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# CHARTE DE MONTRÉAL

sur l'eau potable et l'assainissement adoptée dans le cadre  
du FORUM INTERNATIONAL DE MONTRÉAL:  
les Organisations Non-Gouvernementales en Interaction.

## THE MONTREAL CHARTER

on Drinking Water and Sanitation adopted at the  
MONTREAL INTERNATIONAL FORUM:  
NGO's Working Together.

## CHARTE DE MONTRÉAL

sobre el agua potable y su saneamiento, adoptada en el  
FORO INTERNACIONAL DE MONTRÉAL:  
las Organizaciones No Gubernamentales en Interaccion.

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# FORUM INTERNATIONAL DE MONTRÉAL

## LES O.N.G. EN INTERACTION

LES 18, 19 ET 20 JUIN 1990: À MONTRÉAL

Montréal,  
27 juillet 1990

Montreal,  
July 27, 1990

Montréal,  
27 de Julio de 1990

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Madame, Monsieur,

Vous trouverez ci-joint la charte de Montréal sur l'eau potable et l'assainissement, élaborée dans le cadre du FORUM INTERNATIONAL DE MONTRÉAL: LES ONG EN INTERACTION, les 18, 19 et 20 juin derniers.

Elle sera déposée officiellement le 10 septembre prochain à New Delhi dans le cadre de la Consultation Globale «SafeWater 2000».

Adoptée par les participants du Forum de Montréal, nous serions heureux que vous la lisiez et la fassiez adopter par votre ONG. Nous sollicitons le plus d'avis possible car nous croyons opportun dans la conjoncture actuelle de promouvoir l'idée de la création d'une Coalition Internationale d'ONG préoccupées par la question de l'eau potable et de l'assainissement. De plus, compte tenu du nombre d'appui reçu, nous aimerions exercer un pouvoir de pression auprès de la prochaine assemblée générale des Nations Unies.

Nous nous engageons également à transmettre vos commentaires au groupe des ONG d'éducation et d'aide au développement qui se réunira le 7 et 8 septembre à New Delhi.

Nous avons besoin de votre appui.

Dear Sir/Madam,

Please find enclosed the Montreal Charter on Drinking Water and Sanitation that was drawn up during the MONTREAL INTERNATIONAL FORUM: NGOs WORKING TOGETHER, held on June 18, 19 and 20, 1990.

The Charter will be officially presented on September 10th in New Delhi at the Global Consultation "SafeWater 2000" conference.

We would be pleased if you read this document, which was adopted by the MONTREAL FORUM, and had it adopted by your NGO. We are looking for as much support as possible because, considering the current international climate, we believe now is the time to promote the idea of an international coalition of NGOs concerned with the problem of drinking water and sanitation. In addition, given the support we have received, we would like to exert pressure during the next session of the United Nations General Assembly.

We welcome your comments and undertake to forward them to the NGO Education and Development Assistance Group in New Delhi.

We need your support.

Señora, Señor,

Le adjuntamos la «Charte» de Montréal (Declaración de principios) sobre el agua potable y su salubridad, elaborada en el FORO INTERNACIONAL DE MONTRÉAL: LOS ONG EN INTERACCION, los días 18, 19 y 20 de Junio pasado.

La «Charte» sera oficialmente presentada el próximo 10 de Septiembre en Nueva Delhi, con motivo de la Consulta Global «SafeWater 2000».

La «Charte» ha sido adoptada por los participantes al Foro de Montréal y deseamos que sea leída y adoptada por su ONG. Deseamos recibir el mayor apoyo posible, porque creemos que, en la actual coyuntura, es oportuno el promover la idea de crear una Coalición Internacional de ONG preocupados por el problema del agua y su saneamiento. Además, teniendo en cuenta el gran número de apoyos que hemos recibido, queremos ejercer una fuerza de presión en la próxima asamblea general de las Naciones Unidas.

Los comentarios que recibamos de ustedes, serán bien recibidos y nos comprometemos a hacerlos conocer al grupo de los ONG de educación y de ayuda al desarrollo en Nueva Delhi el 7 y 8 de Septiembre.

Necesitamos su colaboración.

**Raymond Jost**  
Conseiller spécial et  
coordonateur du Forum de  
Montréal  
OXFAM-Québec

**Raymond Jost**  
Special Advisor and Coordinator  
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En septembre prochain, à New Delhi, se dérouleront les travaux de clôture de la décennie internationale de l'eau potable et de l'assainissement desquels se dégageront les actions à entreprendre d'ici la fin de l'an 2000.

**La communauté internationale des ONG d'éducation et d'aide au développement doit contribuer à cette réflexion et faire valoir ses points de vue.**

Voilà pourquoi OXFAM-Québec et ses partenaires ont organisé le FORUM INTERNATIONAL DE MONTREAL: LES ONG EN INTERACTION les 18, 19 et 20 juin derniers. Y ont participé une centaine de personnes représentant des organisations non gouvernementales (ONG) d'Amérique Latine, d'Asie, d'Afrique, d'Europe et d'Amérique du Nord; des organismes multilatéraux et bilatéraux et des spécialistes de l'eau.

Ce Forum visait la formulation et l'adoption d'une charte que nous sommes heureux de vous présenter et dont le contenu est celui qui suit. Que cette charte soit diffusée le plus largement possible est notre souhait le plus vif.

Merci de votre attention et collaboration.

The closing session of the International Drinking Water Supply and Sanitation Decade will be held next September in New Delhi. Participants at the session will be recommending the courses of action that should be given priority until the end of the century.

**The international community of NGO Education and Development Assistance groups must contribute to this process and put forward its viewpoints.**

This is why OXFAM-Québec and its partners organized the MONTREAL INTERNATIONAL FORUM: NGOs WORKING TOGETHER, on June 18, 19 and 20, 1990. A hundred or so people representing non-governmental organizations (NGOs) from Latin America, Asia, Africa, Europe and North America, multilateral and bilateral organizations, as well as water specialists participated in this Forum.

The objective of this Forum was to draw up and adopt a charter that we are pleased to present herewith. We sincerely hope that this charter will be distributed as widely as possible.

Thank you for your cooperation.

El próximo mes de Septiembre, en Nueva Dehli, se celebrarán los trabajos de clausura del decenio internacional del Aqua potable y de su Saneamiento, de donde saldrán las acciones a realizar hasta el año 2000.

**La comunidad internacional de los ONG de educación y de ayuda al desarrollo debe colaborar en dicha reflexión y defender sus puntos de vista.**

Con este motivo, OXFAM-Québec y los demás ONG participantes han organizado el FORO INTERNACIONAL DE MONTREAL: LOS ONG EN INTERACCION, los días 18, 19 y 20 de Junio pasado. Un centenar de personas han participado al Forum, representando las organizaciones no gubernamentales (ONG) de América latina, de Asia, de Africa, de Europa y de América del Norte. También había representantes de organismos multilaterales y bilaterales así como especialistas del Agua.

El Foro tenía como finalidad la formulación de una «Charte» (Declaración de principios) que actualmente les presentamos.

Deseamos que esta «Charte» (Declaración de principios) sea conocida y difundida de la forma más amplia posible.

Gracias por su atención y colaboración.

**Tim Broadhead**  
Président du FORUM  
et Directeur Général du C.C.C.I.

**Tim Broadhead**  
Forum Chairman  
Executive Director C.C.I.C.

**Tim Broadhead**  
Presidente del Foro  
y Director general de CCCI

**Gaston Truchon**  
Directeur Général  
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Executive Director  
OXFAM-Québec

**Gaston Truchon**  
Director general  
OXFAM-Québec



## Charte de Montréal

Sur l'eau potable et l'assainissement

### Déclaration :

L'accès à l'eau étant une condition de survie, nous affirmons que toute personne a le droit d'avoir accès à l'eau en quantité suffisante, afin d'assurer ses besoins essentiels. Par conséquent, priorité doit être donnée au milliard et demi de personnes qui n'ont pas encore accès à l'eau potable.

Le droit d'accès à l'eau et à l'assainissement est indissociable des autres droits de la personne. Il ne peut faire l'objet d'aucune discrimination et implique un respect par tous. Il s'agit de s'assurer que la gestion et l'approvisionnement en eau soient faits de façon équitable et efficace, au moyen de systèmes pérennes, et de manière à renforcer l'autonomie des populations concernées.

L'accès à l'eau pour tous exige des efforts visant la préservation, en termes de quantité et de qualité, de cette ressource vitale de notre planète. Cela concerne tous les pays sans exception, tous les milieux, tous les secteurs allant de l'agriculture à l'industrie, et tous les niveaux allant de la gestion individuelle et communautaire à la gestion nationale et internationale.

## Montreal Charter

On Drinking Water Supply and Sanitation

### Declaration :

Given that access to water is a condition of survival, we affirm that all persons have the right to sufficient supplies of water to meet their essential needs. Consequently, priority must be given to the billion and a half people who do not have access to drinking water.

The right to drinking water and sanitation cannot be dissociated from other human rights. It cannot be subject to discrimination and implies a respect from everyone. We must ensure that water supply and sanitation are managed equitably and efficiently, using durable systems, and in such a way as to strengthen the autonomy of the populations concerned.

Ensuring water supply for everyone demands special efforts for the preservation of this vital resource on our planet, in terms of quantity and quality. This responsibility concerns all countries without exception, all milieux, all sectors from agriculture to industry, and all levels from individual and community to national and international.

## « Charte » de Montréal

Sobre el agua potable y su saneamiento

### Declaración :

Siendo el acceso al agua una condición de sobrevivencia, nosotros afirmamos que toda persona tiene derecho al agua en cantidad suficiente para poder responder a sus necesidades vitales. Por lo tanto, la prioridad debe darse al millar y medio de personas que todavía no tienen acceso al agua potable.

El derecho al agua y a su saneamiento es inseparable de los otros derechos de la persona. No puede ser el objeto de cualquier discriminación e implica un respeto por todos. Hay que asegurar que la gestión y el aprovisionamiento del agua sean realizados de manera justa y eficaz, por medio de sistemas perdurables que fortalezcan la autonomía de los pueblos afectados.

El acceso al agua para todos exige esfuerzos para preservar cualitativa y cuantitativamente este recurso vital de nuestro planeta. Este esfuerzo a realizar concierne a todos los países sin excepción, a todos los medios, a todos los sectores, desde la agricultura hasta la industria, y a todos los niveles, desde la utilización personal y comunitaria hasta la administración nacional e internacional.

## Principes guidant notre action :

### 1. L'accès à l'eau et à l'assainissement est d'abord une question politique.

Aujourd'hui, le non-respect de ce droit pour tous est le reflet, au-delà des disparités géographiques, des inégalités de répartition du pouvoir social et économique, ce qui exige une solidarité internationale soutenue afin de faire respecter ce droit essentiel. À ce niveau, nous tenons à souligner la nécessité :

- de reconnaître que l'accès à l'eau pour tous est compromis par des modèles de développement qui gaspillent et polluent les ressources limitées de la planète, ce qui appelle une réforme des modes de développement économique dominants ;
- d'appuyer les revendications des populations vis-à-vis de l'État en favorisant l'émergence et l'appui à des organisations démocratiques, tant en milieu rural qu'urbain et tout particulièrement dans les bidonvilles, où les besoins essentiels sont cruellement ignorés ;
- de dénoncer et de s'opposer au contrôle de l'accès à l'eau et à l'assainissement comme moyen de pression sur les populations victimes de guerre ou d'occupation militaire ;
- de mettre sur pied des réseaux permanents au Sud comme au Nord, regroupant des ONG de développement ainsi que des groupes environnementaux et de défense des droits de la personne, qui se chargeront de susciter une conscience globale du problème de l'eau, de veiller à l'augmentation et au partage équitable des fonds alloués à ce secteur, et de faire les pressions nécessaires en vue de préserver la qualité et l'équité de l'accès à l'eau et à l'assainissement.

## Principles guiding our actions :

### 1. Access to drinking water and sanitation is, above all, a political issue.

Today, the lack of respect for all of this right reflects, beyond geographical disparities, the inequalities in the distribution of social and economic power, which therefore necessitates sustained international solidarity to ensure that this essential right is respected. In this context, we want to underline the need:

- to recognize that access to water for all is jeopardized by actual development models which waste and spoil the limited resources of the planet, thus calling for a reform of the dominant economic development models ;
- to support the population's demands towards their government by promoting the emergence and providing support to democratic organizations, both in rural and urban centers, particularly in slum areas where basic needs are cruelly ignored ;
- to denounce and oppose the resort to control over water supply and sanitation as a pressure tool over populations who are victims of war or military occupation ;
- to set up, both in the South and in the North, permanent networks joining non-governmental development organizations as well as environmental and human rights groups, who would promote global awareness of the water problem, ensure the increase and equitable distribution of funds allocated to this sector, and resort to the necessary pressure to preserve the quality and equity of access to water and sanitation.

## Principios básicos de nuestra acción :

### 1. El acceso al agua y a su saneamiento es, sobre todo, un problema político.

El no respeto del derecho al agua para todos es, hoy en día, la manifestación de las desigualdades en la repartición del poder social y económico, independientemente de las diferencias geográficas, y exige de todos una solidaridad internacional constante para poder hacer respetar este derecho esencial. Por lo tanto, insistimos en afirmar la necesidad:

- de reconocer que el acceso al agua para todos está amenazado por los modelos de desarrollo que malgastan y contaminan los limitados recursos de la planeta. Por lo tanto, se exige una reforma en los modos vigentes del desarrollo económico ;
- de apoyar las reivindicaciones de los pueblos frente al Estado, favoreciendo la creación y el apoyo de las organizaciones democráticas, tanto en las zonas rurales como urbanas, sobre todo en los suburbios y villas miserias, donde las necesidades esenciales son cruelmente olvidadas ;
- de denunciar y oponerse al control del acceso al agua y a su saneamiento, como medio de presión sobre los pueblos víctimas de guerra o de ocupación militar ;
- de establecer asociaciones permanentes que reúnan los ONG de desarrollo, tanto del Sur como del Norte, así como asociaciones de protección del medio ambiente y de defensa de los derechos de la persona que tengan como objetivo el suscitar una conciencia mundial sobre el problema del agua, de vigilar sobre la distribución y el aumento justo de los fondos destinados a este sector y de presionar los responsables para obtener la calidad y la justa distribución del acceso al agua y a su saneamiento.

## Principes guidant notre action: (suite)

### 2. Concevoir toute action dans ce domaine en appui aux populations concernées.

Partant du constat que l'échec des modèles de développement est en bonne partie imputable au fait que les populations, et tout particulièrement les femmes, ont été tenues à l'écart de l'orientation et des décisions importantes en ce qui concerne le processus de développement, il s'agit dans le domaine de l'eau plus que dans tout autre:

- de veiller à ce qu'aucune décision importante touchant l'approvisionnement et la gestion de l'eau ne soit prise sans la participation, à travers des instances de concertation, des populations concernées et principalement des femmes, qui sont les premières responsables de l'approvisionnement en eau, de l'hygiène et de la santé de la famille;
- de renforcer le pouvoir des communautés de base, et particulièrement des femmes, dans leur capacité de maîtriser la conception et la réalisation des projets d'eau potable et d'assainissement, et de gérer elles-mêmes les installations à moyen et long termes;
- de repenser le partenariat entre ONG du Sud et du Nord, dans lequel les ONG du Sud seraient les véritables initiateurs du développement dans leur milieu, tout en maintenant des liens étroits avec les ONG du Nord.

## Principles guiding our actions: (cont'd)

### 2. Conceive all actions in this field in support to the populations concerned.

Starting from the premise that the failure of development models is, for the most part, due to the fact that the populations, especially women, have been excluded from the orientation and important decisions concerning the development process, it follows that in the area of drinking water, more than in any other area, we have to:

- ensure that no important decision regarding water supply and management is taken without the participation, through consultative bodies, of the populations concerned, especially the women, who are the first ones responsible for providing water, hygiene and health to the family;
- reinforce the power of the basic communities, and particularly the women, in their capacity to master the design and implementation of drinking water and sanitation projects, and to themselves manage the installations in the medium and long terms;
- rethink the partnership between the South and North NGOs, so that Southern NGOs would be the true initiators of development in their communities, while maintaining close ties with Northern NGOs.

## Principios basicos de nuestra accion: (siguen)

### 2. Orientar las acciones en este sector con la finalidad de apoyar a las poblaciones afectadas.

El fracaso evidente de los modelos de desarrollo que se han aplicado, es debido, en gran parte, al hecho de haber excluido de las orientaciones y de las decisiones importantes del proceso de desarrollo a las poblaciones, y particularmente a las mujeres. Por lo tanto es necesario, que en todos los sectores y sobre todo en el sector del agua:

- de asegurarse que toda decisión importante sobre el abasto y la gestión del agua se tome, por medio de mecanismos de concertación, con la participación de las poblaciones afectadas y principalmente de las mujeres que son las primeras responsables del abastecimiento de agua, de la higiene y de la salud de la familia;
- de fortalecer el poder de las comunidades de base y particularmente de las mujeres, en su capacidad de controlar la planificación y la realización de los proyectos de agua potable y de su saneamiento y en la administración, por ellas mismas, de las instalaciones a mediano y largo plazo.
- de analizar nuevamente el concepto de partenariat entre los ONG del Sur sean los verdaderos promotores de su desarrollo, manteniendo estrechas relaciones con los ONG del Norte.

### 3. Intégrer l'eau dans une approche globale du développement.

Partant de l'affirmation que le droit à l'eau est indissociable des autres droits de la personne liés au développement global, il est nécessaire de :

- **considérer l'accès à l'eau et à l'assainissement comme un droit essentiel autour duquel pourra s'articuler un programme de développement intégré, incluant des actions visant la santé, la gestion des déchets, la préservation de l'environnement, l'éducation et la création d'activités économiques ;**
- **prévoir des actions spécifiques visant à préserver la potabilité de l'eau en même temps qu'à assurer sa distribution en quantité suffisante au plus grand nombre ;**
- **privilégier dans tout projet le recours aux ressources locales existantes en termes d'expertise, d'emploi, d'équipements, de technologies, etc., en vue de contribuer en même temps au développement économique de la région nécessaire à tout développement global et durable ;**
- **privilégier dans tout projet le recours aux ressources locales existantes en termes d'expertise, d'emploi, d'équipements, de technologies, etc., en vue de contribuer en même temps au développement économique de la région nécessaire à tout développement global et durable.**

### 3. Water must be integrated into a global approach to development.

Starting from the belief that the right to water cannot be dissociated from other human rights linked to global development, it is essential that we :

- **consider access to water and sanitation an essential right around which can be designed an integrated development program with actions focusing on health, waste management, preservation of the environment, education and the creation of economic activities ;**
- **plan specific actions to preserve safe water, while at the same time ensuring the distribution of sufficient quantities for the most people possible ;**
- **emphasize, in all projects, the use of existing local resources in terms of expertise, employment, equipment and technology, etc., in order to simultaneously contribute to the economic development of the region which is essential for any sustainable development.**

### 3. Integrar el agua en una perspectiva global del desarrollo.

A partir de la afirmación que el derecho al agua es inseparable de los demás derechos de la persona que están relacionados con un desarrollo global, es necesario :

- **considerar el derecho al agua y a su saneamiento como un derecho esencial en torno al cual se puede articular un programa de desarrollo integral, incluyendo las actividades en salud, en la utilización de las basuras, en la preservación del medio ambiente, en la educación y en las actividades económicas ;**
- **prever actividades específicas de conservación del agua potable y asegurar, al mismo tiempo, su distribución en cantidad suficiente al mayor número posible de personas ;**
- **privilegiar, en todo proyecto, la utilización de los recursos locales existentes: maestría, trabajo, equipos, tecnologías, etc., con el fin de colaborar al mismo tiempo al desarrollo económico de la región, como elemento necesario a un desarrollo global y permanente.**

## Principes guidant notre action : (suite)

### 4. Miser sur l'éducation et la formation des populations.

Partant du constat que les solutions purement techniques ne suffisent pas à elles seules à assurer une meilleure qualité de vie aux populations, il est nécessaire de prévoir avec tout projet et programme liés à l'eau, un volet formation visant également les hommes et les femmes. Dans ce domaine, certains principes se dégagent :

- prévoir la formation de gestionnaires de l'eau et de techniciens locaux, tout en cherchant à y inclure spécifiquement les femmes, en vue d'assurer l'entretien des installations à moyen et long termes ;
- la formation comprend non seulement l'aspect technique, mais également la formation plus globale incluant l'hygiène, la santé ainsi qu'une meilleure compréhension du cycle de l'eau dans la nature et des moyens permettant de l'utiliser adéquatement ;
- s'engager à promouvoir auprès des populations (au Sud comme au Nord), une conscience du bien public et de l'importance de préserver la qualité de l'eau et de l'environnement en lien avec la santé ;
- adopter une approche participative dans la formation et s'appuyer davantage sur les compétences et les ressources locales dans tout programme de formation et d'éducation.

## Principles guiding our actions : (cont'd)

### 4. Focus on education and training of the populations.

Starting from the premise that purely technical solutions cannot, in and of themselves, ensure people a better quality of life, all water-supply projects and programs must include equal training for both men and women. In this area, certain principles stand out :

- local water managers and technicians must be trained, and special efforts must be made to include women, so that the installations can be maintained over the medium and long terms ;
- training includes not only the technical aspects, but also more comprehensive programs that include hygiene, health and a better understanding of the cycle of water in nature and the means to use it adequately ;
- the populations of both the North and the South must be made aware of the public good and the importance of preserving the quality of the water and the environment in relation to maintaining good health.
- a participatory approach to training must be used and all training and education programs must increasingly rely on local skills and resources.

## Principios básicos de nuestra acción : (siguen)

### 4. Priorizar la educación y la formación de las poblaciones.

Partiendo de la constatación que las soluciones estrictamente técnicas no son suficientes, por ellas mismas, para asegurar una mejor calidad de vida a las poblaciones, es necesario preveer, en todo proyecto y programa que tenga relación con el agua, el tema de la formación de los hombres y de las mujeres. En este sentido, varios principios se delimitan :

- preveer la formación de administradores del agua y de las técnicas locales, incluyendo de manera especial a las mujeres, para poder asegurar el mantenimiento de las instalaciones a mediano y largo plazo ;
- incluir en la formación no solamente los aspectos técnicos sino también los temas mas generales como la higiene, la salud así como una mejor comprensión del ciclo del agua en la naturaleza y los medios que permiten su adecuada utilización ;
- comprometerse a promover, tanto en las poblaciones del Norte como del Sur, la toma de conciencia sobre el bien público y sobre la importancia de defender la calidad del agua y del medio ambiente, en relación con la salud ;
- adoptar una orientación participativa, utilizando en los programas de formación y de educación la competencia y los recursos locales existentes.



## Recommandations :

Le droit à l'eau et à l'assainissement doit avant tout être garanti par les gouvernements et les institutions internationales qui doivent prendre leurs responsabilités de façon urgente. En ce sens, nous recommandons les actions suivantes :

- 1° Traduire en termes budgétaires le caractère prioritaire de l'accès à l'eau et à l'assainissement dans les plans nationaux.
- 2° Adopter de manière concertée et explicite une politique globale de gestion des ressources en eau touchant également les domaines de l'environnement, de la production agricole et du développement économique de telles politiques ne pouvant être adoptées sans concertation avec les populations concernées.
- 3° Assurer un partage plus équitable des fonds destinés à l'accès à l'eau et à l'assainissement et faire preuve de vigilance, particulièrement dans un contexte d'occupation militaire ou de conflit armé, afin de s'assurer que le droit d'accès à une ressource aussi vitale ne soit pas nié à une partie de la population pour des raisons partisans.
- 4° Faire adopter une législation concernant les droits et devoirs liés à l'eau et à l'assainissement et mettre sur pied des instances de concertation et d'arbitrage, tant sur le plan national qu'international, chargées de gérer les conflits liés à la gestion de l'eau.

## Recommendations :

The right to drinking water and sanitation must be guaranteed by the Governments and International Institutions who have to take up their responsibilities. Hence, we recommend that the following actions be taken urgently :

- 1° To translate in budgetary terms the priority given to drinking water supply and sanitation in all national development plans.
- 2° To adopt, in a concerted and explicit manner, a global policy of water-resource management that deals equitably with the fields of environment, agricultural production and economic development. Such policies cannot be adopted without consultation with the populations concerned.
- 3° To ensure a more equitable sharing of funds allocated to drinking water supply and sanitation and to show proof of vigilance, particularly in a context of military occupation or armed conflict, in ensuring that the right of access to such a vital resource is not denied to a section of the population for partisan reasons.
- 4° To pass legislation regarding the rights and duties related to water and sanitation and establish bodies for consultation and arbitration, at both the national and international level; with the responsibility of managing conflicts around water management.

## Recomendaciones :

El derecho al agua y a su saneamiento-tiene que estar garantizado, ante todo, por los gobiernos y las instituciones internacionales que deben asumir sus responsabilidades de manera urgente. Por lo tanto, recomendamos las siguientes acciones :

1. Integrar en los planes nacionales, y en términos presupuestarios, el carácter prioritario del acceso al agua y a su saneamiento.
2. Adoptar de forma explícita y coordinada una política global de la administración de los recursos del agua, incluyendo los aspectos del medio ambiente, de la producción agrícola y del desarrollo económico; dichas políticas no deben ser adoptadas sin el acuerdo de las poblaciones afectadas.
3. Asegurar una repartición justa de los fondos destinados al acceso al agua y a su saneamiento y permanecer vigilantes, sobre todo en contextos de ocupación militar o de conflicto armado, para asegurarse que el acceso a un recurso tan vital como el agua no sea privado a una parte de la población por razones partidarias.
4. Hacer adoptar una legislación sobre los derechos y deberes al agua y a su saneamiento y establecer mecanismos de concertación y de arbitraje de litigios, tanto a nivel nacional como internacional, que se encargen de solucionar los conflictos relacionados con el agua.

## Recommandations : (suite)

- 5° Reconnaître le droit et le besoin des populations, et principalement des femmes, de participer à travers des structures démocratiques, à la gestion de l'eau en tant qu'élément central à tout développement, en les associant à la définition des politiques et à toutes les phases de projets hydrauliques et d'assainissement.
- 6° Reconnaître et appuyer par leur action et leur politique, les initiatives des communautés locales visant l'accès à l'eau potable et l'assainissement, particulièrement celles trop longtemps ignorées des bidonvilles.
- 7° Insister sur l'importance de gérer et de réhabiliter les ouvrages existants avant de réaliser de nouveaux investissements.
- 8° S'appuyer systématiquement sur les ressources humaines et matérielles locales avant de considérer le recours à des ressources extérieures et associer à tout programme hydraulique le tissu économique local (entreprises, artisans, petits commerces, etc.) en vue de favoriser un développement global.
- 9° Tenir compte de la dimension sociale et humaine dans tout projet d'hydraulique et en ce sens, reconnaître l'importance des rôles respectifs des ONG du Sud et du Nord et chercher à les associer à toutes les étapes : en amont, dans la conception de toute politique liée à la gestion de l'eau, et en aval, dans la mise sur pied de tout programme lié à l'eau potable et à l'assainissement.

## Recommendations : (cont'd)

- 5° To recognize the right and need of populations, and particularly women, to participate in water-management projects through democratic structures and as key actors, by involving them in the definition of policies and at every phase of water supply and sanitation projects.
- 6° To recognize and support, in action and policy, local community efforts to ensure access to drinking water and sanitation, particularly in long ignored slum areas.
- 7° To stress the importance of managing and rehabilitating existing projects before undertaking new investments.
- 8° To rely systematically on local human and material resources before seeking external resources, and ensure that any water-supply project is closely tied in to the local economy (companies, artisans, small business, etc.), in order to promote a sustainable development.
- 9° To take the social and human dimension into account in any water-supply project, and in this aspect to recognize the importance of the respective roles of the NGOs of the South and the North and seek to involve them at every stage : from the initial conception of policies related to water management, to the implementation of any program linked to drinking water and sanitation.

## Recomendaciones : (seguen)

5. Reconocer el derecho y la necesidad de las poblaciones y principalmente de las mujeres a participar, por medio de estructuras democráticas, a la gestión del agua como elemento central de todo desarrollo, asociándoles en la definición de las políticas así como en todas las fases de los proyectos hidráulicos y de saneamiento de las aguas.
6. Reconocer y apoyar, con las actividades y las políticas, las iniciativas de las comunidades locales que buscan el acceso al agua potable y a su salubridad, sobre todo aquellas comunidades tanto tiempo olvidadas de los suburbios y las villas misera.
7. Insistir sobre la importancia de administrar y de rehabilitar las obras existentes antes de comenzar nuevas inversiones.
8. Apoyarse sistemáticamente en los recursos humanos y materiales locales, antes de recurrir a los recursos exteriores y de asociar en todo programa hidráulico la gama de la economía local (compañías, artesanos, pequeños comercios, etc.) para favorecer un desarrollo global.
9. Considerar la dimensión social y humana en todo proyecto hidráulico y en este sentido, reconocer la importancia de las funciones respectivas de los ONG del Sur y del Norte, integrándolos en todas las etapas : en primer lugar, en la elaboración de las políticas de gestión del agua y posteriormente en la puesta en marcha de todo programa de agua potable y de su saneamiento.

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# Statement

Minister for  
External Relations  
and International  
Development

# Déclaration

Ministre des  
Relations extérieures  
et du développement  
international

"Water and development: charting a new course for the 1990s"

Notes for remarks by:

The Honourable Monique Landry  
Minister for External Relations and  
International Development

to a conference of  
the International Forum of Montreal  
entitled "SOS: Water is life"

Montreal, Quebec  
June 18, 1990

Check against delivery

Affaires extérieures et  
Commerce extérieur Canada  
External Affairs and  
International Trade Canada

Canada

Welcome everyone to "SOS: Water is life"! It is a great pleasure and honour for me to welcome all of you to this important conference.

Let me begin by saying how impressed I am by the wide range of people and organizations attending this conference. We have here today representatives from Asia, Africa, Latin America and the Caribbean, Europe, and North America... from NGOs, from government, from the private sector and from multilateral agencies. I'm delighted that so many delegates from around the world were able to attend this conference. When we're dealing with an issue as important as water and world development, it is essential that people from all parts of the world have a chance to participate.

On behalf of everyone here today I would like to extend a hearty congratulations to OXFAM-Québec, and to other conference organizers, for the splendid job they have done in planning and organizing this conference. OXFAM-Québec deserves special recognition for the initiative it has shown in putting this truly international event together. Your success is a clear demonstration of that long-recognized ability of NGOs to bring people together on the issues that really matter. I am proud that the Government of Canada has been able to support your work and the work of this conference.

The title of this meeting - SOS: water is life - is particularly apt. Water is without question the most important, most precious and most versatile substance on earth, the very source of life. It's two-thirds of our bodies. It's the universal solvent... it's clean and abundant, it can even dissolve our age-old enemies: poverty and want, famine and disease. It lets us live.

Here in Canada, most of us take clean water for granted. But what happens when there's no water or it's not clean? That's a harsh reality of life for far too many people. Nearly half of the world's population lacks access to clean water. In Africa, the majority of people are without adequate water supply and sanitation services.

The results are appalling and illustrate dramatically just how important water is. Lack of clean water and adequate sanitation is a contributing factor in the death of about 12.4 million people annually. That's a daily toll of 34,000 deaths, or the equivalent of the fatal crashes of 100 jumbo jets each day - one every fifteen minutes. Along with illness and disability, this adds up to a staggering cost in wasted and impaired lives.

And it doesn't end with this human toll. Who can possibly tally up the economic burden and the costs to a country's future? People are the foundation of any country's well-being. No country can prosper and develop if its population is weakened by illness and disease, and its medical system overburdened by people suffering from preventable illness. A peasant on the site

of a Canadian-assisted project in Sri Lanka perhaps put it best, a decade ago, when he said: "If there's no water, there's no development."

Indeed, we've learned that one of the best and most effective investments we can make in development is in improving water and sanitation services. Much of the progress that has been made in lowering infant mortality rates and increasing life expectancy in developing countries can be attributed directly to improvements in water supply and sanitation.

The 1977 UN World Water Conference, held at Mar del Plata, Argentina, marked a turning point in recognizing how important water is to development. And one important outcome of the World Water Conference was the International Drinking Water Supply and Sanitation Decade (IDWSSD), proclaimed at a Special Session of the United Nations General Assembly in New York on November 10, 1980. We all know the goal of the Decade: to provide access for all people to safe drinking water and adequate sanitation by the year 1990. That was an ambitious goal, but an essential one as well. Now, as we close off the Decade, it's time to look back at what we have accomplished and to look ahead to the work that remains undone. And this forum is the ideal opportunity for everyone involved in the water sector - especially NGOs - to share their experiences and discuss their plans for the future.

It's true that we have not met the lofty goal we set for ourselves back in 1980. But there is much that we have done to make the world a better place. Since 1980, clean water has been provided to an additional 1.3 billion people and sanitation to another 700 million. Tremendous gains have been made against enormous logistical and management problems in nations such as China, India, and Pakistan. Enormous suffering has been averted and thousands of millions of dollars have been saved.

The Decade has also spurred a re-awakening in our awareness of the importance of water projects. It has focused attention on the importance of water in development, and stimulated greater interest and involvement in water sector programs.

At the global level, the Decade has brought about a new era of international cooperation in the water sector. The UN's Inter-Agency Steering Committee for Co-operative Action first brought together the multilateral agencies.

More recently, the Collaborative Council of External Support Agencies has brought the non-governmental organizations and the bilateral aid agencies into this dialogue. I know that several of the delegates at this forum presented the views of NGOs in the December '89 meeting of the Council. More importantly, NGOs and other agencies are cooperating vigorously to implement better programs and projects in the developing countries. This

cooperation is especially valuable as it makes more efficient use of scarce resources.

Despite the progress of the last decade, there is still much work to be done. Some 1.2 billion people in the developing world are still without access to safe water supplies, and about 1.7 billion remain without adequate sanitation services. Most of them live in the rural parts of the Third World.

And the challenge, of providing safe water and adequate sanitation to the world's people, is growing. The world's population is increasing rapidly. By the year 2000, there will be one billion more people on earth needing clean water every day. Growth in Third World cities will be especially rapid. Between 1985 and the year 2000, Third World urban populations are expected to increase from one billion to one and three-quarter billion. Already, many countries are struggling, and failing, to meet basic human requirements - and it's going to get harder, not easier, as the numbers mount.

Providing adequate water and sanitation services to those expanding populations will severely test the limited resources of countries throughout the developing world. We must make the best possible use of all available resources. This is where NGOs, with their proven ability to find appropriate and socially acceptable solutions, have a great deal to offer.

By now, we have built up an important body of knowledge and experience that will help guide us through the difficult challenges of the future. Much of that wisdom will be embodied in the Charter that will emerge from your deliberations over the next three days. We all have our own ideas of what we should be doing to improve the effectiveness of our work in the water and sanitation sector. This conference is an excellent forum for the exchange of these ideas. So, I'd like to start things off with ten points I think we need to keep in mind in our discussions. Some of these points are already well known to NGOs; I hope all will be carefully considered in the future.

#### 1. Water is for people

First of all, water projects, like all development projects, are for people. That means that when we look at water problems and possible solutions, we must always keep in mind how they will affect people. That also means that we should evaluate the success or failure of a program by its impact on people. We shouldn't base our evaluations on purely theoretical grounds. We need to meet the people involved, listen, talk, teach, and listen again.



Getting people involved pays enormous dividends, in better management and use of water and in giving people that important sense that they can make a difference, that they can make an important contribution to the life of their community.

## 2. Emphasis on helping the poorest

In designing water projects for people, we should focus our efforts on helping the poorest people. They suffer the most from unsanitary living conditions, and the prevalence of water-related illness is a major obstacle to overcoming poverty. Nations cannot prosper if their populations are weakened by widespread illness. Water projects can make a direct and huge contribution to the alleviation of poverty throughout the world, so it's vital that we direct our efforts at helping the poorest peoples and countries.

## 3. Promoting cooperation

Cooperation, at the local, regional and international level, is a must. It has to be because water does not obey political boundaries; it follows the laws of gravity and least resistance. Indeed, 214 river basins in the world are shared by two or more countries, including 56 in Africa. Water resources management, though, is inevitably bound by political borders and systems. We need to change that, and make regional and international cooperation a key principle of water management.

As long as water flows across political boundaries, regional and international cooperation in the management of water resources is essential, for better resource management and to ensure that environmental measures are truly effective. In the long run, it's an approach that will benefit us all.

## 4. Knowledge bases

If we are going to develop and manage our water resources in a rational and systematic way, we must first know more about the resource. That's easier said than done. Developing the required knowledge base is a slow and expensive business, and it's a continuing process. Moreover, as we are developing this knowledge, we must also take into account the effects of other variables on water availability. For example, land-use practices - such as deforestation for urban growth, agriculture and firewood collection - directly affect water resources. All of these important factors need to be taken into account as we develop and maintain our data bases.

Building data bases on water resources is a costly process - but experience has shown us that the cost of not developing them is far higher. Reservoirs which do not fill or dams which overflow

due to unexpected floods are just two costly examples of what can happen if we don't have a thorough knowledge of water resources.

#### 5. Involving women

Getting women more involved is also crucial. In some ways, water is a woman's issue. It's a women's issue because women are so vitally involved in the domestic use of water. In most parts of the world, women draw and haul the water, manage its use in the home, and guard the family's health and hygiene.

So women can and must be involved in the planning, implementation, operation and maintenance of the systems. Involving women will lead to better and more effective projects.

And women - who after all make up half of the world - will benefit in very direct and profound ways from cleaner and safer water. They will have more time to devote to other activities - such as income-generation. Their health, and the health of their children, will improve. And they will gain the experience, knowledge and confidence which will allow them to contribute to other community projects.

#### 6. Planning

Thorough and careful planning is especially important in the water sector because water is used in so many different and interrelated ways.

In planning any water project, a multitude of factors need to be considered - for example, the effect of irrigation on the availability and suitability of water for other uses, or the need to manage the waste water which results when a new supply of clean water is provided to a community.

We must also avoid planning for single-purpose use of water resources. This often results in irreparable environmental and economic losses. For example, a system to provide drinking water for people should also be examined to see whether it can provide water for livestock, for gardens and for light industry. Again, the management of the resulting waste water has to be planned from the outset.

Clearly, thorough planning is an essential, but difficult, part of any water project. And, in some ways, this means that water experts must also be experts in a number of related areas. But as we develop a better understanding of the relationships between different water uses and health, the environment, and women's lives, I am confident that the quality of our projects will improve tremendously.

## 7. Affordable technology

An important part of ensuring that water projects are responsive to people is by being certain that they use affordable and appropriate technology. Too often in the past, inappropriate and expensive technologies were used in developing countries - often resulting in the failure of projects. Technologies that worked in an urban setting were transposed to a rural environment - sometimes with disastrous results.

We need feasible solutions, not idealistic and unrealistic master plans that cost a fortune and often end up not living up to their ambitious aims. And we need low-cost, effective and appropriate technologies which are affordable for local communities and can be operated and maintained by them. We will serve more people if low-cost technologies are used and standards are set to meet basic needs.

## 8. Environment

Environmental concerns are also central to all water projects. Taking into account the environmental repercussions of water projects - as well as other projects that affect water resources - is essential. In particular, we must ensure that our use of water is in keeping with the principles of sustainable development. Better management of water - with its multiple uses harmonized, and a balance established between agriculture, fuelwood, and hydro - can help whole regions of the world stabilize their environment and secure their food supply.

So we get back to the need for careful planning and thorough analysis of the wide range of factors that affect our water resources - and, in turn, the multiple effects of water projects on the environment. We must design water projects that meet present needs without compromising the ability of future generations to meet their own needs.

## 9. Strengthening sector institutions

Strengthening the institutions involved in the water sector is vital. If institutions are weak, projects will ultimately fail. Strengthening institutions means more human resource training. Institutions are made of the people who staff them. So we need more trained and skilled people at all levels, including operators, maintenance personnel, mechanics, engineers and managers. Indeed, most of the things I've been speaking about today rely, in one way or another, on trained personnel. Planning, building and analyzing data bases, evaluating environmental concerns - all of these important tasks require the skills and expertise of trained personnel.

NGOs can play catalytic roles in strengthening local institutions, especially if they share the experiences learned on smaller projects. Helping others to learn from and utilize this experience will be a continuing challenges for NGOs.

#### 10. Working together

Last, but by no means least, we need more cooperation among all the players in international development - governments North and South, the private sector, the multilateral institutions, and the NGO community.

I believe that NGOs are key partners in our crusade to provide safe water for all the world's population. Governments do not have a monopoly on water expertise. Nor are governments and their centralized agencies always the most effective channel for delivering water projects. Often, NGOs offer the best channel. The Canadian International Development Agency has learned this lesson. About forty non-governmental agencies have already carried out grassroots water projects with financial help from CIDA and our support to groups like those involved in this forum will continue.

The strength of NGOs lies in their commitment to change and their keen interest in working with people. And, because they are often small and not overburdened by bureaucracy, NGOs have the flexibility needed to respond quickly to pressing needs. NGOs have also proven themselves to be effective communicators. Through their work and especially through their educational initiatives, they have helped to build an awareness among Canadians of development realities overseas.

Over the past few decades, NGOs have built up an impressive record in the water sector. As with other sectors, NGO initiatives in this field have tended to be at the local level, most often in small rural communities.

A particular strength of NGOs has been their ability to organize people at the community level and to build awareness among them of the importance of water and sanitation projects. NGOs have a real knack for helping communities mobilize their own resources and put them to work for the greater good of the community. In short, they help people to help themselves. In the long run, that is very often the deciding factor in the success of a project.

Another strength of NGOs has been their imagination in tackling difficult challenges. Let me just cite one example of how a Canadian NGO has a found creative way to meet development challenges.

Last year, OXFAM-Québec organized an initiative known as "Eau Secours". Nearly 300,000 bottles of water were sold in shopping centres throughout Québec, with the money raised going towards the construction of wells in 100 villages in Mali and Burkina Faso. The project is now well underway and has become a tremendous success. Each of the wells will be able to satisfy the daily needs of about 600 people. I am proud to say that CIDA has been a strong supporter of this initiative, providing three dollars for every dollar raised by OXFAM-Québec. The project combines two of the things NGOs do best of all: building awareness and providing much-needed services at the village level.

But it's certainly not only Canadian or developed country NGOs that are doing creative and effective work in the Third World. More and more, that job is being taken on by NGOs from the developing countries themselves. This I think is a true reflection of the success of NGOs and a very exciting development for the NGO movement as a whole. In the future, I see NGOs from the developing world assuming an ever-larger leadership role, with their counterparts in industrialized countries continuing to work in partnership with them.

In this regard, let me tell you that the Canadian International Development Agency is prepared to consider requests from NGOs from developing countries for support to help them attend the Safe Water 2000 meeting to be held later this year in New Delhi. We think it is important that the results of our discussions in Montreal are shared with those attending this very important meeting in India that closes the water Decade.

In closing, let me simply wish all of you three days of very fruitful and open dialogue. Water and development is a vast and complex subject, one for which there are no easy answers. But I have a lot of faith in human ingenuity... and I am confident that, with the vast array of talent we have present here today, we will come up with imaginative ideas, and a charter that will serve as a guide for action in the coming decade and the next century.

I thank all of you for attending, and I now invite you to come with me to the Oxfam Pavilion where I will inaugurate an important photo exhibit organized jointly by la Cité des Sciences et de l'Industries (La Villette) and le Centre International de Reportages et d'Information Culturelle (CIRIC) de Paris.

STATEMENT  
ON DRINKING WATER SUPPLY AND SANITATION

Proposed by  
Non-Governmental Development Organizations  
at the International Forum of Montreal  
June 18-20, 1990

FOREWORD

Water is life, yet... A billion and a half people do not have access to an adequate drinking water supply. Each year, contaminated water causes the illness and death of 20 million people, mostly children. In many countries, droughts decimate livestock and wipe out agricultural production, causing disastrous famines, while in other countries, floods are equally as devastating. It was in this urgent context that the United Nations launched the Drinking Water Supply and Sanitation Decade (DWSSD 1981-90) in November 1980. Although its ambitious objective, which was to provide drinking water for everyone (20 litres per day/person), is far from having been achieved, the water decade has at least made access to water and sanitation a priority, and governments, international development agencies and non-governmental development organizations (NGOs) have been made more aware of the issues regarding water and sanitation.

It has become increasingly obvious that the problem of water must be treated in a global context, that water is a limited resource that we must learn how to use and preserve, in the North as well as in the South. However, adequate drinking water supply and the recycling of waste water are more crucial for countries of the South, where water is now ever more crucial to development. For the NGOs, there is no question that the different aspects (rural/urban, supply/sanitation,...) of the water problem requires close collaboration from all parties at every level, which requires a globally coherent policy.

Furthermore, experience shows us that solutions cannot be looked at from a purely technical point of view - the social and human aspects of the problem are equally, if not more, important. In this regard, NGOs are in a position to fulfill a special role in any development program. Today, on the occasion of the close of the DWSSD, the North and South NGOs meeting together at the International Forum in Montreal have decided to pool our experiences (successes and mistakes) in this area, in order to develop some general guidelines for use in the future.

These guidelines are inspired in large part by the work done by others, such as the African regional workshop held in January 1990 at Nakuru in Kenya, on the question of sustained water development.

Thus, the themes we are discussing are not new. But it has become clear from our discussions that we have made certain gains that should become the pivotal elements around which our future actions should be structured. We have also tried to draw up a number of resolutions to take to New Delhi for the closing conference of the DWSSD.

### DECLARATION

Given that access to water is a condition of survival, we affirm that every person has the right of access to enough drinking water to meet his or her essential needs. Consequently, priority must be given to the billion and a half people who do not have access to drinking water, particularly people who are victims of war or military occupations.

We also affirm that the right to drinking water also involves responsibilities at all levels, from the grassroots community to international institutions. Water must be managed effectively and efficiently, in a way that strengthens the autonomy of the populations concerned.

### POINTS OF CONSENSUS TO GUIDE FUTURE ACTIONS BY NGOs ON THE WATER PROBLEM:

1. All water projects must be designed with an emphasis on assisting populations in meeting their own needs.

. We must strengthen the power of grassroots communities and particularly empower women in the process of identifying their own priorities and solutions.

. We must support a dynamic that involves local structures, such as supporting a local NGO or creating a water-management committee that would itself be capable of managing the project over the medium and long terms.

23. Education and training of local populations. Training does not only mean technical training, but also includes more general training of populations.

. Training water managers.

. Creating an awareness of "for the public good."

. Systematically addressing the relationships between water and health.

. Rely on the competency of parties from the South for training and education.

#### 34. Political Aspects of Access to Water and Sanitation.

. The disparity in the distribution of water, in terms of quantity and quality, is a reflection of heterogeneous geographical conditions; but it is also strongly correlated with inequalities in the distribution of social and economic power. Dealing with issues of water means dealing with issues of power, and encountering resistance when established models are challenged.

. We must support the demands populations make on their own governments, by promoting the development of democratic processes.

. Water is an area in which both North and South NGOs have an important role in terms of increasing public awareness in their home populations with regard to the need to preserve quality access to water.

#### 4. Integrating Water into a Global Approach to Development.

. Access to water is the pivotal element around which an integrated development program must be developed, with actions in the area of health, preservation of the environment, education and creation of economic activities.

. The connection between distribution of drinking water and sanitation is fundamental. Any improvement in the sanitary conditions of a population must take the combination of these two factors into account.

. Concern about drinking water quality is accompanied by the desire to make it available to the greatest possible number of people. Projects must specifically address the question of preserving drinking water quality.

. Availability of water is connected with having sufficient energy sources available so that the natural resources can regenerate (wood for heating - deforestation - arid lands).



## RECOMMENDATIONS

Based on the above, we hereby make the following recommendations:

We address governments of the North and South, the multi-lateral organizations and cooperating agencies in asking them to take on their responsibilities. They must:

- Stress the importance of water supply, as well as the treatment and recycling of waste water, in developing national plans. This means modifying government structures and increasing training efforts.
- Adopt, through concerted action, an explicit and global water-management policy that includes areas such as health, the environment, agricultural production and economic development. Such a policy can not be adopted without the agreement of the people concerned.
- Recognize the right and the need of the populations and the communities to be involved in all aspects of development and water management, including the creation of accountable structures, defining needs, and planning and implementing water supply and sanitation projects.
- Instead of promoting technical achievements only - achievements with very visible impacts - the sponsors must, through their actions and their policies, recognize the achievements of the local populations and the NGOs working on-site.
- Avoid becoming involved in short-lived projects, such as those that consider their goal achieved once the equipment for drinking water and sanitation systems is installed.
- Promote the development and application of suitable technologies and ensure that the results of research are communicated to the potential users and that all equipment can be managed and maintained in working order through local means.

- Stress the importance of managing and rehabilitating existing projects before starting on new ones.
- Adopt reconciliatory means of resolving conflicts in the distribution of water resources.

We address ourselves particularly to the NGOs of the North and South in making this appeal:

- Because of your privileged contact with the local communities, you have the duty to support these communities in the development and efficient management of their water resources, by integrating adequate practices with regard to hygiene and sanitation.
- You must be conscious of the specificity of your own experience, since it is from that experience that original alternative emerge about "what to do and how to do it."
- Dialogue between the NGOs, particularly in the South, must be strengthened, to emphasize the specificity of their experience.
- All NGOs, both in the North and in the South, must agree to sensitize public opinion in the North about the need to give greater priority to the issue of more equitable distribution and use of water resources. For example, you must claim the resources which might become available through a reduction in military spending. You must also develop closer ties with other organizations (associations for the protection of the environment, associations defending human rights ...).
- Finally, you yourselves must adopt a more rigorous approach (creation of tools, identifying indicators, etc.) allowing you to systematically assess the impact of your work.

This means that we must re-think the partnership between NGOs in the North and the South. In fact, NGOs from the South must become the real initiators of development in their regions, while at the same time maintaining close links with NGOs in the North.

We cannot end this declaration without addressing the populations concerned, they who are the true players in the process of change, by reminding them that access to water and development is not only a right, but is also a duty toward themselves and future generations.



## SCHEDULE AND PROGRAM OF THE FORUM

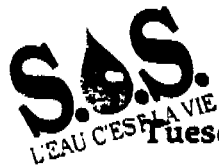
Place: Palais de la Civilisation  
Ile Notre-Dame  
Montreal, Quebec  
H3C 1A9

### Sunday, June 17

- 6:30 p.m. - Registration of participants staying at the hotel
- Departure from hotel by bus
- 7:00 p.m. - Arrival of participants
- Welcome cocktail, courtesy of the City of Montreal (Japanese Pavilion, Botanical Gardens)
- 8:30 p.m. - Return to the hotel by bus

### Monday, June 18

- 8:00 a.m. - Departure from the hotel by bus
- 8:30 a.m. - Registration of participants
- 9:30 a.m. - Opening of Forum at the Palais de la Civilisation
- Opening remarks by Jean O'Keefe, President of OXFAM-Québec
- Speech by Montreal Mayor Jean Doré
- Message from the French Ministre de la Coopération, given by his Senior Advisor, ~~Benoît Chadenet~~ *René Mignot*
- Presentation of tasks by ~~Time Brodhead~~, Chairman, and Alexander H. Rotival, Co-chairman
- 10:45 a.m. - Opening seminar:  
Fresh Water: A Limited Resource for Humanity, by Malin Falkenmark (Sweden)
- 11:45 a.m. - Word of welcome and speech by the Honourable Monique Landry, Minister for External Relations and International Development
- 12:15 p.m. - Inauguration of the international exhibition "S.O.S. Water is Life", by the Honourable Monique Landry, at the OXFAM Pavilion "Water and Development"
- 2:00 p.m. - Seminar:  
The Water Supply Decade: Assessment and Outlook, by Roméo Maione (Canada)
- 2:30 p.m. - Workshops 3-5
- 4:00 p.m. - Coffee break 5-5:30
- 4:30-6 p.m. - Plenary session 5:30-6:30
- 6:30 p.m. - Return to the hotel by bus/Free evening



Tuesday, June 19

- 8:00 a.m. - Departure from the hotel by bus
- 8:30 a.m. - Seminar:  
Social Impact of Water Supply Projects, by Mary Elmendorf (USA)
- 9:00 a.m. - Workshops
- 10:30 a.m. - Coffee break
- 11:00 a.m. - Plenary session
- 12:30 p.m. - Lunch
- 2:00 p.m. - Seminar:  
The Appropriate Technology and Techniques: Solidarity and Partnership Crucial, by Elias Rosales Escalante (Costa Rica)
- 2:30 p.m. - Workshops
- 4:00 p.m. - Coffee break
- 4:30-6 p.m. - Plenary session
- 6:15 p.m. - Departure from Palais de la Civilisation for cocktails by bus
- 6:30 p.m. - Reception courtesy of the Quebec Government; guest of honour, Denis Ricard, Assistant Deputy Minister, Ministère des Affaires Internationales (Ministry for International Affairs) (Hélène de Champlain Restaurant)
- 8:00 p.m. - Return to the hotel by bus  
Free evening

Wednesday, June 20

- 8:00 a.m. - Departure from the hotel by bus
  - 8:30 a.m. - Seminar:  
1990-2000: The decade for Action. We No Longer Have a Choice!  
Part I: Siri Melchior (PROWESS/UNDP, USA)  
Part II: Mazide Ndiaye (RADI, Senegal)
  - 9:30 a.m. - Workshops
  - 11:00 a.m. - Plenary session
    - Study of recommendations
    - Adoption of Charter and strategy for forwarding it to New Delhi
  - 12:30 p.m. - Lunch
  - 2:30 p.m. - Departure from the Palais de la Civilisation by bus
  - 3:00 p.m. - Closing ceremonies at Montreal City hall, with Mayor Jean Doré, the Honourable Andr. J. Hamel, and Martin Beyer, Executive Secretary of the New Delhi Conference
  - 4:00 p.m. - Return to the hotel by bus
- taxi  
6  
airport*

(Le Nouvel Hôtel: 1740 René Levesque Blvd. West, Montreal, tel.: 931-8841)

*120-220 strategy New Delhi*

# Backgrounder "Water is Life"

OXFAM-Québec  
June 1990

**WATER IS LIFE**  
(Information Document)

It is not that water is needed for life; it is life

(Saint-Exupéry)

Introduction

Without question, water is an irreplaceable natural resource. For those of us who use it at will, this fountain of wealth may not seem as delicate as it does for the African, for example, who faces endless droughts. But, in the North as in the South, access to water, which is indeed abundant, is not the only problem. This natural resource must also be managed, a task which is increasingly difficult to accomplish.

A few facts and figures

Fresh water represents only 3% to 3.5% of the planet's total water supply (approx. 1,380 million cubic km). Salt water represents 97% of all the water on the earth's surface. The icebergs in the North and South Poles make up 2% of the total amount of water in the world, but when these icebergs melt, they represent a source of fresh water that is often too far for human consumption. Lastly, the fresh water we use makes up only about 1% of all the water on earth: 0.1% is surface fresh water and 0.9% is underground water (The History of Drinking Water, American Water Works Association, 1984).

To give you a better idea, imagine that all the water in the world is contained in a 450-litre drum. Take a single teaspoon of that water and imagine that it is the amount of fresh water that is useable by man. Now, if you remove two drops of the water in this teaspoon, you will be removing an amount equivalent to the amount that is contained in all the rivers, streams and lakes! The rest of the water in the teaspoon represents accessible underground sources, the ones we have been trying to get to by digging wells (Under the Same Sun, CIDA, 1988).

## Water for Everyone

It should be noted that the accessible world reserves of fresh water are sufficient to sustain the entire population of the world, which is estimated at approximately 5.3 billion people. This figure could reach 8.4 billion by the year 2025, while the amount of water here on earth remains stable!

It may also be encouraging to note that each individual has at his/her disposal 9,000 cubic kilometres of fresh water per year. In principle, this amount of water is sufficient to sustain 20 billion people (For Science, Water In Peril, November 1989).

Of course, drinking water supply conditions may vary considerably from one country to the other and from one developing country to another. Recent studies show that one third of the world population, that is, more than two billion people, do not have access to drinking water.

Canada has one of the largest fresh water reserves on earth. For each 10 litres of fresh water a Canadian has, an American has one litre, an Indian, 0.20 litres and an Egyptian, 0.01 litre (Under the Same Sun, CIDA, Fall 1988).

By itself, Canada has 9% of the overall water reserves on the planet, that is, approximately 3,000 cubic km. By comparison, some countries with the same size population, such as Peru or Kenya, have water reserves that are 70 and 90 times smaller, respectively.

Recent data indicates that 50% of the population of Bangladesh, 66% of the population of Haiti, 72% of the population of Kenya, do not even know what drinking water - water meant to be consumed - is.

According to a report on "human development", published in May 1990 by the UN, only 37% of Africans have drinking water as part of their diet.



### Consumption

Each person needs 20 to 30 litres per day for all their domestic needs (drinking, eating, washing, etc.). One American or one European consumes up to 70 times more water than, for example, a Ghanaian in Africa.

It is estimated that 73% of fresh water is used on crops, 21% in industry and only 6% for domestic needs.

## Health

Water, a colourless, odourless and tasteless liquid ...Yet, according to the World Health Organization (WHO), approximately 80% of all diseases in the Third World are caused by a lack of drinking water. Cholera, malaria, diarrhoea, sleeping sickness, bilharzia, among others, are all diseases related to water. It is diarrhoea that affects the most people. It is estimated that diarrhoea-type diseases alone are responsible for some 5 million deaths among children each year in the developing countries (ICRD, 1988).

Without question, water - its non-sanitary quality, its scarcity - and health go hand in hand. Studies carried out by the World Health Organization have shown that, with cleaner water and adequate sanitation facilities, the general state of health of populations would improve markedly.

### Water Assailants

With phosphates, pesticides, nitrates, hydrocarbons, acid rain, industrial waste and all other forms of pollution, we are, quite simply, courting disaster.

According to a recent study by the International Centre for Research and Development (ICRD), each year, industry pollutes 4,000 cubic kilometres of water, which is equal to approximately 9% of the annual available volume of water on earth. The volume of water on earth has been estimated at 1,380 million cubic kilometres.

According to a Soviet researcher, "In the year 2015, there will be no natural drinking water on earth because of pollution and destruction of the water table." This is due, in part, to the waste of industrialized countries.

Let us hope that these pessimistic predictions will turn out to be false. Then again, for several decades now, the sea has been used as a dump for all sorts of garbage, some of them very toxic and very dangerous. The harmful effects of these substances caused on our collective environment are enormous and, unfortunately, as yet not very well known.

## Interdependence

"From the sea come the clouds. From the clouds comes the rain. From the rain, rivers are born. And, from the rivers, the sea is born. Thus is the cycle of water. Thus is the cycle of the world." - Old Indian Proverb

We, the privileged of the rich countries, who wrongfully believe that water is a limitless resource, must be aware that the problem of drinking water is no longer confined to developing countries. We must above all remember that, in the environment, everything is interconnected and, that the eco system of one region cannot be affected with impunity without causing serious imbalance in the ecology of the entire planet - and affect everyone. We must change our attitude, our behaviour, and live much more reasonably, eventually, much more in harmony with the rest of the world.

There is a great deal of water on earth. In fact, water covers more than 80% of the surface of the earth. But, by all predictions, all of humanity will be increasingly faced with the problem of drinking water supply.

Water, its quality, its scarcity, conserving it, sharing it, consuming it, seeing how it is wasted, are now major concerns for all countries, both rich and poor.

## The Future

According to water specialists, the challenge with which we are now faced is the balance between the drinking water needs of the populations, the use and conservation of resources, such that we do not jeopardize our future needs and, consequently, the future of the entire planet.

Without water, there can be no farming, no trees, no animals, no development ... no life ...

According to M. Falkenmark, author of numerous works on the subject, "The question is not how much water do we need and where will we get it; rather, it is how much water do we now have and how can we best use it?"

For developing countries as a whole, "The fight against disease and for better living conditions depends on harnessing drinking water supply and improving sanitation" (Hunger and Development, 1983).

According to the International Centre for Research and Development (ICRD), "For villagers, governments and development organizations, the problem consists of getting water to where it is needed, at an affordable cost and with no deterioration in its quality. In fact, the amount of water that is theoretically available for human consumption here on earth is much greater than the quantity that is practically useable."

## Possible Solutions

"FEED THE DESERT TO CONQUER HUNGER"

### African Proverb

Several specialists, which is reassuring, are looking into possible solutions and sanitation strategies in order to ensure adequate supplies and the appropriate use of drinking water. According to the ICRD (Fresh water, The Human Imperative), several components are needed:

- appropriate technology and materials to find, tap, stock, purify, analyze and transport water and to prevent its contamination;
- trained personnel to apply this technology and to install and maintain the equipment;
- coordination of the water supplies of the country, including regular analysis and tests of the water;
- cooperation, participation and education of the public regarding water and its sanitation.

## A Global Strategy

Because water is an absolutely essential resource for life, the United Nations made 1980-1990 the Drinking Water Supply and Sanitation Decade. In November 1980, an appeal was made to the international community to mobilize everyone's energy in an effort to supply, by 1990, drinking water and adequate sanitation facilities to two billion people, mainly in developing countries. And so, what has resulted from these worthy ideals and goals? The people in charge will have to debate this issue as part of the closing session of the Drinking Water Decade to be held in New Delhi next September. In the meantime, all water specialists are looking for strategies and trying to define the programs, means and techniques that are most appropriate and most effective for humankind.



OXFAM-Québec and their partners would like to thank the following collaborators without whom the MONTREAL INTERNATIONAL FORUM: NOGs WORKING TOGETHER would not have been possible:

- South Asia Partnership (S.A.P.)
- Philippine Development Assistance Programme (P.D.A.P.)
- Sri Lanka Canada Development Fund (S.L.C.D.F.)
- Solidarité Canada Sahel
- Groupe Action Nord-Sud
- La Société du Palais de la Civilisation
- La Société de l'Ile Notre-Dame
- L'Association Montréalaise d'Action Récréative et Culturelle (A.M.A.R.C.)
- Les Films 24
- La Banque Royale
- Cornellier Denise Traiteur inc.

and its personnel

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the Speakers**

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Mr. Roméo Maione  
Dr. Mary Lindsay Elmendorf  
Mr. Elias Rosales Escalante  
Mrs. Siri Melchior Melchior  
Mr. Abdou El Mazide N'Diaye



## DR. MALIN FALKENMARK

Dr. Malin Falkenmark is from Sweden. She obtained her M.A. in philosophy in 1963 from Uppsala University, specializing in hydrology. In 1975, she obtained a PhD. in philosophy from Leikoping University.

Her professional career spans almost forty years. In 1953, she was already working as a hydrologist in the Hydrology Division of the Ice Department of the Swedish Institute of Meteorology and Hydrology in Stockholm. In 1961, she became the first Swedish hydrologist to occupy the position of Director of the Hydrophysics Department of the same institute.

In 1965, she was Secretary of the Swedish National Committee of the International Hydrology Decade and became a member of the Executive Committee in 1974.

In addition to being a much sought-after hydrology expert to sit on several international committees, she is a member of several environmental protection organizations.

In 1988, Dr. Falkenmark received the party environmental award from the Swedish government for her contributions to the popularization of scientific information.

## ROMEO MAIONE

Roméo Maione was born in Montreal, Quebec. He holds a Ph.D. in Social Sciences from Ottawa University and speaks four languages: French, English, Italian and Spanish.

From 1940 to 1952, he was Chief Shop Steward for Local 1660 of the International Association of Machinists. In 1953, he was appointed President of the Young Christian Workers and, in 1957, became Chief Organizer of the Young Christian Workers International Rally in Rome, attended by 30,000 members.

In 1962, he was Assistant Director of the Social Action Department of the Canadian Catholic Conference and, from 1963 to 1966, Assistant Director of the International Affairs Department of the Canadian Labour Congress.

He became President of the World Assembly of Youth in 1964 and, a year later, was appointed a member of the Royal Commission to study working conditions at Canada Post. From 1967 to 1972, he was Executive Director of the Canadian Catholic Organization for Development and Peace.

From 1972 to 1974, he was Director of the International Affairs Department of the Canadian Labour Congress. In 1975, he was appointed Director General of the Non-Governmental Organizations Division of the Canadian Development Agency, a position he held until 1984.

After taking a year's sabbatical in Australia in 1985, he returned to Canada to work as an international development consultant.

## MARY LINDSAY ELMENDORF

Mary Lindsay Elmendorf has a broad background in psychology, sociology and, above all, anthropology. She obtained her Ph.D. in Anthropology from Union Graduate School in the United States.

Since her early days as a social worker in 1937 in the U.S., Mary Elmendorf has always been an active participant in international development.

In 1945, she was named Section Chief for Refugees at Secours Quaker in Paris, and in 1952, she headed the CARE office in Mexico. For twenty-two years (1960 - 1982), she served as consultant to AID, the Peace Corps and the Overseas Education Fund for the League of Women Voters.

Since 1982, Mrs. Elmendorf has been on the lecture circuit as a professor or guest speaker at numerous universities and several humanitarian and international organizations.

She has received many awards, including the Margaret Mead Award and a Certificate of Achievement from the World Who's Who of Women. She has written an impressive number of articles, technical works and specialized books.

At the age of 80, she still acts as World Bank consultant for the Water Supply and Urban Development program, a consultant for the United Nations Development Program (UNDP), USAID, and several others.

## ELIAS ROSALES ESCALANTE

Elias Rosales Escalante was born in Cartago, Costa Rica. He holds a civil engineering diploma from the ITESM in Mexico and a health engineering diploma from the International Hydraulic and Environmental Institute in Holland.

From 1979 to 1984, Mr. Rosales accepted field research, teaching and engineering assignments for the Institute of Technology in Costa Rica.

From 1984 to 1988, he was actively involved in a research project called the Lime Kiln, for the same institute.

Since 1988, he has been working in research and development for manual-pump hydraulic technology projects, The Unimade in Costa Rica, and also serves as a resource person in the development of water management strategies.

Furthermore, he participates in the projects and research activities of two NGOs: CEDADE and FUNDATEC. His experience and expertise are related to rural water supply and sanitation problems, as well as community involvement and participation.

## SIRI MELCHIOR-TELLIER

Siri Melchior-Tellier is of Danish origin and holds a B.A. from Radcliffe College, U.S.A., specializing in the biological study of populations. After obtaining her M.Sc. in population sciences from the Harvard School of Public Health in 1970, she worked for two years as a demographer for Infraconsult AG, a private consulting firm in Switzerland.

In 1972, she joined the UNFPA (United Nations Fund for Population Activities), where she held various positions for ten years. For example, she was in charge of several development and implementation programs in Africa and Europe, and evaluated numerous projects in Haiti and Ghana. She coordinated and supervised the UNFPA assistance program in Kabul, Afghanistan, and opened and headed the UNFPA office in Beijing, People's Republic of China.

In 1982, still with the UNFPA, she was appointed Deputy Chief, Africa Branch, New York, of the assistance program for 42 African countries. In that capacity, she oversaw a budget of over \$20 million.

Since February 1987, she is the head of the PROWESS program (Promotion of the Role of Women in Water and Environmental Sanitation Services) of the UNDP (United Nations Development Program).

## ABDOU EL MAZIDE N'DIAYE

Abdou El Mazide N'Diaye was born in Dakar. He graduated from the Institut d'Etude du Développement Economique et Social (IEDES) in Paris as a Technicien Supérieur du Développement (Certified Development Technician), specializing in quantitative analysis.

In 1969, he defended his thesis, entitled "The Problem of Village Economy and Community Development" in Asian and Black African methods of production.

From 1970 to 1974, Mazide N'Diaye was Director of the Computer and Data Processing Service of ONCAD (Office National de Coopération Agricole et de Développement). In 1974, he was appointed Administrative and Financial Director of BUD Sénégal, a company specializing in industrial agriculture. In 1977, he became Director of Administrative and Financial Services at Mudra Afrique (African Research and Improvement Centre for the Performing Arts). From 1980 to 1985, he occupied the position of Assistant Executive Director of the Office Africain pour le Développement et la Coopération (African Development and Cooperation Board).

In addition to teaching at the ENAP and ENEAS in Paris, Mr. N'Diaye has also sat on several NGO boards and committees.

Since 1985, he is Executive Director of RADI (Réseau Africain pour le Développement Intégré).

Coping with water scarcity  
Implications of biomass strategy for  
communities and policies

Malin Falkenmark  
Jan Lunqvist  
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## COPING WITH WATER SCARCITY

### IMPLICATIONS OF BIOMASS STRATEGY FOR COMMUNITIES AND POLICIES

by Malin Falkenmark, Jan Lundqvist & Carl Widstrand

#### ABSTRACT

The paper summarizes the present understanding of the particular vulnerability due to water scarcity in semi-arid Third World countries, based on an international seminar convened by the Swedish Red Cross and held in Vadstena, Sweden in February 1989. The water scarcity predicament is explained in terms of four parallel modes of water scarcity, superimposed on each other, two of natural origin and two man-induced. The widespread reduction in per capita and even absolute yields is explained by a number of intertwined factors: reduction of rainfall efficiency due to various processes of land fertility deterioration; massive debt burdens; and government detachment from poverty-prone areas. Starting from the optimistic outlooks of the Kericho workshop on African futures, the ways of reaching livelihood security are addressed, focussing on environmental opportunity analysis, and a strategy for the maximizing of biomass production. Particular emphasis is given to the water balance perspective, and how to reduce unproductive water losses to the atmosphere. An inventory on practical solutions is done with the aim to identify a strategy for concurrent production and conservation to secure long-term productivity. The strategy includes basic problem-mitigation techniques for water and soil conservation; different allocation principles for assured and variable water components; agro-silvicultural strategies benefitting from multi-use tree crop systems; methods for concurrent production and conservation to secure long-term productivity; and a landscape zonation in the implementation.

The paternalistic and veterinarian attitude of the 'conventional wisdom' approach of the past to the rural poor has to give way to radically new efforts to build upon the indigenous knowledge of local communities, representing a time-and-field-tested adaptation to local environmental opportunities. Given the numerous but locally isolated success stories all around the semi-arid tropics, an efficient strategy is needed for their replication in other environments. Basic components have to be inter-village and inter-community contacts, working more through NGO's and small local organizations. In addressing the national policy needed to implement these new strategies, the short-term and long-term perspectives have to be distinguished, the

former focussing on the development of livelihood security and rehabilitation of degraded environments, whereas the latter is related to the water stress generated by rapid population growth but finite water availability. A long-term planning within the environmental opportunities defined by the water scarcity predicament is crucial, and calls for a new awareness among high-level experts and policy makers. A carefully water-balance based land and water use planning is a key component, but depends on expanding the traditional water resources assessment methods developed in the temperate zone so as to incorporate also rootzone water storage, differences in groundwater recharge, and landscape zonation in water-producing vs water-consuming or evaporating areas.

#### 1. INTRODUCTION

A growing uneasiness is noticeable within the international community about the development problems of Africa (Meerman & Cochrane 1984). Its population continues its rapid growth and is predicted to quadruple before levelling off in the next century. Land fertility continues to degrade, yields of the dominating crops remain low, and no high-yield packages are yet in view to accelerate yields for the main dryland crops sorghum and millet. Governments are overburdened with tremendous financial debts and tend to turn their back to poverty-prone rural areas. There is in other words a general inability to deal with the situation.

Improvements are probably strongly affected by the fact that different professions tend to have very different perceptions about the core of the problem. One dimension which has seldom been discussed in the past is the role of climate (Kamarck 1976). Top-level experts and policy-makers are dominated by people trained in the temperate zone, not used to think of water as a constraint to societal activities. Not even the World Commission on Environment and Development touched upon problems emerging when a population grows while a scarce water resource stays finite (WCED 1987).

Ecologists tend to blame the problems on "droughts and desertification", rather than blaming man's way of managing the drylands where intermittent droughts is a basic characteristic feature. Hydrologists are interested in clarifying the role of water scarcity in creating a basic vulnerability. A starting point is the distinction between four different modes of scarcity (Falkenmark 1989), explaining the predicament of semi-arid Africa with the following explanatory model:



<u>vulnerability</u>	<u>complication</u>	<u>triggering</u>	<u>result</u>
aridity, producing a limited growing season	degraded soils disturbing the recharge of the root zone	intermittent droughts	disturbed water supply of plants
water scarcity	water scarcity C	water scarcity B	

In addition to these three modes of water scarcity, there is a fourth type, which is manifested as water stress or chronic water scarcity, and developing in areas where the population is high in relation to the number of flow units of water (water scarcity D). An interesting observation is that a correlation seems to exist in Ethiopia between famine-prone regional units (awrajas), earlier identified by Mesfin (1984), and areas with water scarcity of type D or type C. This confirms that difficulty of access to water by plants or by humans both are fundamental determinants of famine-proneness. This indicates that problems with access to water by plants and by humans both involve fundamental difficulties determining famine proneness.

The general inability to deal with the situation and the widespread ignorance of the role played by water scarcity in generating a basic vulnerability to a region suggest an ever increasing risk for continued famine catastrophes. This alerted the Swedish Red Cross to convene an international seminar in February 1989 in Vadstena, Sweden, hosted by the Dept for Water and Environmental Studies at Linköping University. The aim of the seminar was to clarify the particular vulnerability related to water scarcity in semi-arid developing countries. Special attention was paid to Africa and South Asia. This paper tries to summarize the present understanding, integrating the social development potential on the village level with the opportunity provided by the physical environment, and incorporating also the main inputs to and the basic outcome of the Vadstena Seminar.

## 2. ROOT CAUSES OF FOOD INSECURITY IN DROUGHT-PRONE RURAL AREAS

### 2.1 Famine and reduction in yields

From time to time, dreadful famines haunt people in Third World Countries. A few decades ago famines were mainly a concern for people in Asian countries, but now it is primarily the African continent, which is affected (Kates et al. 1988). Apart from extreme food shortages associated with famine for a certain period, it is essential to

pay attention to the steady decrease in per capita food production in Africa. Whereas per capita food production in Asia and Latin America has shown a steady upward trend since the beginning of the 1960's, the trend in Africa south of the Sahara has been declining (Harrison, 1987). Contrary to a widespread belief, it is not only food production for subsistence which has shown a falling trend in Africa. Per-capita production of most cash crops has also shown a steep reduction (ibid). Even in the case of costly irrigation schemes the performance has been poor (Moris 1987).

Information about famines is, however, invariably built on scanty facts. Through the exposure in media, the root causes and the processes leading to this extreme form of hunger, tend to be given little attention.

### 2.2 Environmental degradation and reduced rainfall efficiency

The desertification phenomenon, repeatedly referred to in discussions of the decreasing fertility of the semi-arid tropics, has tended to be widely misinterpreted due to an undefined use of the concept: it has covered everything from spreading of sand dunes along the desert border, eroded slopelands, crusta-covered lands, poorly managed irrigated lands, and salinization of drylands due to altered land cover (woodland to pasture). "Paradoxically, the term desertification itself has, in a way, become desertified" (Nelson 1988 World Bank). Preferably, desertification should be limited to dryland degradation (ibid). There has been a confusion between cause and symptom. Reduced land productivity is a symptom, manifested through processes at work during drought years. The cause is overexploitation of the ecosystem, generated by human behaviour including increased population pressure on vulnerable drylands. The inevitable result is ecological collapse, famine and outmigration.

For farmers who are facing water scarcity problems, the decreases in yield and general problems to obtain safe yields, are often interpreted as an effect of decreasing precipitation. Olsen (1987) in a study of Rayalaseema in India, however, showed that the climate change so often referred to when explaining the aggravating water shortage is a myth. The real reason for water scarcity in that area was the rapidly increasing groundwater usage drying out local wells.

Gornitz (1987) in a recent study from West Africa shows that precipitation over West Africa does not show any apparent secular decrease, linked to vegetation clearing as earlier suggested. The albedo change was assessed to be only 0.5% over the past 100 years. He concluded that the devegetation may have led to reductions in soil moisture,

placing plants under stress, and producing similar effects as a climatic desiccation. In other words, he identified the problem as the man-made water scarcity, already referred to. Also Jackson (1988) refers to the explanation that the rains have become less efficient, as a result of intensified land use with a reduction in soil organic matter & the fraction of the precipitation which is retained as soil moisture is being reduced. In combination with a heavy usage of available water, scarcity becomes acute,

Indeed, the semi-arid tropics where fertility degradation has developed into a fundamental difficulty, contains a great versatility of hydroclimatic conditions and has to be analyzed with this in mind.

Reduced crop yields as a result of less efficient rainfall is supported also by a study on the development of surface crusts in the semi-arid zone in West Africa - evidently a main determinant in reducing the soil moisture. Valentin & Casanave (1988) described both a multitude of structural and on range lands. The severely crusted and eroded surface had increased 20 times during a 25 year-period (1960-84) when the cultivated land had doubled, and the fallow halved. They referred this transformation of the landscape to population increase in combination with a sequence of drought years, which had forced the farmers to expand their fields to compensate the declining crop yields.

Also decreasing nutrient status of the soil might contribute to the decreasing dryland productivity. Breman & Uthol, in a study of the primary production in the Sahelian zone in Mali (1984), arrived at the conclusion that soil poverty is at least as big a problem as water shortage. They found that Sahara is not advancing to the South - the cause of decreased productivity is overexploitation, related to increased land use intensity and increasing grazing pressure. Unfortunately, the solution is not as simple as just introducing nitrogen-fixing species due to climate problems. Consequently, the reduced fertility can in that case be remedied only by external inputs according to this study.

### **2.3 Debt burden**

A deteriorating performance in terms of agricultural output per capita and outbreaks of famine are evidently end results of a number of inter-related factors. Apart from disruptions in the ecological system referred to above the official policy is a major factor for the shape of the agricultural sector. National policies are in turn reflected by international relations. The tremendous financial debt of Third World countries and structural adjustments, designed by IFM, are hitting the poor countries

very significantly. The situation is particularly problematic in Africa - Africa's debt-servicing ratios are by far the highest in the world. Debt-servicing flows are now reported to run at \$16bn per year, its average debt service ratio has more than doubled from 15 per cent in 1980 to 33 per cent in 1987. In some countries the debt service ratio even exceeds 100 per cent" (Hyden 1988, 3-4).

In its latest yearly report, UNICEF is bluntly blaming policies advocated by IBRD and IFM and pressed upon Third World countries, as a direct cause for human suffering and particularly among children. "The situation has reached a point where both African governments and international donors must rise above their day-to-day concerns and think not only in terms of single policy interventions but also of restructuring the whole policy and governance arena" (Hyden 1988, 25)

### **2.4 Government detachment from drought-prone regions**

Often, prevailing policies have meant a detachment from development problems of the traditional agricultural sector. At the Seminar, Michael Stöhl pointed out that it should not be taken for granted that national governments would give priority to semi-arid areas in their investment allocations. In a situation characterized by adverse macro-economic trends, it is likely that priority allocation of capital resources, infrastructure and staff would go to areas considered to have a potential for quick economic returns, i.e. well watered highlands, river valleys etc. Hence the semi-arid areas would be left for international charity.

Michael Stöhl mentioned Ethiopia as an example. Although impressive tree planting and terracing campaigns are underway in the drought-prone degraded highlands, this is almost totally financed by food-for-work and other types of international aid. Government resources for agricultural development are channelled to a number of districts which have been identified as "surplus producing". These are found on highland plains with deep soils and adequate rainfall. The strategy is to maximize production of cereal crops utilizing conventional seed-fertilizer packages. Extension staff and other inputs by the Ministry of Agriculture are concentrated here. As a consequence of this policy, extension staff of the drought-prone Wollo region has been reduced by more than 50% over the last two years and has been relocated to high potential areas.

The inability to deal with the situation is particularly worrisome in the face of rapid population growth. Prospects for Africa are alarming. Its current population of 600 million (in 1987) is projected to reach 880 million by the end of the century, and 1.6

billion by 2025 AD (Wahren 1989). Apart from a mounting pressure on the resource base, the high fertility rates create a situation where the ratio of young people to grown-ups implies a heavy burden upon adult males and females. The burden upon females is particularly noticeable, and it is observed that there is a great unmet need of the part of females for child spacing methods (ibid).

### 3. Challenges of the environmental opportunities

#### 3.1 The Kericho document

The current trends in African development give a gloomy and difficult picture. But trends are not destiny. As pointed out in the so called 'Kericho' document (African Academy of Sciences 1987) the time of troubles may extend up to year 2000 when a renewal would commence. In 2057 AD per capita income, life expectancy and other socio-economic characteristics would have improved considerably "... it would be as densely populated, as wealthy, healthy and educated as Greece was in the early 1980s" (p. 5). What is said to be needed in the short run for this massive transformation is a change in perception to bring about and welcome 'surprises'. But 'surprises' should apparently not be generated through imported goods and models. They must rather build upon and be amalgamated with the the indigenous cultural and social fabric in combination with the opportunities provided by the environment. The document provides an inspiring reading in its optimistic outlook. It is, however, remarkable for omitting to incorporate a natural resource perspective.

#### 3.2 Increased attention to environmental opportunities

The optimism expressed in the Kericho document about a "big lift" and a brighter situation after 2000 AD is built upon a trust in socio-cultural dynamics, rapid advances in biotechnology and benefits derived from climatic changes. For the realization of such a vision it is, however, fundamental to pay attention to what Mageed at the seminar described as the "environmental fabric", its relation to water scarcity, and the processes by which it is being naturally regulated. Soil characteristics, vegetation sequences, animal species, and human socio-economic patterns are all related to variations and degree of water scarcity. He also stressed that the prolonged drought hitting Sub-Saharan Africa in the 1970's in fact created panic among populations as well as governments, and that the stage has been set for the collapse of the ecosystem by the continued soil degradation from overgrazing, tree felling, and inadequate land use practices. The dilemma of the poverty-prone region is magnified by the combination of acute economic and financial problems with complex factors of water scarcity, increasing food gap, and general poverty.

He stressed the importance that relief and emergency efforts, generated by this panic and the collapse of the ecosystem, be an integrated part of a long-term rehabilitation and restoration program for the environmental system. Otherwise there is an evident risk that supply of drought resistant seeds for example will encourage spread of crop production into more marginal lands, and that emergency water supply projects or food aid will generate dependence attitudes among local societies.

Mageed (ibid) proposed as a remedy out of this general situation to recognize the dimensions of the crisis and the collapse situation in which water scarcity is a central issue. Land and water use maps, based on the opportunities afforded by the environmental system, are needed and they should be reinforced by legal land and water use instruments, providing effective non-structural means to mitigate the water-scarcity related vulnerability in the region.

#### 3.3 Maximized biomass production

The most evident way to improve life quality in drought-prone areas which are far away from any passing rivers bringing exogenous water for irrigation, is to benefit to the largest possible degree from local rainfall (UD 1988). The strategy should be a "best possible use of local rain", involving biomass production for multiple purposes: crop production to provide self-reliance in food, and trees and forestry to provide fodder, fuelwood and timber for sale.

At the seminar Dalye argued that a considerable rethinking is actually taking place in India in this direction. In the past, sustainability of livelihood in hydrologically vulnerable drought-prone regions has been discussed mainly as dependent on exogenous water entering from distant catchment areas, better endowed with rainfall, and often favouring cash income generated through market-oriented crop production. The new focus on a production based on local rainfall has raised the question of the sustainable supporting capacity of a system, where tree crops are integrated with seasonal crops for food and cash.

In areas where water is the scarcer resource, maximum biomass production per unit of water is a more evident goal than maximum production per unit of land, capital or other factor of production. A fundamental challenge in such areas is the simple fact that biomass production is equivalent to the returning of a large amount of water back to the atmosphere. Studies from natural ecosystems indicate these overall "losses" to amount to 1000 m<sup>3</sup>/ton biomass (Falkenmark 1986).

### 3.4 A balanced perspective on water balance components

In hydrologically marginal regions, where a major part of the rain input to the area is being returned to the atmosphere in the complex evapotranspiration process, only very limited amounts remain for the recharge of terrestrial water systems in rivers and aquifers. This is equivalent to a competition for water between the return flow to the atmosphere, on the one hand, and other human water demands on the other.

Fig 1a illustrates the water scarcity situation based on a simple water flow analysis for a land unit in a rainfed upstream landscape where the only source of water is the local rainfall. The tremendous difference between the huge amount of water returning to the atmosphere and the minor amount remaining to recharge local water systems, typical for the semi-arid tropics, is clearly illustrated.

The return flow to the atmosphere has two components (Falkenmark 1986): the productive part tied to the plant production process, and the unproductive part tied to evaporation from moist surfaces in the landscape. In order to minimize the latter, vegetation has to be as dense as possible under the circumstances. In addition, however, the foliage has to be as small as possible to minimize also the interception losses of rain adhered to the leaf surfaces during rainfall, and rapidly evaporating again after the rain. Moreover, there is an interception loss from the litter layer accumulating on the ground, which has to be balanced against the need for mulching in order to avoid unnecessary erosion.

In order to achieve such results, infiltration should be facilitated so that rainwater may rapidly enter the soil and recharge the root zone water storage. Other measures to maximize productivity would include maximizing the amount of water possible to store in the root zone. The water holding capacity could be increased by adding organic material from crop residues to compensate for the rapid breakdown of such material, typical for tropical climate.

A typical water balance for the Sahelian rangelands (100-600 mm annual rainfall) is illustrated in fig 1b, based on data from Breman & Uithol (1984). Under present conditions only 10-20 % of the precipitation was productive in plant production, whereas another 60 % returned to the atmosphere as unproductive evaporation from the soil surface. Their study indicated that by improving the access to nutrients, the productive "losses" could be increased to 50 % of the rainfall, i.e. the water used by vegetation be more than doubled.

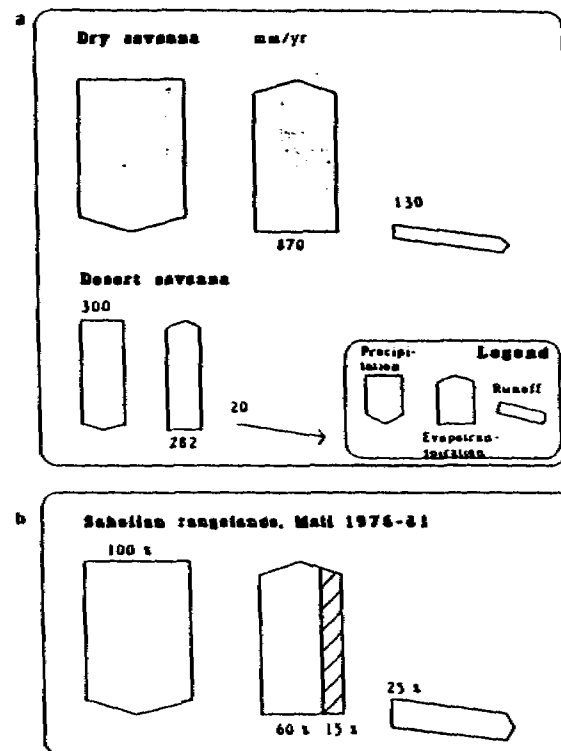


Fig. 1 WATER FLOW ANALYSIS OF SOME TYPICAL SEMI-ARID ENVIRONMENTS

Upper figure (a) shows relation between return flow to the atmosphere and recharge of terrestrial water systems. Data from Uithol 1979

Lower figure (b) shows relative proportions in percent between productive part and non-productive part of the return flow. Data from Breman & Uithol 1984

#### 4. PRACTICAL SOLUTIONS

##### 4.1 Water scarcity modes and basic problem-mitigation methods

It was evident from the Seminar that there is ample information available on the various technical arrangements to mitigate different problems related to water scarcity, land degradation and risk for crop failure. Indian scientists have been particularly active in this area and energetic action is being taken in many of the Indian states to reduce vulnerability, based on an awareness of the constraints produced by limited water availability and related land management problems. Sivanappan gave a comprehensive overview of various techniques developed and increasingly brought to use in different restoration and land development projects in India in the last few decades. Table 1 presents an overview of the principal mitigation methods, as related to the respective modes of water scarcity. Table 2 relates these different techniques to their basic scope as seen from an hydrological perspective and to the main water scarcity mode addressed, distinguishing between soil and water conservation technique on the one hand and agronomic technique on the other.

Various means for water harvesting have been identified as a way to mitigate poor conditions for plant production generated by low and erratic rainfall with particular reference to Sub-Saharan Africa (Reij et al 1988). Knowledge of indigenous systems in the region is however scanty and the acceptance of donor supported techniques is low. Not surprisingly, the low or slow rates of adoption are due to an omittance to consider the social factors or the way that communities are organized. Techniques aimed at harvesting water in large watersheds make it difficult for individual farmers to identify their role and position, and the implications with regard to tenurial structure are not properly attended to (ibid)

##### 4.2 Allocation of different water components

Because of the large interannual fluctuations of rainfall, the reliability of the rainfall and the fluctuations in water availability in terrestrial systems has to be taken into account. Darye, in ongoing experiments in Maharashtra in India, aiming at developing realistic principles for achieving sustainable and stable income with the help of assured water and minimal use of external and cash inputs, has developed a philosophy based on compartmentalization of the local water into an assured and a variable component.

Table 1. MAIN MITIGATION MEASURES

Water scarcity mode	General scope	Measures	Principal measure
A.	get best out of short growing season	<ul style="list-style-type: none"> <li>crop selection</li> <li>incr water use effic</li> <li>supply extra water (irrigation)</li> <li>facilitate infiltration</li> <li>percol ponds</li> <li>agric techn</li> <li>farm ponds</li> <li>weed control</li> </ul>	<ul style="list-style-type: none"> <li>water conservation</li> <li>tree crops</li> </ul>
B.	preparedness for drought years	<ul style="list-style-type: none"> <li>early warning</li> <li>crop storage from good years</li> <li>drought resilient crops</li> <li>increased water use efficiency</li> <li>supply extra water</li> <li>overyear water storage</li> <li>facilitate infiltration</li> <li>percol ponds</li> <li>agric techn</li> <li>farm ponds</li> <li>weed control</li> </ul>	<ul style="list-style-type: none"> <li>use water efficiency even during good years</li> <li>avoid wastage</li> </ul>
C.	restoration of degraded land / restore groundwater availability	<ul style="list-style-type: none"> <li>improve infiltration</li> <li>land use policies</li> <li>groundwater policies</li> <li>improve water holding capacity</li> <li>soil conserve</li> <li>afforestation</li> <li>burning</li> <li>terracing</li> <li>agroforestry</li> <li>manure</li> <li>clay</li> </ul>	<ul style="list-style-type: none"> <li>land development</li> <li>integrated soil and water conservation on watershed basis</li> </ul>
D.	optimum allocation of available water	<ul style="list-style-type: none"> <li>storage of wet season flow</li> <li>water use priorities</li> <li>administrative coordination</li> <li>sequential reuse</li> <li>renewable urban sewage for irrig</li> </ul>	<ul style="list-style-type: none"> <li>crop selection</li> <li>drip/partial (irrigated areas)</li> <li>supplemental irrigation (dryland areas)</li> </ul>

Table 2. DRYLAND AGRICULTURE TECHNIQUES

TECHNIQUE	BASIC AIM OF TECHNIQUE										
	improve water holding capacity	facilitate infiltr	improve groundw. recharge	storage of surface runoff	supply extra water -irrig	reduce erosion	stop sedim flow	reduce water loss	effective water use	nutrient supply	addressed water scarcity mode
<u>Soil and water conservation technique</u>											
soil conservation	X	X	X			X					ABC
check dams			X	X			X				
farm ponds				X	X						ABC
percolation ponds			X								ABC
irrig. tank				X	X						AB
groundw. irrigation					X						AB
system/irrig. (resq.)					X			X			AB
agric techn (broad bed & furrows)	X			X		X					AB
<u>Agronomic technique</u>											
rainfall analysis											AB
dry seeding											AB
crop selection											AB
low-cost fertilizers									X	X	AB
optimum plant population									X		AB
weed control									X		AB
cropping diversification									X	X	AB

The assured component would have to be estimated from a baseline rainfall that could be available with a high degree of dependability, say 80 %. Part of this water could be provided by water harvesting of rainwater over nearby non-cropped areas, storing it and making it accessible for protective irrigation of the land devoted to food security. Over and above the assured supply, a variable component would be available in many years with better-than-average rainfall. This water could be used for tree establishment and yield augmentation in the tree plots or the food plots, but also for commercial crops under good years. Evidently, the assessment of assured water and requirements for basic needs has to be site-specific.

Dalye suggested that the assured water be treated as a scarce resource, i.e. distributed equitably to attain sustainable livelihood and food security for the local farming communities in vulnerable areas. The variable surplus, on the other hand, could be distributed as a free market good or a private priority right to be utilized for water intensive commercial crops

#### **4.3 An agro-silvicultural strategy for livelihood security**

Dalye also reported on the philosophy and practical results of the ongoing experiments. The basic idea is the combination of watershed management and development for best possible use of local rainfall, and a sustainable biomass production providing stable agricultural yields and general livelihood security. Basically, a family holding should be divided in two parts: a small part providing food security to the family, and the rest assigned to multi-use tree crop systems. The role of trees is thus multiple: to provide economic gains and security, and to contribute to improvement of productivity of the area (see also Chambers & Leach 1989). The silvicultural part should provide also biomass material to be used as organic input on the agricultural land to improve the water-holding capacity of the soil.

The very quick results are not necessarily worthy. After the first two years of the 5-year period of experiments the results indicate that, from a rainfall of 500 mm, out of which 300 mm could be utilized for productive purposes, an overall production of 20 ton/ha of dry matter could be achieved in the forestry part and 3 ton/ha in the crop production part. Root zone water security was achieved by 2-3 protective waterings to fill interspell water shortages, in all 150 mm. Organic input was achieved from one cartload of dung per 100 m<sup>2</sup> of cropped area. Dalye concluded that, with 5 tons/ha as a realistic yield goal for the coming years, 0.3 ha would be enough for one family to provide them with 1.2-1.5 tons of grains needed annually for their food security.

#### **4.4 Securing long-term productivity**

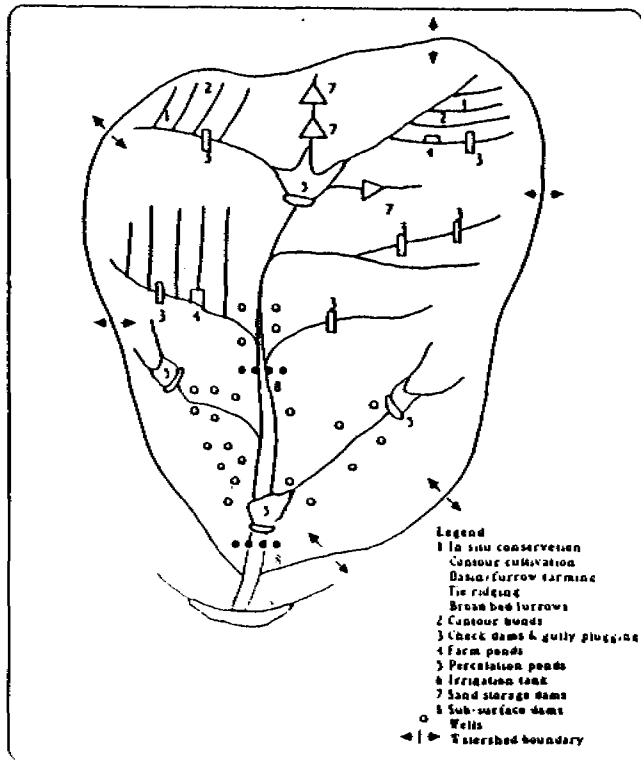
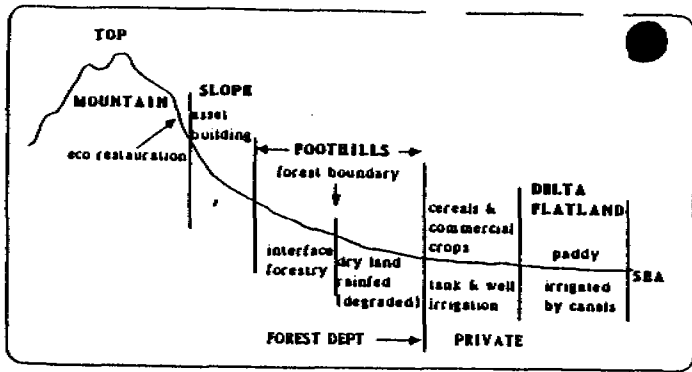
In order to conserve the long-term fertility of the soil, nutrients have to be continuously added to compensate for the nutrient uptake, exported with the harvested biomass. But also organic matter has to be added on an intermittent basis to secure adequate water-holding capacity throughout the years. At the Seminar, Lionel Weerakoon reported about ongoing experiments in the dry zone of Sri Lanka, addressing sustainable agriculture by developing a strategy aiming at concurrent production and conservation. A key component is the avoidance of unnecessary depletion of fertile soils by erosion. Therefore, no-tillage systems should be preferred compensating the tillage benefits by crop residue mulches. The system has a number of components in order to meet a set of major criteria, focussing on soil fertility maintenance, biomass production, control of weeds and other pests, firewood and fodder needs, avoiding high cost inputs, farmer acceptance and compatibility with the farming systems in the area (Weerakoon & Schall 1987).

#### **4.5 Implementation in the landscape**

In Weerakoon's experiments, landscape zonation plays an important role. The sustainable land use must be fitted to suit different categories of land in what he calls a "catenary sequence". Components are multi-storey homegarden with nitrogen-fixing trees, erosion control barriers of hedgerows along the contour lines in the landscape, contour bunds on slopes, grass planted in buffer strips to minimize erosion and provide fodder for cattle, intercropping legumes with cereal crops instead of monocropping, in the lowlands line or double hedgerow planting on rice bunds for fertility maintenance, and plant mixtures for green manure purposes with fast and high biomass production (ibid).

Constructed soil conservation measures such as conventional earth bunding systems are evidently expensive for the small farmer, but there are cheap do-it-yourself alternatives. Grimshaw, in a World Bank pamphlet (1987) describes the use of vegetative systems for soil and moisture conservation. Suitable plants such as Vetiver grass, are planted to form hedges along the contour lines. The result is both yield increase and increased groundwater recharge as an effect of holding up the surface runoff.

In India, Sivanappan has already urged for similar landscape arrangements in a number of papers (Sivanappan & Panchanatan 1985, Sivanappan 1989). Figure 2 presents a sketch on how to coordinate uphill, slope and downhill land use and the technological measures needed to support such land use (cf table 2). The basic idea is



to restore the forests in the upper catchments for both resource purposes, protection against soil erosion and to facilitate infiltration of rainwater, and therefore also recharge of groundwater aquifers, transporting surplus water to lower inhabited areas. Basic measures in uphill areas and hillslopes are contour trenching and contour walls or bunds to prevent erosion and to obstruct runoff; check dams to stop the silt in the streams; and afforestation to restore the forests. In the foothill, in situ moisture conservation may be implemented by contour cultivation, furrows, broad based ridges and furrows, and tie ridges, and local runoff can be stored in farm ponds to supply water for protective irrigation during critical vegetation periods. In the lowlands, runoff arriving from upper parts of the catchments may be stored in tanks, and desilted to improve their storage capacity. Water saving irrigation techniques such as drip irrigation would increase productivity per unit of water.

## 5. IMPLEMENTING A STRATEGY FOR CONCURRENT PRODUCTION AND CONSERVATION

### 5.1 Building upon the knowledge and abilities of local communities

Not only are the poor people in rural communities the victims of rural stagnation and environmental disruption, but they also form the backbone of the countries' economies. A paternalistic attitude towards rural poor is, however, noticeable in the 'conventional wisdom' approach to the development of Third World countries, the needs and the lacks have been highlighted rather than their potential. At the Seminar, Peter Warshall described the situation with the help of a metaphor: there are two different ways to describe a cup which is half filled. We can look at it as half empty or as half full. The rural poor are conventionally looked upon from a 'half empty' perspective. The metaphor can be further tapped symbolic significance. It is the bottom of the cup, not the top, which first and last has a content, and it is through the top that the craving for the contents at the bottom of the cup is realized.

At the Vadstena meeting there was a unanimous support for the idea that a better future must to a much larger degree than is currently the case, build upon the resources and abilities of local communities. The knowledge regarding the environment that can be found in local communities must be recognized, mobilized, supported and upgraded and put into use. Datye emphasized that identification and implementation of the biomass strategy discussed above was largely done with and through people in the communities concerned.

FIG. 2. LANDSCAPE ZONATION OF SOIL AND WATER CONSERVATION MEASURES

Upper figure shows vertical, lower figure horizontal arrangements. After Sivanappan 1989

In a number of articles and books, Robert Chambers has elaborated on the need and promise to accommodate the experience and abilities of the millions of resource poor farmers in the efforts to improve livelihood security in rural areas in Third World Countries (Chambers & Ghildyal 1985; Chambers & Jiggins 1986; Chambers 1987). The challenge is basically to identify practices which fit the total environment, i.e. social and ecological, rather than trying to make farmers adopters of 'miracles'. "Scientists project 'first' values - Industrial, capital intensive, dependent on cash inputs - into 'last' environments - Impoverished, labour intensive, dependent on local inputs - where they often make no sense or are otherwise unadoptable" by resource poor farmers (Chambers & Jiggins 1986, 20).

This has nothing to do with a romanticizing image of the role that people in rural communities can play. "A sentimental belief in 'trad values' and a gut feeling that the 'people know best' without knowing why and under what circumstances, will be unhelpful and damaging to the prospects of rural development in the long run" (Richards 1980. Quoted by Niamir, 1989, p. 2).

### **5.2. Adaptability a key component**

Historically people in Africa and in Asia have proved to be able to adapt well to an adverse environment with large variations in climate. A diversified cropping pattern and an ability to adjust commencement of season to rainfall pattern have been important principles in making use of the potential of semi-arid areas. This adaptability reflects a great degree of dynamics and resilience of traditional societies which is often missed in current interpretations of the context in which rural development occurs. According to a popular belief, perceptions and knowledge prevailing in traditional local communities are static and 'fossil'. But there are noteworthy illustrations that the knowledge and skills is not static nor "fossil". Niamir (1989) gives ample evidence of the great spectrum of 'indigenous technical knowledge of natural resource management'. He stresses its functional and utilitarian values and notes that "...although lacking a regional/national outlook, it makes up by being rich on local details and historical trends". But its functional relevance and attachment to local conditions means that it is easily eroded if not used. The extension service and perhaps also formal education are obviously faced with a big challenge to maintain and upgrade traditional technical knowledge.

The professional knowledge proliferating much of the development efforts, is accumulated and tested according to quite different criteria as compared to knowledge of local communities. In contrast to the 'laboratory-tested' attempts to boost

development, local communities have acquired a truly holistic insight into the behaviour and potential of the integrated man-environmental system through a 'time-and-field-tested approach' (Madduma Bandara 1985). It is through combining knowledge and preferences from the local communities with the formal science knowledge that an efficient and sustainable development may prove possible (Niamir 1989).

In the case of project design in development assistance, it certainly requires changes in communication with people residing in local communities. Joran Fries, at the Seminar, expressed the change of approach with the following description. Some time ago, development assistance was typically prescribed; it was the approach of a veterinarian who did not ask the "patient" nor did he expect the "patient" to have any ideas about how to treat the problem. Then came the approach of the house doctor who examines and talks to his "patient", but hardly discusses his proposal with him. What is aimed at now is the approach of a waiter in a restaurant. After a presentation of the menu, the waiter and the client would discuss the options, and the successful waiter would leave the decision to his client.

The idea that people in local communities themselves should be the basis of development has a wide acceptance. But in spite of all talk about community participation, it seems that development efforts are rather based in communities than based upon community preferences and capabilities, that is they are not of the community but placed in it by some external agency. Such a situation leads to local non-interest, non-cooperation, and to dependency on government or outside agencies for the simplest projects. It is probably the best way to create a society of "aid junkies".

### **5.3 A question of replicability**

#### **5.3.1 An efficient strategy is lacking**

In the literature it is easy to find examples of successful resource management practices which have increased production, boosted income and contributed to halt a negative out-migration. To what an extent they are successful, for whom and how lasting the successes will be can, no doubt, be debated. But the perhaps most important question is to what extent the promising examples can be replicated on a larger scale. In view of the rapidly degrading environment, a growing population, and an escalating pressure on the resource base, there is a very great need to spread successful management practices from isolated examples so that we will not be ending



up saying that "Individual battles have been won, but we are losing the war" (Shaik et al 1988, p.42-43).

In a detailed search and analysis of successful natural resources management in the Sahel, observations from seventy successful initiatives in four countries had been synthesized (Ibid p 42-43). They also conclude that "...Initiatives are not successful on their own terms, but show considerable promise of being replicable in other contexts" (p. 22). An efficient strategy to spread successful practices is obviously lacking, however. Spreading of techniques is often a futile exercise, particularly in case of costly or complicated techniques. But principles of resource management practices with respect to socio-economic and environmental conditions that can be replicated are urgently needed.

### 5.32 Strengthen inter-community contacts

Conventional development assistance typically disregards inter-village networks of communication. A vital and functional way to stimulate the spread of information about successful methods to meet droughts, to economize with human efforts and to identify acceptable ways of increasing food production and other outputs, is sadly overlooked and missed. In principle and in practice, the flow of information and good examples in bi-lateral aid projects and in national development programmes are primarily spread in a hierarchical manner. Target groups or target areas are delineated in order to facilitate and to speed up the channeling of resources to the most needy segments of the population or the most urgent cases. Such a principle will also facilitate an accounting purpose.

But quite often the target groups are missed and various "spill-over effects" may be noticeable. A certain technology which has been designed for a specific objective and given to a community may be used for some quite different reason than originally intended. A stove programme launched with the intention to save forests in Mali was thus adopted by the women since it helped them to save time (Shaikh, 1988, 43 - 44).

And a household water supply scheme in Malawi had a noticeable positive effect on households that did not belong to the target group at the same time as all the intended beneficiaries were not reached (Lindskog & Lundqvist 1989).

Not denying the need to support site-specific projects, it is nevertheless of vital importance to strengthen inter-community contacts, to increase contacts between the actual and potential "doers" of development. Dynamics within communities and especially inter-community contacts is often neglected also in research. By focussing on individual interviews the dynamics of groups is hard to grasp and evaluate. A

research methodology which incorporates interactions within groups is however very promising (Chambers & Jiggins 1986). Organized contacts or meetings between farmers from various villages to discuss common problems and alternative approaches would similarly hold considerable promise as a means to estimate the potentials and limitations of various resource management strategies, including their replicability.

### 5.33 Adopting the principles of NGO's

About three decades of development efforts have left a legacy of distrust and misconceptions among farmers and other groups in Third World countries, whereas lack of adherence in the response gives nourishment to reciprocal cynical attitudes on the part of development agents and national governments. Given the psychological and institutional drawbacks of formal organizations in this connection, it is obvious that the Non-governmental Organizations (NGO's) may play a significant role "... agencies and governments, to avoid past errors, are either going to have to work more through NGO's and small local organizations, or work more like them - or maybe do both" (Timberlake 1985, 217).

The role of the NGO's in mobilizing, supporting and spreading viable resource management practices is increasingly being recognized. At the seminar, Camilla Toulin informed about the range of organizations engaged in efforts to improve the situation in the Drylands of the world. She emphasized the importance of having a clearing house for stimulating contacts between the various organizations and individual researchers engaged in Dryland issues. Similarly, a stimulation in the spread of information to and from development practitioners working at the local level is crucial. Among the objectives of IIED in this regard is to bridge the communication barrier between English and French speaking Africa. (For further information, see Haramata, A Bulletin of the Drylands, IIED, London).

## 6. NATIONAL POLICY FOR SOUND DEVELOPMENT OF LIFE-SUPPORTING SYSTEMS

### 6.1 Short-term versus long-term challenges

It has to be realized that the problems of poverty-prone, semi-arid regions suffering from land degradation and famine proneness look quite different when seen in the short-term as opposed to the long-term perspective.

In the short-term, the main challenge is rural development and finding a way out of the vicious circle of today and the threatening ecological collapse of entire regions. This

includes the finding of ways to adapt to the effects of hydroclimatic (endemic) water scarcity (modes A and B), and to mitigate and remedy the effects related to water scarcity C. It has been shown earlier in this overview report that there are evident ways out of the present dilemma. The main actors are local farmers. What is demanded from the national government is mainly interest in supporting such rural development, even of the poverty-prone and most backward regions of the country. What is needed on the policy-making national level is the incentives necessary to make the efforts worthwhile as seen from the perspective of the individual farmer.

In the long-term the problem looks entirely different (Falkenmark 1988) The challenge is then to accelerate the biomass production even further as to be able to meet the demands of a rapidly growing population. If 3 ton/ha are achievable in the short-term development of low-input crop production, as indicated by Dalye's experiments, it would be necessary to double these yields in a time perspective of only around two decades in order to feed twice as many people. This might involve difficulties due to a reduced per-capita amount of water available for protective irrigation. Whether the root zone water security, essential for securing such yield levels, is achieved by facilitating increased infiltration of local rainfall, which would otherwise form runoff in local streams, or by regular irrigation with stream water, the effect will anyway be a decreased amount of water available in streams or aquifers for other purposes. (Fig 3). Improved rootzone water security will therefore have to compete with other human needs for water (municipal water, rural water supply, local industry, irrigated cash crop production). Experience from other regions indicate that this might involve large problems when the number of people per flow unit of water available from the water cycle increases (water scarcity D).

### 6.2 Population policies and water futures

Successful population policies are necessary in order to avoid a situation of water starvation, which will inevitably mean environmental migration out of the area. As has been shown by Falkenmark et al (1989), population growth will be forcing many African countries into a situation where a water amount of no more than say 5H (H being the amount needed simply for household needs, assumed to be 100 l/p d) would be available to support all water needs. For comparison, this amount is what Sweden is using for municipal water supply only. The amount is also dramatically less than typical water demands in semi-arid irrigated countries. 5H should be compared to what is used today in irrigated developing countries, viz 20 - 100 H, and what is used in most irrigated industrialized countries, 75 - 200 H. However, the most water-conserving of those countries need no more than 12 H.

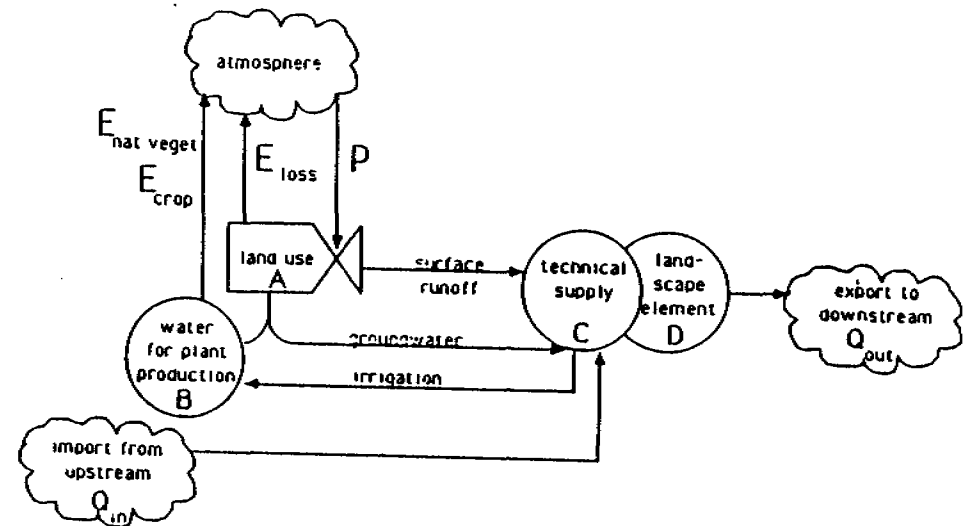


Fig. 3. PRINCIPAL RELATIONS BETWEEN FRESHWATER SUPPLY AND HUMAN WATER USES AT THE COUNTRY OR CATCHMENT SCALE  
From Falkenmark 1989 (AMBIO)

It is easy to understand from this discussion that a water scarcity of type D constitutes an extremely severe constraint, which must be avoided by all means. The earlier that the population can be stabilized, the better quality of life will be possible to achieve in water scarce rural areas and the more water will there be to support crop production and socio-economic development. Rapid population growth in regions where water availability is finite, but also scarce is equivalent to futures foregone in terms of life quality. The less water there will be on a per capita basis, the more famine-prone will conditions be when there is an insufficient amount of extra water to mitigate droughts and crop failures.

### **6.3 Long-term planning within environmental opportunities**

It is evident that the water scarcity will call for dramatic changes in approach to water. The relevant question is not the traditional one, inherited from consultants with temperate zone training and experience: how much water do we need and where do we get it? but rather: how much water is there and how should we best benefit from it? (Falkenmark et al 1989) In other words, the challenge is to promote a strategy which aims at proper management of water demands rather than a supply-oriented water resources management.

There is consequently an urgent need for a new awareness among politicians and high level decision makers that problems that seem to be related to land may in fact be caused by water penury. What has to be strived at is best use criteria, basically in line with the ideas brought forward by the Brundtland Commission (WCED 1987), i.e. to delineate broad land categories and identify land according to best use criteria, based on inventories of land capabilities and descriptions of a country's fundamental natural resources.

At the same time it is fundamental that the new approaches needed in order to develop sound methods for land husbandry and nature management pay due attention to the role of water scarcity for the various life support systems. This importance of water scarcity in fact escaped most audiences even in the recent past, including both the Brundtland Commission and the recent international congress on Nature Management and Sustainable Development (cf Ganning&Kessler 1989). That congress in fact concentrated on natural parks and protected land areas in their discussion of the semi-arid tropical grasslands!!

What is most urgently called for is the development of new methods of assessment of the carrying capacity and land use potential of semi-arid lands as a basis for sound ways of land husbandry.

### **6.4 Water balance based planning**

At the Seminar, the need to further develop the traditional methods for water resources assessment was stressed by Abdulay Diawara from Mali. Only when such water resources assessment has been made does there exist a base for long-term planning of land use, with due regard to water limitations.

It is however necessary to expand from the temperate zone practices, which are mainly applicable to conditions of humid climate, concentrating on the water in the long branch of the water cycle (rivers and groundwaters). Arid areas pose completely different water resources assessment problems. For one thing it is necessary to include the water in the vertical branch of the water cycle, i.e. in particular soil moisture, the critical resource that defines biomass production potential. What is needed is methods for the assessment of the recharge and water holding capacity of the root zone, but also the recharge of groundwater aquifers under arid climate. Furthermore, it has to be recalled that groundwater recharge takes place in different ways under humid and arid conditions. (Falkenmark&Chapman 1989). Humid climate allows regional groundwater recharge, whereas in arid regions, such recharge may only exist in mountain areas while the recharge is otherwise limited to river bottoms during flash floods and inundated banks along flooded stretches of major rivers.

It is also necessary to introduce a distinction between water producing areas in the landscape, where the terrestrial water systems are being recharged from local rainfall, and water consuming or evaporating areas where emerging groundwater seepage and river flow evaporates, leaving salt crusts behind, and reducing the flow along the river. Margat (1982) suggests to distinguish between river basins when discussing water producing parts of the landscape, and "anti-basins" when discussing evaporating areas. Examples of the latter are the Jonglei region along the White Nile, and all the numerous sebkhas and chotts all around the arid regions.

Evidently, due to the marginal conditions and the water scarcity, both agriculture and forestry in water producing areas should be carefully based on water-balance based planning on a catchment basis. It was reported at the Seminar that in India, both federal and state governments have now agreed in principle to this concept.

## 7. CONCLUSIONS

The current situation in semi-arid regions gives a gloomy impression of series of parallel problems (land degradation, rapid population growth, tremendous debt burdens, official detachment from poverty-prone areas etc), which is a strong reason for very serious concern (fig 4a). The gravity in the situation is reinforced by misperceptions about proper and effective ways to deal with the situation. A characteristic of the conventional approaches to the problem is a focus on the lacks and the needs rather than the potential that exists to improve the situation. The possibility to tackle the situation is also hampered by a dominating technical bias when dealing with the most scarce resource of semi-arid regions, e.g. water. The conventional approach has typically been to ask how much water do we need and where do we get it, rather than how much water is there and what can best be produced from that available amount of water.

The impression from the Vadstena Seminar is that the know-how of coping with water scarcity and mitigating fertility degradation is more advanced in S Asia, although efforts are ongoing in many places in Africa as well. One main problem to address seems to be the replicability in other environments of successful resource management practices. To find the way towards a brighter future, it is of paramount importance to build development from the available resources and to plan land use so that best possible use can be reached from local rain. This would mean to maximize the production part of the return flow to the atmosphere and minimize the unproductive losses. Such efforts to maximize biomass production per unit of water will also have implications in terms of soil conservation.

Typical additional components of a biomass strategy are diversification, allocation of assured water to food crops to reach food security, intercropping of trees with seasonal crops etc. The biomass strategy by necessity leads to a diversified production, possible to implement at the level of the village community, without expensive inputs from the outside, and manageable within the community context. Indeed, it presumes an active participation by local communities. See fig 4b.

There are a multitude of isolated success stories all around the semi-arid tropics. A fundamental issue to be addressed by careful interdisciplinary research is however the criteria for replicability. This is a major challenge for donor support and includes the support of networks of community contacts rather than the support of individual projects.

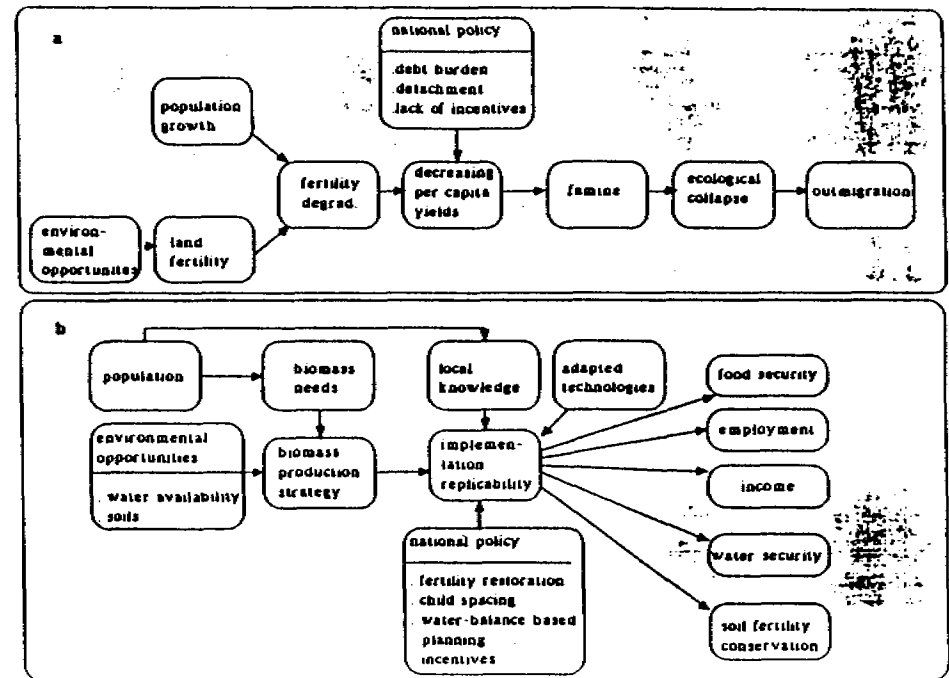


Fig. 4. SYSTEMS VIEW ON FACTORS INFLUENCING RURAL FOOD SECURITY

Upper figure shows present predicament, lower figure the conclusions from the Vadstena Seminar

The long-term predicament of many semi-arid countries with rapid population growth remains gloomy unless government authorities are able to respond to the urge for access to methods allowing child spacing. This urge emerges from the women and is manifested in a massive number of abortions, estimated to be of the order of 50 millions only in Africa. In short, the option is either access to sizeable amounts of water per capita to support the socio-economic development which is largely dependent of water, or access to extremely limited amounts per capita, given the projected population growth before stabilization. The result will be continued poverty, environmental stress and probably outmigration from the most severely hit areas.

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Dossier-synthèse d'information  
"L'eau c'est la vie"

OXFAM-Québec  
Juin 1990

## L'EAU C'EST LA VIE (dossier d'information)

*"L'eau n'est pas nécessaire à la vie, elle est la vie"*  
(Saint-Exupéry)

### Introduction

L'eau constitue incontestablement un patrimoine irremplaçable. Pour celui qui en dispose à volonté, cette richesse peut ne pas apparaître aussi fragile qu'elle ne l'est pour l'Africain, par exemple, aux prises avec des sécheresses répétées. Mais, au Nord comme au Sud, ce n'est pas tout d'avoir accès à l'eau, fût-ce en abondance. Encore faut-il gérer cette ressource naturelle, de plus en plus difficile à gérer.

### Quelques faits et chiffres

L'eau douce ne représente qu'entre 3% et 3.5% du total (environ 1 380 million km cubes) des réserves d'eau sur la planète. En fait, l'eau salée représente 97% de toute l'eau à la surface du globe. Les glaciers des pôles Nord et Sud constituent 2% de toute l'eau du globe, mais la fonte des glaciers représente une source d'eau douce souvent trop éloignée pour la consommation humaine. Finalement, l'eau douce qu'on utilise ne constitue environ que 1% de toute l'eau du globe (*L'histoire de l'eau potable*, American Water Works Association, 1984).

Pour nous donner une meilleure idée, imaginons que toute l'eau de la planète puisse être contenue dans un baril de 450 litres. Si nous prenions une seule cuillerée à thé de cette eau représente la quantité d'eau douce utilisable par l'homme. Maintenant, en enlevant 2 gouttes d'eau à cette cuillerée, nous enlevons l'eau des rivières, des ruisseaux et des lacs! Le reste de la cuillerée représente l'eau souterraine accessible, celle qu'on essaie de rejoindre en creusant des puits (*Sous un même soleil*, ACDI, 1988)



## De l'eau pour tous

Il faut savoir que les réserves mondiales d'eau douce accessibles suffisent amplement à soutenir la population totale de la terre, estimée à environ 5,3 milliards d'habitants (ce chiffre pourrait atteindre 8,4 milliards en l'an 2025).

Il peut être encourageant aussi de savoir que l'individu dispose de 9000 kilomètres cubes d'eau douce par an. Cette quantité peut, en principe, suffire à faire vivre 20 milliards d'individus (Pour la science, *L'eau en péril*, novembre 1989). Le défi en est de gestion des ressources, entre autres.

Bien sûr, les conditions d'approvisionnement en eau potable peuvent varier considérablement d'un pays en développement à un autre. Selon certaines études récentes, un tiers de la population mondiale, soit plus de deux milliards de personnes, n'ont pas accès à de l'eau potable.

Selon certaines données, 59% de la population du Bangladesh, 66% de la population haïtienne, 72% de celle du Kenya ne savent même pas ce que c'est de l'eau potable, propre à la consommation.

## Consommation

Selon l'Organisation mondiale de la santé (OMS), les humains n'ont besoin que d'environ cinq litres d'eau par jour pour boire et préparer les repas. Mais de 20 à 30 litres d'eau par jour sont nécessaires à chaque personne pour tous les besoins domestiques (boire, manger, laver, etc.). Un Américain ou un Européen consomme jusqu'à 70 fois plus d'eau qu'un habitant du Ghâna, par exemple, en Afrique. Selon un rapport sur "le développement humain", publié en mai 1990 par l'ONU, seulement 37% des Africains disposent d'eau potable pour leur alimentation.

Selon les évaluations, 73% de l'eau douce sert à l'irrigation des récoltes, 21% à l'industrie et seulement 6% sert pour les besoins domestiques.

Le Canada possède l'une des plus grandes réserves d'eau douce de la planète. Pour chaque 10 litres de réserve d'eau douce qu'un Canadien possède, un Américain en possède un litre; un Indien, 0,20 litre et un Egyptien, 0,01 litre.

(ACDI, *Sous un même soleil: l'eau*, automne 1988)

A lui seul, le Canada possède 9% des réserves globales d'eau douce de la planète, soit approximativement 3 000 km cubes. Par comparaison, pour certains pays de populations égales comme le Pérou ou le Kenya, la quantité d'eau douce dont les populations de ces pays peuvent disposer est 70 et 90 fois plus petite, respectivement.

## Santé

L'eau, liquide inodore, incolore et sans saveur... Pourtant, selon l'Organisation mondiale de la santé (OMS), environ 80% des maladies dans le Tiers Monde proviennent du manque d'eau potable. Le choléra, le paludisme, la diarrhée, la maladie du sommeil, la bilharziose, entre autres, sont toutes des maladies liées à l'eau. C'est la diarrhée qui affecte le plus de gens. On estime qu'à elles seules, les maladies diarrhéiques causent la mort d'environ 5 millions d'enfants annuellement dans les pays en développement.  
(CRDI, 1988)

Le lien entre l'eau et la santé est sans équivoque. Des études menées par l'Organisation mondiale de la santé ont prouvé qu'avec une meilleure qualité d'eau et des installations sanitaires adéquates, il y avait une nette amélioration de l'état de santé générale des populations.

## Les assassins de l'eau

Les phosphates, les pesticides, les nitrates, les hydrocarbures, les pluies acides, les déchets industriels et toutes les autres formes de pollution: nous courons tout simplement à la catastrophe. Selon une récente étude menée par le Centre de recherches pour le développement international (CRDI), l'industrie pollue globalement, chaque année 4 000 km<sup>3</sup> d'eau, ce qui équivaut approximativement à 9% du montant total du volume annuel global d'eau disponible. Le volume d'eau sur la planète est estimé à 1 380 millions km<sup>3</sup>.

Selon un chercheur soviétique, "En l'an 2015, il n'y aurait plus d'eau naturellement potable dans le monde en raison de la pollution et de l'épuisement des nappes phréatiques." Et cela dû, en partie, au gaspillage des pays industrialisés.

Espérons que ces sombres prédictions se révèlent fausses. N'empêche que depuis des décennies, la mer sert de lieu de rejet des ordures de toutes sortes, et des plus toxiques et dangereuses. Les torts que ces substances causent à notre environnement collectif sont énormes et malheureusement encore très mal connus.

## L'interdépendance

*"De l'océan viennent les nuages. Des nuages nous vient la pluie. De la pluie naissent les rivières. Et des rivières naît l'océan. Ainsi va le cycle des eaux. Ainsi va le cycle du monde." -vieux texte indien*

Nous, les privilégiés des pays riches, qui croyons, à tort, que l'eau est une ressource inépuisable, devons prendre conscience que le problème d'eau potable n'est plus le seul problème des pays en développement. Il faut surtout bien se rappeler que tout se tient dans l'environnement et qu'on ne touche pas impunément au système écologique d'une région sans que l'écologie de la planète entière ne risque un déséquilibre grave... pour tous. Il faut changer notre attitude, notre comportement, afin de vivre de façon beaucoup plus responsable et éventuellement beaucoup plus en harmonie avec le reste de la planète.

Il y a sur la terre des grandes quantités d'eau. En fait, l'eau couvre près de 80% de la surface de la terre. Le problème c'est que cette eau est très inégalement répartie. Certaines régions en reçoivent trop, d'autres pas assez. De là, les inondations dévastatrices dans certaines régions et les sécheresses terribles dans d'autres.

Mais, globalement, l'humanité est et, selon toutes les prédictions, le sera de plus en plus, confrontée au problème constant de l'approvisionnement en eau propre à la consommation. L'eau, sa qualité, sa rareté, sa conservation, son partage, sa consommation, voire son gaspillage, sont devenues des sources majeures de préoccupations pour tous les pays, riches et pauvres.

## L'avenir

Le défi qui se pose maintenant, selon les spécialistes de l'eau, est celui de l'équilibre entre les besoins des populations en eau potable, son utilisation et la conservation des ressources de telle sorte à ne pas mettre en danger nos besoins futurs et, par conséquence, l'avenir de toute la planète.

Pas d'eau, pas d'agriculture; pas d'eau, pas d'arbres, pas d'eau, pas d'animaux. Pas d'eau, pas de vie...

Selon M. Falkenmark (*Water - the silent messenger between cause and effet in environmental problems*, Water International, 1984), "La question n'est pas de combien d'eau avons-nous besoin et où allons-nous l'obtenir mais plutôt de combien d'eau disposons-nous actuellement et comment pouvons-nous en disposer le mieux possible?"

Pour l'ensemble des pays en développement, "la lutte contre les maladies et pour de meilleures conditions de vie passe par la conquête de l'eau potable et l'amélioration de l'assainissement" (*Faim et développement*, 1983).

D'après le Centre de recherches pour le développement international (CRDI), "Le problème pour les villageois, les citadins, les gouvernements et les organismes de développement consiste à amener l'eau là où on en a besoin, à un coût abordable et sans détérioration de sa qualité. En fait, la quantité d'eau théoriquement disponible sur terre pour consommation humaine est de beaucoup supérieure à la quantité utilisable dans la pratique."

## Des pistes de solutions

*"FAIRE VIVRE LE DESERT POUR FAIRE MOURIR LA FAIM"*

-proverbe africain

De nombreux spécialistes, et c'est rassurant, se penchent sur les solutions possibles et les stratégies d'assainissement afin d'assurer des approvisionnements adéquats et une utilisation appropriée de l'eau potable. Selon le CRDI (*L'eau douce, un impératif pour l'humanité*), "il faut diverses composantes générales, entre autres:

- des technologies et des matériaux appropriés pour déceler, capter, stocker, épurer, analyser et transporter l'eau, de même que pour empêcher sa contamination;
- un personnel formé pour appliquer ces technologies et pour installer et entretenir l'équipement;
- une coordination d'ensemble des approvisionnements en eau du pays, y compris des analyses et des tests réguliers de l'eau;
- la collaboration, la participation et l'éducation du public au sujet de l'eau et de son assainissement."

## Une stratégie mondiale

C'est parce que l'eau est une ressource absolument essentielle à la vie que l'Organisation des Nations unies a fait de 1980-1990 la Décennie de l'eau potable et de l'assainissement. En novembre 1980, un appel fut donc lancé à la communauté internationale afin que les efforts et les énergies de tous se mobilisent dans le but de fournir, d'ici à 1990, de l'eau potable et des installations suffisantes d'assainissement à deux milliards de personnes, principalement dans les pays en voie de développement. Qu'en est-il de tous ces dignes idéaux et objectifs? Ce sera aux responsables d'en débattre lors des travaux de clôture de la Décennie de l'eau, qui se tiendront en septembre prochain à New Delhi. Entre temps, tous les spécialistes de l'eau sont penchés sur des stratégies et tentent de définir les programmes, les moyens et les techniques les mieux adaptés et les plus efficaces pour l'humanité.

## DR MALIN FALKENMARK

Madame Malin Falkenmark vient de Suède. Elle obtient sa maîtrise en philosophie, spécialisée en hydrologie, de l'Université Uppsala en 1963. En 1975, elle décroche un doctorat en philosophie de l'Université Leikoping.

Sa carrière professionnelle s'échelonne sur une période de près de quarante ans. En 1953, elle travaille déjà comme hydrologue dans la division hydrologique du département "Ice" de l'Institut suédois de météorologie et d'hydrologie de Stockholm. Elle devient en 1961, première hydrologue de l'État de Suède pour occuper ensuite, le poste de directrice du département de l'hydrophysique du même institut.

En 1965, elle siège en tant que secrétaire sur le Comité National suédois de la Décennie internationale de l'hydrologie et devient membre du comité exécutif de 1966 à 1974.

En plus d'être demandée comme experte hydrologue sur plusieurs comités internationaux, elle est membre de plusieurs organisations de protection de l'environnement.

Le Dr. Malin Falkenmark a reçu, en 1988, du gouvernement suédois le prix environnemental du parti pour la vulgarisation qu'elle apportait à l'information scientifique.



## SIRI MELCHIOR-TELLIER

De nationalité danoise, Madame Siri Melchior-Tellier détient un B.A., spécialisé en études biologiques de la population du Collège Radcliffe aux États-Unis. Après l'obtention de sa maîtrise en sciences de la population du Harvard School of Public Health en 1970, elle travaille pendant deux ans comme démographe pour Infraconsult AG, en Suisse, une firme de consultation privée.

En 1972, elle entre au service de l'UNFPA (United Nations Fund for Population Activities) où elle occupera diverses fonctions pendant dix ans. Elle sera, entre autres, responsable de plusieurs programmes de développement et d'implantation en Afrique et en Europe et responsable de l'évaluation pour plusieurs projets en Haïti et au Ghana. Elle aura coordonné et supervisé le programme d'assistance de l'UNFPA à Kabul en Afghanistan et, ouvert et dirigé le bureau de l'UNFPA à Beijing, en République Populaire de Chine.

En 1982, toujours au sein de l'UNFPA, elle est nommée "Deputy chief", Africa Branch, New York du programme d'assistance pour 42 pays d'Afrique, supervisant ainsi un budget de plus de 20 millions de dollars.

Depuis février 1987, elle dirige le programme PROWESS (Promotion of the Role of Women in Water and Environmental Sanitation Services) du PNUD (Programme des Nations Unies pour le Développement).

## ABDOU EL MAZIDE N'DIAYE

Monsieur Abdou El Mazide N'Diaye est né à Dakar. Après des études à l'Institut d'Étude du Développement Économique et Social (IEDES) à Paris, Monsieur N'Diaye obtient son diplôme de Technicien Supérieur du Développement, spécialisé en analyse quantitative.

Sa thèse de doctorat sur le "Problème de l'Économie villageoise et le développement communautaire" dans le mode de production asiatique et de l'Afrique Noire est soutenue en 1969.

De 1970 à 1974, Mazide N'Diaye est directeur du Service Informatique et Traitement des données de l'ONCAD (Office National de Coopération Agricole et de Développement). En 1974, il devient directeur administratif et financier de BUD Sénégal, une société de maraîchage industriel. En 1977, il accepte la direction administrative et financière de Mudra Afrique (Centre Africain de Perfectionnement et de Recherche des Interprètes de Spectacle). De 1980 à 1985, il occupe la fonction de directeur général adjoint de l'Office Africain pour le Développement et la Coopération.

En plus d'avoir pratiqué des charges professorales à l'ENAP et à l'ENEAS de Paris, Monsieur N'Diaye a siégé sur plusieurs conseils et comités d'ONG.

Depuis 1985, il est Directeur général du RADl (Réseau Africain pour le Développement Intégré).

## MARY LINDSAY ELMENDORF

Madame Mary Lindsay Elmendorf possède une vaste expérience dans plusieurs champs d'activité, en psychologie, en sociologie mais, surtout, en anthropologie. Elle détient un doctorat en anthropologie de l'Union Graduate School aux États-Unis.

Depuis ses débuts comme travailleuse sociale en 1937 aux États Unis, Mary Elmendorf a toujours collaboré et s'est toujours impliquée dans le domaine du développement international.

En 1945, elle devient chef de la section pour les réfugiés de Secours Quaker, à Paris. En 1952, elle dirige le bureau de Care, au Mexique. Pendant vingt-deux ans, soit de 1960 à 1982, elle sera consultante pour AID, the Peace Corps et le Fonds d'éducation outre-mer pour la Ligue des femmes électriques.

Depuis 1982, madame Elmendorf n'aura jamais cessé d'être invitée comme professeure et conférencière pour plusieurs universités et un grand nombre d'organismes humanitaires et internationaux.

Récipiendaire de plusieurs prix, elle s'est vu attribué, entre autres, le prix Margaret Mead et le Certificat d'honneur du World Who's Who of Women. Elle a rédigé un nombre impressionnant d'articles, d'ouvrages techniques et de livres spécialisés.

À 80 ans, elle agit toujours comme consultante auprès de la Banque Mondiale pour le programme Water Supply and Urban Development, auprès du programme des Nations unies pour le développement (PNUD), auprès de l'US AID, ainsi que plusieurs autres.

## ROMÉO MAÏONE

Monsieur Roméo Maïone est né à Montréal, Québec. Détenteur d'un doctorat en sciences sociales de l'Université d'Ottawa, monsieur Maïone parle couramment quatre langues: le français, l'anglais, l'italien et l'espagnol.

De 1940 à 1952, il est Délégué principal d'atelier pour le local 1660 de l'Association internationale des machinistes. En 1953, il est élu président de la Jeunesse Ouvrière Chrétienne et, en 1957, il est l'organisateur en chef du Congrès de la même association qui réunit quelques 30,000 membres à Rome.

En 1962, il est assistant-directeur du Département d'Action sociale de la Conférence Catholique Canadienne et devient, de 1963 à 1966, directeur-adjoint au Département des Affaires internationales du Congrès du Travail du Canada.

Il accepte, en 1964, la présidence de l'Assemblée Mondiale des Jeunes. On lui confie, en 1965, un rôle sur la Commission Royale d'Enquête sur les conditions de travail au Ministère des Postes. De 1967 à 1972, il est directeur général de l'Organisation Catholique Canadienne pour le Développement et la Paix.

En 1972, il dirigera pendant deux ans le département des Affaires internationales du Congrès du Travail du Canada. En 1975, on lui offre la direction de la Division des organisations non gouvernementales de l'Agence canadienne de développement international, poste qu'il occupera jusqu'en 1984.

Après une année sabbatique en Australie en 1985, il revient au Canada pour travailler en tant que consultant en développement international.

## ELIAS ROSALES ESCALANTE

Monsieur Elias Rosales Escalante est né à Cartago, au Costa Rica. Il détient un diplôme en ingénierie civile de l'ITESM au Mexique et un diplôme en ingénierie sanitaire de l'Institut international d'ingénierie hydraulique et environnementale de Hollande.

De 1979 à 1984, monsieur Rosales s'est appliqué dans la recherche pratique, dans l'enseignement et dans l'ingénierie pour l'Institut technologique de Costa Rica.

De 1984 à 1988, il s'implique activement dans un projet de recherche, le Lime Kiln, pour le même institut.

Depuis 1988, il travaille surtout dans la recherche et le développement pour les projets de technologie hydraulique de pompes manuelles, The Unimade au Costa Rica, en plus d'intervenir comme personne-ressource pour l'établissement de stratégies en gestion de l'eau.

De plus, il participe aux travaux et aux recherches de deux ONG: CECADE et FUNDATEC. Son expérience et son expertise sont reliées aux problèmes ruraux d'approvisionnement et d'assainissement de l'eau, en visant aussi l'implication et la participation de la communauté.



# FORUM INTERNATIONAL DE MONTRÉAL

LES O.N.G. EN INTERACTION

LES 18, 19 ET 20 JUIN 1990: À MONTRÉAL

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*Pour diffusion immédiate*

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### FORUM INTERNATIONAL DE MONTRÉAL:

## 80 PAYS FONT FACE À DE SÉRIEUSES PÉNURIES D'EAU DOUCE

(Montréal, le 25 mai 1990) -- Actuellement, 80 pays regroupant à eux seuls 40% de la population mondiale font face à de sérieuses pénuries d'eau douce. La santé de plusieurs millions d'individus est menacée. Pendant ce temps, l'Organisation mondiale de la santé ne cesse de répéter que 80% des maladies qui font des ravages dans les pays en développement proviennent directement du manque d'eau ou de son insalubrité.

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Les 18, 19 et 20 juin prochains au Palais de la Civilisation de Montréal, une centaine d'intervenants du milieu des ONG de différents pays du globe se pencheront sur la question dans le cadre du Forum international de Montréal initié par OXFAM-Québec.

Les problèmes d'approvisionnement en eau potable sont criants pour une grande partie de la population mondiale. Deux milliards d'êtres humains n'ont pas accès à l'eau potable. Sans eau, point d'agriculture, point d'hygiène, point de développement.

L'un des grands problèmes auxquels nous faisons face, c'est que nous avons pris l'habitude de considérer que l'eau douce est une ressource inépuisable, illimitée. Or, seulement 3,5% du volume d'eau douce existant sur la Terre est disponible. Certaines études nous apprennent que l'industrie pollue globalement, chaque année, 98% du montant total du volume annuel global.

(verso)

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Aux côtés de cette vision apocalyptique, il y a des données encourageantes. L'humanité dispose de suffisamment d'eau douce pour faire vivre 20 milliards d'individus. Le problème est ailleurs: c'est la répartition de cette eau... puis l'usage qu'on en fait.

Le Canada possède à lui seul 9% des réserves mondiales d'eau douce. Chaque jour, chaque famille canadienne utilise près de 160 litres d'eau douce pour le bain, la vaisselle, la chasse d'eau de la toilette. Nos besoins primaires (boire, se laver et rester en santé) ne nous demandent qu'environ 30 litres par famille par jour. Ailleurs dans le monde, cinq millions d'enfants meurent chaque année de la diarrhée causée principalement par la consommation d'une eau insalubre. D'autres meurent tout simplement de soif.

Le Forum international de Montréal traitera des problèmes d'approvisionnement en eau potable. Un problème de taille qui, pour le moment... nous coule entre les doigts.

(30)

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## COMMUNIQUÉ DE PRESSE Pour diffusion immédiate

### FORUM INTERNATIONAL DE MONTRÉAL: Exposition Internationale de photographies "S.O.S., L'EAU C'EST LA VIE."

(Montréal, le 6 juin 1990) - OXFAM-Québec présente une exposition internationale de photographies ayant pour thème "S.O.S., l'eau c'est la vie." Cette exposition se tiendra du 18 juin au 3 septembre prochains au Pavillon Oxfam "Eau et développement" situé en face du Palais de la Civilisation sur l'île Notre-Dame à Montréal.

A l'Aide du véhicule magique de la photographie, cette exposition fournira les informations et les données les plus actuelles sur la question essentielle de l'eau dans le monde. Elle sera présentée sous forme de 25 panneaux et comportera une centaine de photos, en noir et blanc, qui mettront en lumière toute la force et l'importance de l'eau pour l'homme, pour la nature et pour la vie. Plus d'une vingtaine de thèmes seront abordés, dont "Porteuses d'eau", "Eau à tout faire", "Niveau d'eau, niveau de vie". Des textes explicatifs bilingues accompagneront les photos.

Cette exposition s'intègre dans le cadre du Forum International de Montréal qui se tient les 18, 19 et 20 juin prochains au Palais de la Civilisation. Quelques 120 intervenants des organisations non gouvernementales mondiales (ONG) se pencheront alors sur les problèmes cruciaux d'approvisionnement en eau potable et en

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assainissement auxquels fait face la communauté mondiale. Le but de cette rencontre vise la formulation et l'adoption d'une charte qui fera partie intégrante des travaux de clôture de la décennie internationale de l'eau potable et de l'assainissement prévus pour septembre prochain à New Delhi.

Parcourir cette exposition d'envergure internationale, c'est à la fois vivre et mieux comprendre toute la nécessité pour l'humanité de préserver l'eau, cette richesse qui se fait de plus en plus rare. C'est aussi manifester sa solidarité avec les pays en développement qui vivent tous les jours des problèmes sérieux d'approvisionnement en eau potable.

Cette exposition a été réalisée par OXFAM-Québec en collaboration avec la Cité des Sciences et de l'Industrie de Paris (La Villette), l'Agence canadienne de développement international (ACDI), le ministère des relations internationales du Québec, le ministère de la Coopération française et du développement, le programme français Solidarité-Eau et le Centre international de reportages et d'informations culturelles (CIRIC).

-30-

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