large dams and develop internationally acceptable criteria, guidelines and standards for large dams. The World Commission on Dams commenced its activities in May 1998 and made every effort to incorporate all points of view. Many felt that the contested nature of the dams debate would pull the Commission apart. However, the twelve Commissioners from diverse backgrounds developed an understanding and approach based on mutual respect that saw them through many contested discussions.

The result was not a bland compromise document, but rather an innovative framework within which to examine dams, both existing and planned. The Commission’s final report, “Dams and Development: A New Framework for Decision Making” was launched in November 2000.

A two-year follow-up to the process, initiated by the Commission, got underway in November 2001. A project of the United Nations Environment Programme (UNEP), the Dams and Development Project (DDP) promotes dialogue on improving decision making, planning and management of dams and their alternatives based on the WCD core values and strategic priorities. A wide range of discussions are taking place at the international, national, institutional and local level.

World Commission on Dams, www.dams.org
UNEP Dams and Development Project, www.unep-dams.org
Other typical conflicts, in developing countries often at relatively small scale, are those between the growing demands of urban areas and the current users of water – often agriculture. Given the high social value of water for municipal purposes and the high economic value of water in industry, urban areas can usually “outbid” or displace agriculture – but with ample conflicts in the process.

In most cases conflicts are multi-dimensional and linked to other non-water issues. Resolving such conflicts requires a comprehensive approach to finding solutions that have positive outcomes for all or most of the stakeholders.

**What is dialogue?**

In simple terms, dialogue is about helping key stakeholders to “think differently” so that practical solutions to emerging water conflicts, or dilemmas, can be found. Roling and Woodhill (2001) defined dialogue as follows:

“A dialogue is a contrived situation in which a set of more or less interdependent stakeholders in some resource are identified, and invited to meet and interact in a forum for conflict resolution, negotiation, social learning and collective decision making on concerted action.”

A dialogue process, then, is a process of negotiation that leads to a convergence of interests, through joint learning about the stakes and the mechanisms at work, through deliberate reflection about mutual interdependence on others and the need to agree on common solutions (Roling and Woodhill, 2001). Mechanisms that are thought to be part of effective dialogue processes are indicated in box 3 below.

**Box 3: Dialogue mechanisms**

*Conflict management:* That is, understanding the different interests and underlying values that lead groups into conflict and what methodologies and political strategies can be used to overcome them.

*Social learning:* Different stakeholders have very different ways of looking at the same resource. For example, farmers might only have a farm level perspective and are unable to consider as one coherent whole the catchment in which their farm is located. Engaging different stakeholder groups in a shared learning process is required to reach some level of convergence on the basis of which dialogue and collective decision becomes possible.

*Overcoming social dilemmas:* a social dilemma is a situation in which everyone is motivated to make short-term selfish choices, while all would be better off if they made long-term co-operative choices. Such social dilemmas can be overcome through reaching agreements about such issues as the number of people who have access to that resource, rules of access, ways of monitoring compliance, and sanctions for non-compliance.

*Facilitation:* Dialogues need to be facilitated. This refers to the management of the interactive processes among the stakeholders and includes skills in using participatory approaches, the creation of curricula for discovery learning, ability to design inclusive processes of change in large groups in which communicative rationality is used in a strategic manner.

A design workshop organised by the Dialogue on Water, Food and Environment (DWFE) among stakeholders interested in developing national and basin level dialogues on water issues resulted in a list of conditions that are conducive to a successful dialogue process (see box 4). Some very large-scale water-related dialogue-type processes have been the World Water Vision process (Cosgrove and Rijsberman, 2000) and the World Commission on Dams (see box 3). But dialogue processes have also been used successfully at a smaller, basin scale, as the example of the Usangu wetlands in Tanzania shows (see box 5).

**Dialogue on water, food and environment**

A key conclusion of the World Water Vision process and the subsequent discussions at the 2nd World Water Forum was that there was, despite all best efforts, still insufficient cross-sectoral dialogue – particularly among the agriculture and environment (sub-) sectors. As a result 10 international organisations in the water1 sector established a Consortium to jointly sponsor the Dialogue on Water, Food and Environment. This Dialogue was launched last year by HRH the Prince of Orange through a presentation here at the 2001 Stockholm Water Symposium. Since that time several other international dialogue processes have been set up by key international organisations, i.e. the Dialogue on Water and Climate2 and the Dialogue on Effective Water Governance3.

The key assumption behind the Dialogue on Water, Food and Environment (DWFE) was that there is an urgent need to develop water management strategies that ensure a fair, transparent and inclusive process that arrives at a consensus on reasonable trade-offs and identifies solutions for existing and future water management dilemmas. The identified solutions and management strategies should be acceptable to stakeholder groups in the

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**Box 4: Conditions for a successful dialogue**

1. Appropriate forums and platforms for dialogue are established
2. The dialogue forum and process has legitimacy, a clear mandate and is politically feasible
3. All relevant stakeholders are appropriately engaged and represented
4. The dialogue is integrated with existing institutions and processes
5. The focus of the dialogue is clearly defined
6. Incentives for participation and negotiation by stakeholders are established (disincentives minimized)
7. Interaction occurs between national, basin, and international levels
8. The dialogue process is effectively facilitated and communicated
9. The dialogue is informed by good information, including a thorough situation analysis
10. A diversity of approaches (methodologies) are utilized
11. Performance questions and indicators are established and monitored
12. Plans are developed and commitment is established for follow-up actions

*Source: Dialogue on Water, Food and Environment, [www.iwmi.org/dialogue](http://www.iwmi.org/dialogue)*

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1 Food and Agriculture Organization (FAO); Global Water Partnership (GWP); International Commission on Irrigation and Drainage (ICID); International Federation of Agricultural Producers (IFAP); IUCN, The World Conservation Union; International Water Management Institute (IWMI); United Nations Environment Program (UNEP); World Health Organization (WHO); World Water Council (WWC) and World Wide Fund for Nature (WWF). – see [www.iwmi.org/dialogue](http://www.iwmi.org/dialogue)
2 WMO, UNESCO, IUCN, UNDP, FAO, WWC, IPCC and WB.
3 GWP, UNDP and ICLEI.
agriculture and environment sectors as well as beneficial to people directly involved in the management and use of water all over the world.

The DWFE, further referred to here as the Dialogue, approach is building on the principles of Integrated Water Resources Management (IWRM) but adds the human dimensions of conflict resolution, consensus building and social learning to the equation. The Dialogue is an action-research program that has limited objectives and a limited life-span. The Dialogue initiative does not pretend to solve all or all major problems related to water, food and environment. The intention is to contribute to finding tangible solutions to the problem and building a body of knowledge on critical issues related to water, food and environment. The body of knowledge will consist of authoritative answers to a set of questions (research questions) on which at present there is no consensus. The Dialogue will produce a number of case studies that demonstrate that the dialogue approach can be successful and will leave behind a group of people that have gained experience and are willing to continue sharing their knowledge even after the closure of the Dialogue Initiative.

The focus of the Dialogue is on water, food and environment. In the real world context this sounds artificial because in most cases multiple interests and sectors make claims on limited water resources. Still, agriculture and environment are the main consumptive water users. It may therefore be acceptable to use these sectors as entry points for the knowledge base. Real world case studies will have to be flexible to integrate the demands of other sectors. In short, the Dialogue seeks to find solutions and answers to questions that are controversial and related to water, food and environment through an approach combining

**Box 5: Example of a dialogue process: towards a future for Usangu**

The Great Ruaha River starts in the highlands of the Usangu catchment, Tanzania. From here it flows through the Usangu wetland – home to 350 species of birds and a potential Ramsar site – and onwards to the Ruaha National Park and Mtera Reservoir. Mtera provides water for up to half of Tanzania’s electrical power production; shortages of water here have previously caused national power rationing. Many people have blamed this on activities in Usangu. In Ruaha National Park, the Great Ruaha River has dried up every dry season since 1993, stressing animals and reducing its attractiveness to tourists. And within Usangu there is more competition over land and water, sometimes leading to conflict. Water supports local livelihoods through irrigation of 40,000 ha of rice, grass growth in the wetland for livestock, and fishing in the rivers and wetland. However, the wetland is threatened as less water is available for the annual flood; a large part already no longer floods every year.

To improve management of Usangu’s resources, the Sustainable Management of the Usangu Wetland and its Catchment project (SMUWC) is facilitating “a shared vision for the future” by raising awareness and bringing stakeholders together, from all levels, to discuss these issues and seek locally acceptable solutions.

In the Mbarali District, dialogue has helped to improve management of village resources by bringing together local government representatives from the hamlet, village, ward and district levels and members of the local community in order to strengthen the planning system. This process has assisted village governments in understanding their roles and duties, assisted in the resolution of conflicts through village level land use planning, helped villages overcome existing problems and plan their future development, and made all parties aware of their roles and rights in shaping the future of their villages and of Usangu.

scientific rigor and stakeholder participation in an action research program. The work of
the Dialogue can best be understood along clearly defined core issues. A suitable way of
classifying these issues is the level to which the issues relate:

Global level
Work at global level is fairly advanced because of the established capacity of the organisa-
tions that established the Dialogue at international level. Issues include:

What is the dimension of the water, food and environment problem? Where and to what
extent is water for food and nature really in conflict? What are the trends?

The Comprehensive Assessment Program of IWMI is designed to provide answers to this
set of questions, starting with agriculture and exploring the interactions with other users
and the environment. The Water and Nature Program of IUCN has similar objectives start-
ing from an environmental perspective.

What is the potential of reducing pressure on limited water resources? Options include
more efficient agricultural water use, alternative production systems, and technological
innovations such as drought resistant or short cycle crops.

WWF has started a program to explore the potential of alternative production systems. A
group of research institutions around IHE have started a multi-year program that will
explore the potential of improved rain-fed agriculture through water harvesting options in
the moist savannahs of Africa.

Country (policy) level
Issues at country level are in most cases policy related. There is uncertainty over the food
security strategy to follow and very often the agricultural policies contradict or undermine
stated environmental objectives. Questions include:

How can the policy coherence in the agricultural and environmental sectors be
increased? What policy options do countries have to assure a reasonable level of food
security under situations of water stress?

The PODIUM model of IWMI is a suitable instrument to explore different policy options
and support a policy dialogue. ICID in cooperation with FAO has started policy dialogues
on food security policy in China and India. Similar work is under preparation in Egypt,
Pakistan, and Morocco. The Dialogue is planning the launch of a number of additional
country (policy) dialogues that would in particular focus on the issue of policy coherence
and food security strategies are being planned. It is obvious however that this depends on
the active interest of governments. Box 6 describes the dialogue process in Malaysia.

River basin level
One of the results of the debate at the Second Water Forum was a consensus that the debate
on water, food and environment should be brought down from the abstract to a level where
the real problems are and where solutions can be found. This is in most cases the river basin
level. The Dialogue is planning to initiate a number of case studies that will attempt to pro-
vide answers to questions such as:

What are the options to achieve win/win solutions or mitigate negative impacts of
agricultural development? What are the in-stream flow requirements to preserve the
eco-system?
A series of basin level dialogues is currently under preparation for the Yellow River, the Volta and a number of smaller basins in, particularly, Asia and Africa.

**Local level**

The local level is particularly important for the continuum of water, food production and environment. Any decision on land use taken by a farmer is a decision on water management that may impact many people and the environment downstream. Questions to be addressed at this level include:

*How to integrate local experience in river basin and policy dialogues? How to assure participation and a voice for local action groups in higher level dialogues without paralyzing the decision process? How to scale-up local experience to river basin and regional level? How to assess the impact of the up-scaling operation?*

The GWP and a group of NGOs are currently preparing a number of dialogue activities at local and regional scale.

**Cross-cutting issues**

In addition, a set of cross-cutting issues and questions will address the overriding issues of poverty and health as well as the overall feasibility of the dialogue approach in the context of evolving societies. Questions include:

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**Box 6: Dialogue on water, food and environment in Malaysia**

Purpose: (1) To establish, facilitate and promote an effective dialogue process at the national/sector/basin levels by incorporating the entire spectrum of stakeholders. (2) For improved implementation of better irrigation and drainage. (3) To address related institutional and organizational issues.

It started with the interest and the devotion demonstrated by the Malaysian Water Partnership (MWP). The MWP was keen on helping the dialogue process underway in that country. MWP involved the Malaysian National Committee on Irrigation and Drainage (MANCID). On behalf of MANCID, and the Director General, the Department of Irrigation and Drainage (DID) has established an “Organizing Committee with a Secretariat”. This Secretariat is chaired by the Director/DID and is tasked with organizing and implementing the Dialogue in Malaysia. This is a clear example of how a country could own its dialogue and make it operational. During the planning of Dialogue activities, the Organizing Committee has realized the importance of facilitation and assistance from the Dialogue Secretariat. The Dialogue Secretariat agreed to organise a 5 day training workshop during the first half of May 2002, for the intended local facilitators, with external expert inputs. At the end of this training participants agreed on a Dialogue process – a plan of work to be implemented. This work plan entails three local level dialogue meetings in three identified basins along with three papers on Water, Environment and Food Security. Materials and opinions from those three dialogues and papers will feed into five mini-sectoral dialogues, the results of which will be synthesized into a single thematic paper to be discussed at a national dialogue. It is expected that this will be reflected in Malaysian water management.

*Source:* DWFE Malaysia.

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How to make sure that the poor and vulnerable are not negatively affected by trade-offs between food production and conservation? How to ensure that the rural poor own and benefit from conservation measures? What is the capacity of depressed societies in evolving societies to really engage social learning and conflict resolution (putting short-term individual goals behind longer term societal goals)? What mechanisms are required to trade short-term individual gains against long-term collective benefits? What is the role of peer pressure and social control? Is the time ripe for the dialogue approach? What is the influence of the level of education and awareness? How to mainstream dialogue results in the political process?

The goals of the Dialogue are ambitious and the participating institutions have no illusion about the difficulties of the way ahead. The objective is not to launch a maximum number of dialogue initiatives but to initiate a limited number of carefully monitored case studies and build a knowledge base that allows tentative answers to these questions. Case studies will be supported by targeted research and analytical desk studies. The list of questions is not closed but will be reviewed and expanded as experience is gained and in accordance with recommendations of the STAP. Any organization involved in water, food and environment is invited to join the Dialogue’s Forum of Associated Organizations in order to initiate dialogues, share experience and contribute to the knowledge base.

Conclusions
Increased water conflicts, particularly in the agriculture-environment arena, are the result of the rapidly increasing relative water scarcity in many basins to which water institutions have not yet successfully adapted.

“Dialogue” is proposed in this paper as a non-market, negotiated process that can help resolve water conflicts that arise due to the rapidly increasing relative scarcity in water resources in many basins. A dialogue process is understood to be a process of negotiation that leads to a convergence of interests, through joint learning about the stakes and the mechanisms at work, through deliberate reflection about mutual interdependence on others and the need to agree on common solutions.

The Dialogue on Water, Food and Environment (DWFE) is a program of activities that employs dialogue processes at international, national, basin and local scales to help build bridges between agriculture and the environment. The DWFE was launched in August 2001. It has gone through a one-year phase of establishment and design, and is currently in the process of kicking-off concrete dialogue activities in the field.

References