Education, Gender Partnership, Finance: decisive keys to combat water stress?

proceedings of the
5th Interdisciplinary Colloquium
organized by the W4W
on 20 March 2018
at Geneva's History of Science Museum

WORKSHOP FOR WATER ETHICS

IRSE

Education, Gender Partnership, Finance:
decisive keys to combat water stress?

Proceedings of the 5th Interdisciplinary Colloquium

organized by the W4W Group (Workshop for Water Ethics) on March 20, 2018

at Museum of History of Science of Geneva

Preview proceedings

2011 “Too Much or Not Enough, How Can We Wisaly Deal With This Vital and Unpredictable “Resource?

2012 “Water, Vital Need and Global Justice”

2013 “ A Global Water Ethic”

2017 “Oceans Flooded with Plastic: Myth or Reality?”

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Members of the W4W Group

A doctor of ecophysiology at the Orsay Faculty of Sciences (Paris-Sud), **Annie BALET** worked on metabolism and the ultrastructure of plants in reaction to environmental problems. She subsequently taught biology at the secondary-school level, raising the awareness of students to associated environmental and humanitarian issues. She helped organize informal week-long seminars on sustainable development.

Benoît GIRARDIN is a professor of political ethics at the Geneva School of Diplomacy and International Relations, a university institute. He has extensive international experience, having been responsible for Swiss cooperative development efforts in Cameroon, Pakistan, and Romania, then later for evaluation, finally serving as the ambassador to Madagascar. Initially, he had earned a doctorate in theology at the University of Geneva in 1977.

Evelyne FIECHTER-WIDEMANN is a hon. member of the Geneva bar and holds a master's degree (MCJ) from New York University. After obtaining a doctorate in theology at the University de Geneva in 2015, she is pursuing her research on the global ethics of water in Singapore. She served as a deputy judge on a judicial commission of CRUNI (Geneva's administrative court) and taught Swiss and international public law at the Collège de Genève. She was on the Swiss Church Aid (EPER) foundation's board and also that of the International Museum of the Reformation.

Following her studies at the University of Geneva, **Laurence-Isaline STAHL GRETSCH** spent fifteen years as an archeologist specializing in prehistory, both in Jura Canton (for construction related to the Trans-Jura freeway) and at the University of Geneva. Following the defense of her dissertation in sciences, she was hired by Geneva's History of Sciences Museum, which she headed for over ten years. In 2009 the museum created an exhibit on hydropower in Geneva.

After earning a master's degree in civil engineering at the Swiss Federal Institute of Technology in Zurich, **Christoph STUCKI** initially specialized in analyzing the behavior of materials at the Swiss Federal Laboratories for Materials Science, before joining an engineering firm in Lausanne. He then developed a railway network planning model at the Swiss Federal Institute of Technology in Lausanne. In 1980 he became the general manager of Geneva's public transport system. Currently, he is the president of Unireso, the cross-border transport fare network for a basin encompassing parts of France, Vaud, and Geneva.

Gary VACHICOURAS, who holds a doctorate in theology, studied at the Holy Cross Greek Orthodox School of Theology (Brookline, Mass.), the University of Paris IV-Sorbonne, and the University of Athens. He was a teaching fellow at the Ecumenical Patriarchate's Orthodox Center in Chambésy-Geneva and the executive director of the Foundation for Interfaith and Intercultural Research and Dialogue. His involvement in higher education has touched on human security, especially through his teaching, innovative research, and intergovernmental dialogue.

Following his training as a professional IFR pilot, **Renaud DE WATTEVILLE** traveled and created Swissmate, an events management company. For over 20 years he managed projects for various companies in Switzerland and abroad. In 2008 he started Swiss Fresh Water SA, which developed a low-cost decentralized desalination system intended for use by low-income populations. This was an opportunity for him to make his experience available for a high-impact industrial project.

W4W Group (Workshop for Water Ethics)

W4W Group is an apolitical civic-minded interdisciplinary platform that brings together notable figures from the theological, ethical, political, scientific, economic, and legal spheres who share a common concern for water challenges in a globalized world.

Water is a natural resource that was long considered a free good. Its status is changing as awareness of its increased scarcity grows, and especially as it is used abusively (polluted and wasted, especially in agriculture).

Indeed, this resource is increasingly threatened not only by increasing demand from the public, agriculture, and industry, but also by climate change.

To meet the demand and avoid water wars by defusing water-related conflict, the public sector – in partnership with the private and community sectors – must create appropriate conditions for managing this resource fairly and sustainably.

It has set the following goals for itself:

1. Conceptualize and explain the ethical dimension – essential for identifying and implementing solutions – of fair and sustainable water management in a globalized world;

1. Contribute original thoughts that could influence the creation of a favorable environment for implementing the Sustainable Development Goals (in particular 12.1, 12.5 and 14.1);

2. Take these solutions' interdisciplinarity into account;

3. Using a pluralist and ecumenical approach, establish contacts with existing ethical focus groups, for example IRSE, Gloethics.net, the Institute of Business Ethics, and similar entities globally;

4. Involve influential private-sector players, university researchers and students, as well as civic-minded associations;

5. Organize colloquia on the topic of water's ethical challenges in a globalized world, provide targeted information to decision-makers and influential stakeholders, and exchange thoughts in networks and on blogs.

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Speakers

Christophe Chalamet is Associate Professor at the Faculty of Theology of the University of Geneva since 2011, after eight years at Fordham University, the Jesuit University of New York. His latest book is entitled *Une voie infiniment supérieure* (Labor et Fides, 2016).

A Rwandan national, **Josephine Mukabera** received her PhD in Gender Studies from the National University of Seoul in 2017, after completing a Master's degree in Development Studies in Ireland. From 1995 to 2009, she worked as coordinator of a counseling and reintegration program for women in distress in Rwanda. Since 2010, she has taught at the Protestant University of Rwanda and heads the Rural Development Department. Since 2007, she has focused her research on the social change in the status of Rwandan women and gender relations after the genocide, the subject of her thesis.

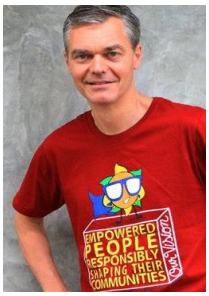
Julia Bertret is an Environmental Engineer and holds a Master's degree in Entrepreneurship from HEC Paris. After starting her career in environmental strategy consulting, she was responsible for creating and developing Veolia Environment's open innovation program. Since 2017, Julia has devoted her energy to developing fWE, which aims to offer new models for financing environmentally related infrastructure in order to accelerate the ecological transition.

After obtaining her Bachelor Degree in Management & Tourism at HES-SO in Valais/Switzerland, **Clémence Langone** worked as a volunteer in Brasil for a NGO promoting social and economic development for women. She is presently "project manager" at the Foundation Access to Water at Romanel-sur-Lausanne.

Born in Cameroon in the Bamileke region, **Hermine Meido** studied in Geneva where she obtained a PhD in Psychology. An independent psychologist, she has also practiced ethno-psychiatry in hospitals and is the author of several books and articles on cultural diversity. Very committed to helping the Health Centre in her village, she created an association in 2006 in Switzerland. As a traditional African queen, she was able to motivate the inhabitants to carry out the earthworks for water catchment and pipe installation. Now not only the Health Centre but also the different districts of the village are supplied with drinking water via 24 standpipes.

Christian Häberli is a Fellow at the World Trade Institute on food security from a trade and investment perspective. His professional career with the ILO and the Swiss government led him to chair the WTO Committee on Agriculture and to be a panelist in some twenty dispute settlement proceedings.

After obtaining Master's degrees in Conference Interpretation and Economic and Social Sciences from the University of Geneva, **Jeanne Barras Zwahlen** began a diplomatic career with the Ministry of Foreign Affairs of the Swiss Confederation, and then served as an economic advisor to the Swiss delegation to the OECD in Paris. She was Senior Economist at Credit Suisse in Zurich and served on the Boards of responsAbility in Zurich and Symbiotics in Geneva. She is currently an independent consultant at Bank Julius Baer in Geneva and a member of the Board of Child's Dream Foundation.



After nearly 20 years with UBS, **Marc Thomas Jenni** left the bank in 2003 to set up Child's Dream Foundation together with Daniel Siegfried. Marc is a 'Swiss Certified Banker' and holds an Executive MBA Degree from the Swiss Banking School, Zurich. While working in Hong Kong and Singapore as a private banker, Marc had the privilege to meet many wealthy individuals who helped the less fortunate by making donations and volunteering in various charity projects in the region. This inspired him to do his part in making a difference for the underprivileged in society.

Daniel Marco Siegfried is a co-founder and the head of projects of Child's Dream Foundation. A Chartered Financial Analyst (CFA) and graduate of the Zurich Business School, Daniel worked for 9 years at UBS in Zurich, Hong Kong, Seoul and Singapore. During his years with UBS he traveled extensively in the region, visited numerous charitable organizations and encountered many different underprivileged groups. Of them all, it was children who made the greatest impact on him, and who inspired him to intensify his involvement in charity work.

Annie Balet, Benoît Girardin, Evelyne Fiechter-Widemann of W4W Group.

Foreword

Education, Gender Partnership, Finance :

decisive keys to combat water stress?

Evelyne Fiechter-Widemann, W4W Group

With this 5th colloquium, opened to a large public, the W4W remained faithful to its ethical and interdisciplinary approach of developing viable solutions to the difficulties of accessing and reusing water (water stress) common in many countries of the globe.

The W4W postulated that responsible water management includes providing access to education and information for all, promoting gender balance when it comes to tasks, and using efficient technologies and appropriate financial instruments.

The panel had researchers from different parts of the world, and W4W is very thankful for their valuable contributions to a complex issue.

W4W's thanks are extended to all persons who made the venue at the great hall of its History of Science Museum possible, among them **Laurence-Isaline Stahl Gretsch**.

Introduction

The importance of women's voices where water stress is a threat: observations from Zimbabwe, South Africa and Singapore

Evelyne Fiechter-Widemann, W4W Group

Preamble

The third principle of the 1992 *Dublin Statement on Water and Sustainable Development* is dedicated to women, in the following terms:

Women play a central part in the provision, management and safeguarding of water. This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programs, including decision-making and implementation, in ways defined by them.

What has been achieved in twenty-five years? Very little. To move the agenda forward, our think tank on water ethics, the W4W, proposes to focus on education, gender partnership and the search for appropriate financial models.

This introduction to the 5th W4W Colloquium will be divided into two sections. After defining the meaning of "water stress", I will illustrate how this concept can be applied in the field, through personal observations in Zimbabwe, South Africa and Singapore. My aim is to combine theory and reality.

Water stress, a new concept

Water stress is an economic indicator, invented in 1986 by the Swede Malin Falkenmark, renowned for her research in science, focused on water solidarity and the resilience of water in particular. She sought to quantify the amount of water needed for an acceptable life. Simply put, water stress occurs when the amount of water available is less than the amount needed to meet needs or when water supply does not meet demand. The table below shows three degrees of water scarcity:

Water Stress	Water Scarcity	Absolute Water Scarcity
the volume of water available in a country, per year and per capita, is less than 1,700 m^3	the available water volume is less than 1,000 m^3/year per capita	the available water volume is less than 500 m^3/year per capita
4,600 liters/day per capita	2,700 liters/day per capita	1,400 liters/day per capita

Let me point out that the available water mentioned in this table uses the concept of virtual water. In addition to drinking water, this concept includes water for personal care, cooking (about 150 to 200 liters), and water to produce food and clothes, or about 4,400 liters.

In our ethical reflections, the W4W postulates that water scarcity is not inevitable. While water is certainly a natural phenomenon, it is also and above all an anthropic and therefore social phenomenon: that of the good management of the resource.

This reflection will be supported by factual contributions, during the case study section, particularly in Africa and Asia.

Observations in Zimbabwe, South Africa and Singapore

I chose to visit these three countries in order to better understand the degrees of water scarcity explained in the table above. Zimbabwe suffers from water stress, South Africa from water shortage or scarcity and Singapore from absolute water scarcity.

In **Zimbabwe** in 2011, under the dictatorial regime of Robert Mugabe, I met women who spent most of their day fetching water. Will the new head of the country, Emmerson Mnangagwa, be able to turn the situation around, which could play a crucial role in access to water? Only time will tell, and in particular the elections under close international supervision next summer. Meanwhile, women will continue to walk many kilometers to provide for their families' water needs.

In **South Africa**, I observed that not all regions have access to the prosperity that the country enjoys. In the Limpopo region I visited, the situation was not much better for women than in Zimbabwe. On the other hand, unlike in Zimbabwe, the conditions for better development do exist. Women's rights are also better reflected in South Africa's Constitution.

Singapore is a country suffering from absolute water stress because it does not have enough fresh water for its 5.5 million inhabitants. It must exploit unconventional water sources such as desalinated water or wastewater converted into NEWater. If it has been able to develop these innovative water resources, it is thanks to new technologies, in particular reverse osmosis, as the Access to Water foundation will discuss this afternoon.

I note with pleasure that three women have contributed to Singapore's well-being in its struggle against absolute water scarcity, one Chinese, one American and one Mexican, Olivia Lum, Juan Rose and Cecilia Tortajada respectively. Olivia Lum founded Hyflux, the company that runs the water reprocessing plants, and Juan Rose lived in Singapore for 17 years to promote NEWater. Cecilia Tortajada published in 2013, with two other authors, the *Singapore Water Story* which reports on Singapore's incredible resilience in providing access to drinking water for all. Granted, the villagers who lived in stilt-huts, as is still seen today in Malaysia, a few kilometers from Singapore, and had neither running water nor toilet facilities, were moved to low-income housing, called HDB, but they did get tap water and toilets in their new homes. We are talking about the generation of pioneers, who are widely respected and admired by Singapore's current inhabitants and are supported by social assistance programs.

Conclusion

Before concluding, and in anticipation of the speech at the end of the afternoon by Child's Dream, an NGO founded by two Swiss bankers, I will say a word about philanthropy, to which I devoted a chapter in my book published last year *The Human Right to Water: Justice or... Sham?*

In the book, I point out that although there is resentment towards those who have significant economic resources, some of those who have gained these resources by their own efforts have chosen to share with the most vulnerable. For instance, the banker Lien Ying Chow founded the Lien Foundation in Singapore, which today focuses on three areas, namely education for disadvantaged children, the issue of water and care for the elderly. His Chinese widow had a verse from Luke's Gospel (12:48) put on the website of the Lien Foundation: *"From everyone to whom much has been given, much will be required; and from the one to whom much has been entrusted, even more will be demanded"*.

Theological Perspective

Gender partnership and water management: what do ethicists/theologians say?

Christophe Chalamet

"Praised be You my Lord through Sister Water, So useful, humble, precious and pure".[1]

Lack of access to water kills, and kills many: 2.5 million people die each year from lack of access to water (Baechler 2017:175). Dirty or contaminated water kills more than war, malaria, AIDS and traffic accidents combined (Barlow 2007:1). When it does not kill, lack of access to drinking water makes people sick, keeps children and adolescents away from school and makes the lives of countless adults complicated and difficult. It is not just education that suffers from this situation, but also political and economic life.[2] I mentioned children, adolescents and adults, but in fact most of them are young girls and women.

This observation alone, the awareness of the scale of the problem and the dramatic, tragic consequences of the lack of access to water, cannot but touch our hearts, whoever we are, wherever we live, whatever our philosophical, political and religious convictions.

What do Christian theologians and ethicists say about these issues? The authorities of the great historical Churches have taken a stand, through the World Council of Churches, Patriarch Bartholomew, who is closely interested in the issue of water and the great rivers, and Pope Francis, in the first lines of his encyclical Laudato Si' (May 2015): "*The violence present in our hearts, wounded by sin, is also reflected in the symptoms of sickness evident in the soil, in the water, in the air and in all forms of life*". (Laudato Si', §2; see also §§27-31 on "The Issue of Water"). Among theological ethics specialists, Christiana Zenner Peppard ends her book *Just Water* (2014) with a chapter entitled "Women, Wells, and Living Water". She points out that it is mainly women who fetch water, in many countries that do not have sanitary infrastructures, and this has become the norm in Europe (32, 179-180). Responsibility for water supply is not gender neutral. In fact, drinking water does not flow indiscriminately, it does not flow in all directions: it flows towards those who have power at all levels, one could say: at the family level, at the level of urban districts, which are served very unequally in some countries, at the level of regions of countries, continents and the world.

How can we mitigate the serious problems of access to water? How can we relieve the water stress that affects so many human beings on our planet? How can we move towards greater access to water when demographics worldwide - but especially in the countries of the southern hemisphere, which are already suffering most from the problem - forecast an explosion of new births and very large human population growth in the coming decades? How can we achieve fairer, more equitable access to water while recognizing the strong growth of the middle classes that is predicted in various countries, with the explosion in per capita water consumption that accompanies this type of growth (Baechler 2012:7)?

How can people who know little or nothing about water stress at the personal, family, regional and national levels become more aware of water access issues in different parts of the world, in

[1] François d'Assise, "Le cantique des créatures", in *Écrits*, Paris Cerf, 1981 (Sources chrétiennes 285), p. 383.

[2] Cf. UN Women, http: //www.unwomen.org/en/about-us/about-un-women, as well as the document "Women and Water" (February 2005), *Women2000 and Beyond*; Christiana Zenner Peppard, *Just Water. Theology, Ethics, and the Global Water Crisis*, 2014, 32).

Asia, Africa, the Americas, and elsewhere (Baechler 2017:176-177)?

The Global Water Summit that recently took place in Paris (15-17 April 2018), with the title Transcending Boundaries, attracts more top water leaders and business executives than any other water event. The basic view is that this summit "recognizes the intrinsic link between water and money, it aims to revolutionize the role of water in the global economy".[3]

Faced with the large multinationals that see water essentially as a source of profit, a theological contribution could aim at promoting - through publications, teaching in civic and religious communities in the countries of the southern and northern hemispheres - better partnerships between men and women, with shared responsibilities regarding access to water.

Both Jewish and Christian traditions focus on the notion of "covenant". The Christian Scriptures have been known since the first centuries of Christian thought as the Old and New Testaments, that is, the Old and New Covenant. This theme of the covenant can be used again, in a theological sense. Both Jewish and Christian faiths, however, do not separate, when properly understood, the vertical dimension of the relationship to God from the horizontal dimension, that of the relationship amongst human beings, whoever they may be, and with particular regard to the most vulnerable members of a given society. The covenant, in these two dimensions of verticality and horizontality, is a way of feeling connected to others, of being engaged in a relationship, and being largely responsible for it.

Many biblical passages, taken from the Hebrew Bible or the Old Testament, show us how, on the basis of the covenant, an urgent appeal is made to remind the people what it means to live in this covenant. The covenant forbids the abuse of others, especially the most vulnerable: widows, orphans, displaced persons, refugees and exiles.

Without claiming directly to transpose the messages of the Hebrew prophets (from Amos and Hosea continuing on to Jesus of Nazareth), could we not reactivate or update their reminder of the covenant at the level of social relations, and especially their warning against the abuse and ill-treatment of people who are virtually powerless, people whom we hardly see or whom we do not want to see? Could we conceive of an understanding of the covenant, among Christians, that would correct the preferential treatment that men grant themselves, such that the task of fetching water most often rests on the shoulders, arms and heads of women and girls? Is a fairer covenant possible between men and women, within families, villages and cities? Can we recall, as Evelyne Fiechter-Widemann does in her doctoral thesis, now published in English and French (2017), the importance of the golden rule (*"In everything do to others as you would have them do to you; for this is the law and the prophets"*, Matthew 7:12)? The golden rule expresses in its own way the bond that should connect us to one another - the bond of the covenant, without a doubt, a bond that, paradoxically (this is the great mystery of freedom), is the source of freedom.

Nothing is less certain, at a time when growing Protestantism in many countries of the southern hemisphere is proposing a literalist interpretation of the Bible and is more interested in questions of individual salvation and hope of the afterlife than in the never apolitical message expressed through the words of the prophets of Israel as well as those of our time like Martin Luther King Jr., Dorothy Day, Desmond Tutu and Sister Emmanuelle, to name but four exceptional personalities. As Heather Eaton states in a recent article on the relationship between injustice and gender, "religious institutions are one of the few public spaces where debates about values, ethics and societal choices are possible. Taking a leadership role to support these debates, but also to recall the religious meaning of

[3] I quote more broadly: "Founded in 2006, The Global Water Summit remains a unique event for the water sector. Not only does the event assemble more top corporate executives and water leaders than any other event, it also acknowledges the intrinsic connection between water and money and sets out to revolutionize the role of water in the global economy", http: //www.watermeetsmoney.com/about/ (consulted on 19 April 2018). Such events seem to be totally captive to the interests of multinationals (see Barlow 2007: 54).

the Earth, is a decisive responsibility in the framework of religion and ecology".[4]

The covenant in the Bible is condensed into the phrase: *"I will be your God, you will be my people".* This phrase is found in the very last chapters of the Bible, in chapter 21 of Revelation (verses 5-7):

"And the one who was seated on the throne said, *"See, I am making all things new".* Also he said, *"Write this, for these words are trustworthy and true".* Then he said to me, *"It is done! I am the Alpha and the Omega, the beginning and the end. To the thirsty I will give water as a gift from the spring of the water of life. Those who conquer will inherit these things, and I will be their God and they will be my children".*

The close link in this passage between the covenant and the free offer of the water of life to those who are thirsty is worth examining more closely. In Christian theology, God is the one who initiates this covenant relationship, which is a relationship of friendship and mutual understanding, and God who initiates the covenant is himself the *"spring of the water of life"* (Jeremiah 17:13; John 4:14; 7:38), given without cost. Here is the invitation of the prophet Isaiah (55,1a): *"Ho, everyone who thirsts, come to the waters; and you that have no money, come!"* All this, this free gift, is an integral part of the covenant that God makes with his people, and with humanity and all of creation. God offers without cost. On Earth, between human beings, things are very different of course. Without adopting a utopian vision that ignores the economic data underlying our relationship to water, can those who claim to be part of this covenant proclaimed by a prophet like Isaiah accept the blatant commodification of water? Can we envisage a prophetic pragmatism in ethics that aims at a certain "transformation through critical participation in reform processes"?[5] According to Willis Jenkins, a pragmatic strategy starts by examining the problems we face, and then carefully looks at how reform projects use their own traditions to elicit attempts to address these problems.[6]

On the basis of this covenant, and no doubt also independently of it, there are covenants to be formed, for Christians, Jews, Muslims and members of other religious traditions as well, but also agnostics and atheists, to put pressure on the corrupt governments of so many countries: governments that care little about the conditions in which their fellow citizens live. In Luanda, Angola, only one in six households has access to basic sanitation services (Barlow 2007:10). There are too many governments that are either unequipped, inattentive, or uninterested in the fact that a very high percentage (90% according to Maude Barlow; see Barlow 2007:6) of wastewater is discharged, untreated, into rivers, streams and coastal waters. It is not only human beings who suffer and die from this situation. Animals also suffer the full consequences, at a time when human beings reserve the largest share of clean water for themselves (Barlow 2007:6).

There is also pressure to be exerted in Europe and information to be disseminated in relation to the large Western multinationals (which often have the support of Western governments and embassies throughout the world) so that they do not forget the poor populations in the countries where they operate.

Maude Barlow is right to call for a global covenant for water.

I will conclude by quoting these words of Pope Francis in the encyclical Laudato Si' that I have

[4] "Religious institutions are one of very few public spaces where discussions about values, ethics, and social choices are possible. Taking a leadership role in both encouraging these debates, as well as affirming the religious significance of the Earth, is a key role for religion and ecology efforts", Heather Eaton, "Gender Injustice", in: *Routledge Handbook of Religion and Ecology*, New York, Routledge, 2017, p. 326.

[5] Willis Jenkins, *The Future of Ethics. Sustainability, Social Justice, and Religious Creativity*, Washington D.C., Georgetown University Press, 2013, p. 9.

[6] "A pragmatic strategy supposes that the most interesting ethical production happens within the tactics of live moral communities because those tactics enable a community to keep cultivating the sort of moral agents who can understand themselves and so give answer to God amid *and for* emergent powers and unprecedented problems", *Ibid*., p. 84. The point is to begin "from problems" and attend "to how reform projects use their traditions to create faithful responses", *Ibid*., p. 88.

already mentioned: *"Access to safe drinkable water is a basic and universal human right, since it is essential to human survival and, as such, is a condition for the exercise of other human rights. Our world has a grave social debt towards the poor who lack access to drinking water, because they are denied the right to a life consistent with their inalienable dignity"* (Laudato Si', §30) - *"Soil, water, mountains: everything is, as it were, a caress of God"* (ibid., §84).

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Sociological Perspective

Gender and development: analysis framework for gender role change

Josephine Mukabera (Rwanda)

Gender and development: gender role change analysis

Introduction

The roles and responsibilities of women and men in society are influenced by perceptions and expectations arising from cultural, political, ecological, economic, social and religious factors, as well as customs, laws, social class, ethnicity and individual or institutional prejudices (Lindsey, 2005). In patriarchal societies and cultures, women continue to face discrimination based on customs and traditions. The gender approach promotes formal and real equal rights for women and men, equitable sharing of resources and responsibilities, and more comprehensive and sustainable human development for all (Goetz, 1998).

The analysis framework for gender role change

The framework for analyzing role change focuses on more equal participation of both genders in development, as well as transformations related to cultural and traditional, religious, legal and political limitations. The following analysis of role changes will consider the case of Rwanda. It will draw primarily on Harvard's analytical framework, the social relations approach, and other frameworks that analyze laws and regulations that affect women's and men's access to and control over resources (Macdonald, 1994).

Rwanda has experienced a succession of political regimes characterized by ethnic and regional discrimination, and which maintained a culture of impunity and gender divisions for years. The Government of National Unity set up after the Tutsi genocide (1994) committed itself to promoting equality between men and women in all fields (United Nations, 2000). In practice, the change in gender roles in Rwanda is linked to many factors and the interaction of many development actors:

- Contribution of women individually or in associations: because of the marked decrease in numbers of men after the genocide, women, individually or in

associations, have played an essential role in national reconstruction, even taking on family and community responsibilities traditionally performed by men (Ballantine and Roberts, 2010). These women's achievements have persuaded and motivated political leaders to promote their involvement in the formal organization of society.

- Political will: Rwanda has ratified numerous international treaties enshrining the principle of gender equality. The 2003 Constitution allocates at least 30% of positions to women in decision-making bodies. The National Gender Policy focuses on positive actions to promote women's participation in all development sectors and the establishment of national policies for gender mainstreaming (Republic of Rwanda, 2009).

- The role of the international community: in addition to a considerable number of conventions prepared by international development actors that support gender equality policy and women's rights, Rwandan women's efforts have been supported by assistance and training from local and international organizations.

Notable achievements

Close collaboration between Rwandan women's associations has positively influenced *the revision and formulation of gender-sensitive laws and policies*. Examples include the law on matrimonial regimes, liberalities and successions, as well as the law relating to the prevention and punishment of gender-based violence.

Changes related to discriminatory responsibilities, norms and practices: in addition to the involvement of women in decision-making positions, different projects and activities promote women's

empowerment: banking projects facilitating women's access to loans; financial institutions initiated by women's associations; national education policy featuring positive discrimination strategies in favor of girls; projects facilitating women's access to healthcare; programs encouraging positive masculinity and male participation in traditionally female activities; and religious institutions that have included women in decision-making positions.

However, it is necessary to pursue training and research projects related to gender equality in order to support and improve on the milestones achieved. Likewise, the determination of men and women and the national and international network are crucial to the success of gender equality policies and programs.

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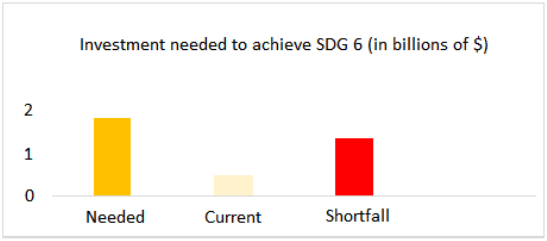
Economic Perspective

Developing new financing models to promote access to drinking water and sanitation

Julia Bertret

Currently, 1 billion people worldwide still live without access to drinking water and 2.5 billion without sanitation. The 193 United Nations Member States committed themselves to ensuring access to safe drinking water and sanitation in Goal 6 of the Agenda for Sustainable Development (SDG 6). Recent estimates by the World Bank indicate that investments in excess of $1.7 trillion are needed to achieve this by 2030. However, current funding is four times lower, at 420 billion. This means that 1.28 trillion must be mobilized to achieve the SDGs.



Source: World Bank

To find out how this shortfall can be financed, it is first necessary to understand how the water sector is financed today.

In developing countries, investments in the water sector are mainly provided by government loans and concessional financing from national, bilateral or multilateral development banks. Global development financing, which amounts to $130 billion, includes not only water-related investments, but also all other development sectors, and is therefore not sufficient to finance the 1.7 trillion needed.

The global economy is worth $100 trillion. Involving the private sector in water financing therefore seems to be the only sustainable way to achieve the SDGs. Unfortunately, today there are very few private financiers in this sector in emerging countries, because water is perceived as a risky and unprofitable sector.

How can water financing be made sufficiently attractive to private investors?

As we have seen above, a quarter of resources are now deployed, mainly by development banks, governments and, to a much lesser extent, by philanthropic foundations. Rather than using financial resources to carry out a limited number of projects in the form of loans and grants, why not use public funding as a catalyst to eliminate the barriers that currently inhibit private investment? This concept is called blended finance. It is defined as *"the strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets"*. Philanthropic and public financing can use various tools to reduce the risk of private financiers or increase their return, including development funds, guarantees, reserve funds and interest-free loans. Thus, the contribution of philanthropic or public funds can take different forms, depending on the needs of a project.

Case study: Blended financing for the expansion of the As-Samra wastewater treatment plant in Jordan

Location

Amman and Zarqa, Jordan

Context

Jordan is one of the most water-scarce countries in the world. Per capita levels of available water resources have fallen to 155 m^3, far below the 500 m^3 threshold of absolute water scarcity. In addition, the country's rapid population growth and a large influx of refugees are generating a huge increase in demand. This is placing enormous stress on the water infrastructure. In particular, the As-Samra wastewater treatment plant, initially designed to treat wastewater for Amman's 2.3 million

inhabitants, nearly reached its maximum capacity in 2008.

The Jordanian government therefore decided to expand the plant, and at the same time upgrade it to enable the use of treated wastewater in agriculture, thereby freeing up freshwater for use by the population. However, the project was too expensive to be financed by the country. Attempts at securing private financing through a bank loan were also unsuccessful.

Blended finance approach

As the project cost was $223 million, the Ministry of Water decided to finance it through a build-operate-transfer (BOT) contract. In the BOT framework, the government delegates the construction, operation and financing of the project to private companies. It grants them the right to operate it commercially, for a specified period, at the end of which the facility is transferred back to the government. Consequently, a special purpose vehicle (SPV) was created by a consortium of private companies, led by Suez, to make financing attractive to these private investors. A diverse blend of financing was accessed:

- a US development bank, the Millennium Challenge Corporation (MCC), provided a $93 million grant for the expansion work
- the Government contributed an additional $20 million
- payments are guaranteed by a reserve fund of the Ministry of Water, itself guaranteed by the Ministry of Finance

The blended finance approach reduced the project costs and increased profitability while limiting the risk.

The SPV financed the remaining $110 millions, including 102 million in commercial debt from a syndicate of Jordanian local banks and other institutions arranged by the Arab Bank. The remaining 8 million was financed by the consortium in the form of equity.

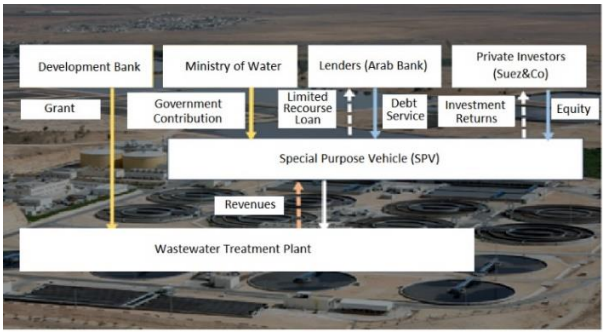


Figure 1: Investment contract model

Source: World Bank

Results

This approach made it possible to secure funding to increase the plant's processing capacity by 40%. The upgrade also enabled the treated waste water to be used for irrigation, freeing up additional freshwater for domestic use for over 2 million people.

Conclusion

The public funding and development grant made it possible to attract private financiers to this project, without whom the project would not have seen the light of day. For these private actors, the risks and returns were sustainable. For Jordan, this helped to address a vital problem for its population that it could not solve alone.

This type of model can be applied to many projects around the world, particularly in emerging countries. At fWE, we believe that promoting such models is one of the keys to solving the global water crisis. Thanks to our dual expertise in the water sector and in investment, we have given ourselves the mission of supporting local authorities and businesses in setting up outsourced management models for their water-related infrastructure. We develop and design with each of our clients the best solution for each case, identifying the stakeholders to involve in the project (development banks, private investors, water agencies, EPC contractors) then provide ongoing support until their project is effectively up and running.

For more information: http://waterassetdeveloper.com.

Part II: Water Management - Case Study

Water-kiosk women in Africa and Asia (a project jointly undertaken by the Access to Water foundation and Rotary)

Renaud de Watteville, Christoph Stucki and Clémence Langone

Founded in 2012 by Swiss Fresh Water (SFW), Access to Water (A2W) is a Swiss non-profit foundation promoting water treatment and job creation programs in low-income communities in developing countries. In late 2017, A2W installed 150 water treatment machines in DIAM'O kiosks in Senegal, creating 540 jobs, and providing access to drinking water to approximately 315,000 people. Every machine installed remains operational thanks to regular monitoring and maintenance via Internet telemetry.

The Access to Water foundation installs kiosks in villages of all sizes, from small to large. It then establishes cost-sharing of maintenance expenses among the kiosks.

In large villages, the foundation is able to finance the kiosks with loans from impact funds. However, in small villages, which are often in remote areas and have urgent water needs, and struggle the most with the out-migration of youth, it is necessary to find sponsors for each water kiosk installed.

This locally produced water is sold at a very affordable price negotiated with local authorities, varying between 0.7 and 1.5 cents per liter, i.e. 20 to 80 times cheaper than the first available drinking water. Even at such low prices, the water income is enough to finance local salaries and maintenance of the facilities, as well as repayment of the funds borrowed by A2W for the large villages.

Following the success of the project in Senegal, A2W decided to launch a second phase on both sides of the Senegal River in Mauritania, Mali, Guinea and Senegal, to install 100 new water treatment machines and generate 300 new jobs.

This will bring major benefits to nearly 500,000 people in four areas:

- Health: reduction of diseases linked to dirty, salty or polluted water, including diarrhea, fluorosis, hypertension, cancer, bilharzia, etc.
- Economic: job creation and reduced absenteeism
- Social cohesion: improved living conditions, reduction of rural exodus, increased integration of women into the labor market
- Environmental: reduction of waste through the use of recycled bottles, use of solar energy and reduced transport of water thanks to on-site production

The water treatment systems are developed in the Lausanne region by Swiss Fresh Water. While chlorine can kill bacteria and viruses, which in some cases is an effective and necessary solution, the SFW machine, thanks to reverse osmosis, can produce fresh water without chemicals, free of not only bacteria and viruses, but also hormones, antibiotics, pesticides, all heavy metals like lead and mercury, and salt. The machine produces up to 4,000 liters of drinking water per day, certified to meet WHO standards. Water composition and taste are very close to rainwater, which is highly appreciated by those who drink the water.

The water can be remineralized to suit different tastes as needed. Internet telemetry enables monitoring of each machine, and facilitates the coaching of those responsible for local maintenance from Switzerland if necessary.

Training in water-related jobs prioritizes women and youth

To install 100 new machines in the Senegal River region and increase the efficiency of existing kiosks, A2W and its partners in Senegal need high-quality, well-trained staff to implement the project. To that end, A2W is launching a new training program related to water professions that aims to both significantly improve the know-how of current kiosk employees, and also to train personnel for the new kiosks. The program goal is to create 300 jobs in the water sector, primarily for women and young people. The plan is to provide high-quality theoretical training followed by a practical internship of several months in one of the water kiosks. In collaboration with local women's associations, students will be recruited from villages targeted to be equipped with kiosks in the Senegal River region, namely in Mauritania, Mali, Guinea and Senegal.

To date, A2W has found that, of the many kiosks installed in Senegal, those where women play an important role in management are faring the best. At the same time, there is a strong demand for both rural and urban women's economic and social empowerment. Most of these women are eager to enter the work force, but often lack opportunities or independence. For this reason, A2W wishes to offer this training program primarily to women.

Example of sponsored projects

For its projects in rural areas, the Access to Water foundation receives donations from various organizations, including Rotary Clubs. A project to install five drinking water treatment units in the Kedougou region (Senegal) was sponsored by the Rotary Club Geneva-Lac in collaboration with the Dakar Soleil Club.

Water stress in sub-Saharan Africa: what challenges for women and health?

Annie Balet

In many countries in sub-Saharan Africa, women work long hours every day to provide water for their families and households. They draw water from ponds, backwater and rivers without treating it. However, in these countries, as in Mali, nearly 10% of the population does not have access to covered latrines, and outdoor defecation is a common practice. The feces of sick people contaminate water, hands, soil and food with pathogens that maintain the cycle of diseases such as diarrhea and intestinal worms. In addition, feces attract flies that spread pathogens and contaminate drinking water if it is not protected. Under these conditions, women are at once victims of this water stress, responsible for the spread of infectious agents and maintain the vicious cycle of poverty. In 2017, WHO estimates that the lack of drinking water and sanitation alone is responsible for 80% of the diseases affecting developing countries. Sub-Saharan Africa has a high rate of endemic waterborne diseases.[7] Thus, women and children suffer most often from diarrheal diseases, the second cause of death in children under five years of age; schistosomiasis, the second endemic parasitic disease after malaria; and trachoma, the leading cause of infectious blindness. Another form of gender inequality, related to the lack of asepsis and antisepsis during childbirth, is maternal and infant morbidity and mortality, which remain very high.

In addition, conventional medicine is unable to break the cycle of water stress-related diseases because the accessibility and quality of care in health facilities in rural areas are inadequate, and preventive care messages are difficult to understand. To solve health problems, the majority of the population uses traditional medicine because it is culturally more accessible, less expensive and there is at least one traditional healer in each village. Traditional medicine was combatted for many years, but was rehabilitated in 1978 by WHO in the Declaration of Alma-Ata, which advocated the use of traditional skills and knowledge available for primary healthcare. This declaration raised so much hope that WHO and the Heads of State of the African Union made it a priority.[8] But is traditional medicine safe and does it meet the desired quality and effectiveness criteria for primary healthcare? Given that conventional medicine focuses on the biomedical causes of diseases, and traditional beliefs adopt an empirical and holistic approach, is collaboration between these two types of medicine possible? Faced with this medical pluralism, how are water-related diseases addressed, what is the place of traditional knowledge, and what contribution does it make?

Let's start by examining how conventional medicine treats waterborne diseases. According to biomedicine, diarrheal symptoms are a sign of intestinal infection caused by various microorganisms such as viruses, enterobacteria or protozoa. Infection is transmitted through contaminated water or food, or from one person to another if hygiene is poor. However, three quarters of these infections could be prevented by access to drinking water and hand washing. Oral or intravenous rehydration treatments prevent the severe dehydration and water loss that led to death in the past. Due to a lack of antibiotics and vaccinations, bacterial septic infections are now the leading cause of death. In low-income areas, children under five suffer several episodes of diarrhea per year. Each episode deprives them of

[7] An endemic disease is constantly present in a population of a given region. It is caused by the presence of a reservoir of pathogens in the area which allows it to proliferate and contaminate humans.

[8] Declaration of the Decade for the Development of Traditional Medicine (2001-2010) by the Heads of State of the African Union. Since then, WHO has officially designated 31 August of each year as African Traditional Medicine Day.

the nutrients they need to grow. As a result, diarrhea is a major cause of life-threatening malnutrition and immunosuppression.

Also known as bilharzia, schistosomiasis is a vector-borne parasitic disease caused by schistosoma worms. Although in decline, this chronic disease affects poor populations who do not have access to water and sanitation and especially women who do their laundry in backwater and the children who accompany them to play. It is very disabling in adults and causes stunted growth in children. Contamination occurs when schistosoma larvae (called cercariae) emerge from water snails and enter the skin. In the body, adult worms live in the digestive or urinary tract where they reproduce. Infected people excrete eggs with their excrement, which in turn can infect the water snails. The snails then release the second generation of cercariae into the water. The single dose of Praziquantel reduces morbidity, but does not prevent superinfections, and should be repeated periodically on a large scale. In addition to building latrines, the other way to break the schistosomiasis cycle is to destroy the snails using either synthetic molluscicides, which are dangerous for fish, or extracts of native plants rich in saponins or tannins that are less harmful to the environment.

In Mali there is a linear relationship between the distance to the water source and the prevalence of trachoma among children ages 1 to 9. The prevalence is low when there is a well in the concession, but having to walk more than 30 minutes is a serious risk factor. Caused by repeated infections, trachoma manifests itself by chronic inflammation of the eyelids which causes the eyelashes to turn inward and rub on the eye, eventually leading to blindness. It is spread through contact with dirty hands, dirty clothes and flies contaminated by a bacterium, *Clamydias trachomatis.* Topical and oral antibiotic therapy does not prevent reinfection. The later effects of trachoma such as corneal opacities are more common in women because of the care they provide to children, who are reservoirs of the disease. At the advanced stage of the disease, surgery is performed to prevent blindness. Prevention is based on face-washing, providing safe drinking water at a reasonable distance and building closed latrines to prevent flies from proliferating.

More than half of maternal deaths occur in sub-Saharan Africa, particularly among rural populations. Most deaths are due to inadequate, late or absence of treatment. Among the main causes of maternal mortality[9] are infectious diarrheal diseases aggravated by pregnancy and intestinal parasitosis. Hookworm[10] causes severe anemia in pregnant women, resulting in low birthweight and premature birth, which can be life-threatening to the child. One of the complications during childbirth is the deformation of the pelvis resulting from the heavy loads of water carried from childhood over long distances. Added to this are the disastrous hygiene conditions during childbirth. According to WHO (2017), 38% of health facilities have no access to water, 19% have no sanitation facilities and 35% have no soap and water for hand washing. In these conditions, the risk for the mother of puerperal infection leads to 15% of all maternal deaths, and for the newborn, there is a high risk of contracting often fatal diseases such as neonatal tetanus or sepsis.

Let us now consider how traditional medicine can manage diseases. It can be defined as *"the sum total of all the knowledge and practices, whether explicable or not, used in diagnosis, prevention and elimination of physical, mental, social or spiritual imbalance and based on sociocultural and religious foundations of a given community, as well as on practical experience and observation handed down from generation to generation, whether verbally or in writing"* (Koumaré). The traditional practitioner's sphere of action is therefore not limited to diseases in the strict sense. As keepers of the heritage on

[9] Maternal mortality is defined as the ratio between the number of women who die during pregnancy and the 42 days after delivery and the number of live births.

[10] Intestinal parasitosis caused by two tiny round worms (nematodes), *Necator americanus* and *Ankylostoma duodenale* that contaminate the soil. This disease is transmitted by contact with soil contaminated with feces when walking barefoot or accidentally swallowing contaminated soil particles.

the potential of plants, traditional healers also offer holistic care.

Phytochemical studies have shown that the pulp of baobab fruit (*Adansonia digitata*), commonly used in self-medication for diarrhea, is rich in electrolytes and has the same effect as oral rehydration salts. *Moringa oleifera* leaf powder, used in the infant malnutrition program, is very rich in minerals, vitamins and protein. It contains all the amino acids essential to humans. Moreover, moringa seeds are used as a natural flocculent to clarify turbid waters, and are biodegradable, unlike aluminum sulphate. They also have a mild antibacterial effect and eliminate protozoan cysts.

As a pioneer in this area, Mali developed policies in 1968 to promote traditional medicine by creating the Department of Traditional Medicine (DMT) of Bamako within the National Institute for Public Health Research. In collaboration with traditional healers, the DMT has developed improved traditional medicines that have obtained marketing authorization. These medicines from the traditional pharmacopoeia are said to be improved because they have undergone scientific testing to verify their safety and efficacy, and the production quality is monitored. Numerous studies have shown that *Euphorbia hirta* extract is non-toxic, reduces intestinal motility and kills amoebas. Pharmacies sell Dysenteral, a tea made from *Euphorbia hirta*, at an affordable price to treat diarrhea and amoebic dysentery. In Senegal, Mbaltisane, also made from *Euphorbia hirta* and prepared by a private laboratory, obtained a marketing authorization.

The inclusion of traditional healers into the conventional health system is less advanced and takes longer to establish, as it requires intercultural dialogue and greater cooperation. Traditional practitioners enjoy high credibility and deep respect within their communities, and when well trained, they can avoid a delay in care by diagnosing and referring serious clinical cases to the mainstream health system. For example, traditional practitioners have their own diagnostic criteria: *"red eye disease that does not secrete pus; broken or itchy eyelashes correspond to the more advanced stage".*

In Africa, cleaning is the job of women, as they are involved in providing personal cleanliness, preparing food, caring for children and the ill and cleaning the house and yard. Although traditional healers do not subscribe to the notion of germs, they could be educated about hygiene, which is a medical notion that is different from cleanliness. As they are better respected than any other health specialist, as the UNAIDS study shows, they can be good messengers for hygiene measures, such as hand washing and water management, to prevent the spread of pathogens. Moreover, these hygiene measures are particularly important and effective if they are applied by traditional birth attendants.

In rural areas, traditional birth attendants are responsible for three quarters of all deliveries. In the villages, they are the only ones to provide healthcare during pregnancy, childbirth and the postnatal period. Moreover, the population is traditionally in favor of them. R. Sanogo and S. Giani have set up a communication and intercultural partnership program in Mali to promote traditional birth attendants. They learn the basics of antisepsis and asepsis, umbilical cord care, early detection of pregnancy complications requiring transfer of the mother-to-be and basic hygiene rules. The program has been effective in reducing perinatal tetanus and late neonatal deaths, encouraging immunization and registering births.

Endemic water-related diseases particularly affect women's quality of life, which is endangered during every pregnancy. These dangers can only be lastingly eradicated when safe drinking water, sanitation and hygiene education are accessible to all. To ensure better primary care coverage, the functional and structural failures of conventional medicine could be offset by promoting traditional medicine, to which the populations are very attached. It is important to advance the dialogue between these two types of medicines in order to perceive the possible convergence between traditions and biomedicine to enable traditional

medicine to modernize. It must be better supervised, regulated, categorized and standardized to provide effective, safe, high quality care. Traditional healers are valuable local providers of preventive and primary healthcare. The traditional pharmacopoeia offers avenues of research that can lead to the production of drugs to replace imported drugs. This ethno-medicine, which is affordable to lower-income populations, helps enhance the cultural and natural wealth and autonomy of sub-Saharan African countries.

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Drinking water in Batchingou: incredible confrontation between David and Goliath!

Hermine Meido

It was in October 2006 that, surrounded by some friends and close relatives, I had the privilege of convening the constituent assembly of GAB (Batchingou-Cameroon Action Group) in Geneva.

The initial aim was to improve the quality of care at the Integrated Health Centre in Batchingou, a village in western Cameroon.

The traditional authorities having welcomed our project with pride and enthusiasm, there was no reason not to get started. The large ceremony took place at the Batchingou chiefdom, all day on 31 December 2007. The notables gathered in the village were in charge of preparing and serving offerings to each of the nine sanctuaries of the village, without forgetting the old chiefdom.

After which, GAB began its activities in the field with complete peace of mind.

Initially, we provided training for the laboratory assistant, as well as the two nursing assistants to whom we continue to pay a monthly salary.

In order to reinforce staff training, GAB invited Jacques Bufquin-Goutaud, a nurse representative of the AGIR association in Paris, on several occasions.

In Geneva, the members of the Association felt that we cannot provide health without drinking water.

Luckily, I met Jean-Michel Yepdieu, Chairman of the Village Consultation Committee at the time, in Batchingou. In due form, his team had studied the terrain and located springs on Doubok Mountain. The report initially prepared and signed by the competent authorities had to be sent to Cameroon's capital, Yaoundé, for approval by the Office of Participatory Development.

Despite the efforts of the Consultation Committee, the project was not approved.

So it's not surprising that Jean-Michel became a founding member of GAB in Batchingou, and responsible for the water catchment project.

Then, around this simple and courageous man, a core of "dedicated sons of the land" formed, and work began. I leave it to the members of GAB to recount how the young and not so young loaded down with bags of cement or iron bars would travel more than a kilometer uphill, to build underground water tanks. They will also tell you about the grueling and sometimes dangerous work involved in breaking rocks to make way for pipes or to make gravel, digging arid soil and chopping through tree roots. Everything is done by hand.

Unlike other water projects, which receive large amounts of funding, we can only count on individual donations and membership dues. Nevertheless, GAB remains a non-profit association, and respects international standards for each of its decisions.

However, not only does the gravity fed water catchment project in Batchingou not have a budget, but it was imposed on our humble association whose main goal was to improve the health of people in Batchingou.

Moreover, I learned at my expense that the solidarity law, which was one of the strengths of Africans, has now been transformed into a law of opportunism, fueled by corruption. In this sense, there is a lot of work to be done to develop popular awareness, in order to recognize and respect the common good.

To say that an association is non-profit means that it supports one or more humanitarian projects, without seeking to contribute to anyone's personal enrichment.

However, so far and paradoxically, the wealthiest expect to remain privileged, including when it comes to the distribution of drinking water in Batchingou.

Fortunately, GAB is making progress.

From a project that was based on eight water points, and despite our very limited resources, GAB now has twenty-four standpipes throughout the

village. The inhabitants of some neighboring villages even come to Batchingou to get drinking water.

Several times, the population has shown its determination, especially against those who want to privatize water for their sole advantage.

God willing, local GAB members will continue to maintain their water catchment systems, assuming their responsibilities, as they have done so far. Because, in the end, they were the first to believe in it and they put all their efforts into it right from the start. For that reason alone, they deserve everyone's respect.

The Health Centre has remained our primary concern.

By 2014, there was a documented decrease in infectious diseases.

There are also many personal expressions of gratitude from the population.

But nothing can be taken for granted.

This is why we have begun working to raise awareness among the population as a whole and make people accountable for the upkeep of the water distribution system. Every citizen should in the near future consider the possibility of participating, even financially, in the upkeep and repair of pipes, taps and other parts of the system.

Eventually, we will have to exploit a new spring in addition to the three existing ones. Last year's experience has made this clear. A few months ago, the country experienced a major heatwave, and water became extremely scarce. One of the consequences was the epidemic of typhoid fever and other types of fever.

In conclusion, the fight continues.

Water management in Peru: what avocados are we eating?

Christian Häberli

Gold and Water from Peru

Four centuries ago, Peru gave us the potato, which saved us from famine in Europe. But the Incas had also built one of the greatest empires in the world, without wheels, without iron, without writing and without horses, and they revolutionized agricultural production, food security, conservation technologies unknown in Europe, and irrigation - even in desert regions.

Today, water management is an even greater challenge than in the pre-Columbian period. Agriculture provides 8% of the GDP and employs one third of the female labor force. Advanced irrigation technology literally turns water into gold. But, to take the example of the avocado, now traded worldwide, it is not just more profitable for the producer, but also much more water-hungry: it takes a thousand liters to produce a single kilo of this delicious fruit. The question is whether, by eating avocados and drinking the virtual water they contain, we are depriving urban populations, foreign exchange-earning gold and copper miners, and women farmers, of water. And would those farmers, rather than growing our avocados, earn a better living by working their own fields – with that water they had had access to for centuries in order left to grow their potatoes? Not to mention the amazing natural landscapes and world-class biodiversity of Peru, forever incarnated by the goddess Pacha Mama.

Indeed, water stress is a serious problem in Peru where only 10% of the total population lives in the Amazon forest (66% of the national territory) where rainfall is very abundant. All the other inhabitants, about 30 million, live in the desert or on the high plains. That's where our avocados, asparagus and Pisco Sours grow. And that is where the cost of producing, transporting and distributing water is highest. How can we ensure the Right to Water to the portion of the population that no longer has the means to pay the market price? It is an extremely difficult and never sustainable trade-off: politically privileged urban populations and cash crop farmers pump from the aquifer, and mines (industrial and, even more artisanal) pollute rivers, at times until they are clinically dead.

Avocados, water and the local issues

In the Ica Valley, some 500 kilometers south of Lima, there is not much left of the Ica River (seasonal and diverted), nor of the famous irrigation canal allegedly built by the Ninth Inca, the famous Pachacútec Yupanqui (1438-1471). Poor maintenance and climate change are just two of the reasons for this. The current shortage for everyone has led commercial agriculture to migrate to the coastal desert, where the water is underground, not renewable, but of much better quality.

In short, the water management dilemma in these conditions is the choice between an almost waterless, inefficient and expensive family field, and the hi-tech plantations that use much less water, pay their workers better, and earn much more by selling their cash crop products in Lima or Geneva. Moreover, it seems that they pay their workers up to three times the legal minimum wage, which in 2016 was 30 soles a day (about 9 Swiss francs). Peru, it should be said, is not poor. According to World Bank statistics, only 3% of the total population lives below the poverty line.

While politicians, economists and agricultural engineers seem satisfied with this situation, sociologists report a crisis of governance in the Ica Valley, and in Peru, resulting according to them from the neoliberal policy of its governments.

The question is how to assess the sustainability of avocados. To tell the truth, nothing is certain in this

country that may have emerged from its frequent political crises and coups d'état, except that water will become even scarcer and that there will still be earthquakes and storms and other disasters of all kinds. Not to mention Peru's other existential challenges, such as climate change, El Niño, and the price of copper!

Is one avocado in the hand worth two in the bush?

What solutions?

It's important to remember that water does not flow on its own. Too often, in Peru as elsewhere, it flows towards the rich, and towards men. And the virtual water contained in each avocado is consumed even in our households in Geneva.

The challenge is ensuring an equitable allocation of water. But how can we get there? Should we stop eating avocados to ease our conscience? It is of course possible for all of us to do so – but this would also reduce the income of Peruvian farmworkers.

We could limit our consumption to fruit deemed "fair trade" by the Max Havelaar organization. However, if we want water to flow equitably, we should know that "organic" is not synonymous with "well managed" or "fairly priced" water. And it is not right for us to define, in Switzerland and for the whole world, what "fair trade and sustainable avocados" are.

Can we measure, and charge for, the virtual water in each avocado? There are some interesting avenues to explore. But they are not very realistic at this stage of the debate.

Unfortunately there is no internationally agreed public standard for "fair trade and sustainable avocados". So it is not possible to prohibit imports only of predatory avocado producers that divert water from the poor and underpay their farmworkers. On the other hand, many private quality standards already exist in Europe and the United States. The one I prefer, based on my research and experience, is called GlobalGap. One problem I see in such private standards, however, is that they are often a sort of diktat imposed by our distribution chains.

Personally, I find the proposals of Nestlé's former CEO Peter Brabeck-Letmathe very interesting. He frequently and explicitly recognized the Right to Water and advocated for a given quantity of water delivered free of charge around the spring producing mineral water for his company. According to Nestlé, this water for nearby residents should and could be paid for by consumers of mineral water. For economists, this is a form of transfer pricing.

For agricultural water, in line with Mr Brabeck-Letmathe's idea, Peru could perhaps regulate access to water by reserving a share of the water pumped by exporters for small-scale farming, at an affordable price justified by their presence since pre-Hispanic times. In order to prevent unfair competition and social dumping by competitors in Mexico, Guatemala, Chile, South Africa, Ghana, Israel and Spain, cooperation between the largest exporters would obviously be an excellent thing.

Stay tuned!

Education: success stories in Myanmar, Laos and Cambodia

Child's Dream, founded by Marc Thomas Jenni and Daniel Marco Siegfried,
represented at the W4W fifth Colloquium by Mrs Jeanne Barras Zwahlen
at the roundtable moderated by Benoît Girardin

Water Systems in Myanmar, Laos and Cambodia provided by Child's Dream

Overview

Chronic fresh water scarcity and contamination are among the predominant challenges in the least-developed and remote villages of Myanmar, Laos and Cambodia, posing serious health problems to children and adults. Many schools in these rural villages have a high prevalence of diseases related to inadequate water supply, sanitation and hygiene, and child malnutrition and other underlying health issues are common. These health problems are preventable, but, if not addressed, can disrupt students' attendance at school. Generous financial support from our donors has been facilitating our quick-impact and pragmatic work in contributing water supplies for safe consumptions and sanitation to poverty-stricken communities.

Water Challenges

In Myanmar

The poor infrastructure in remote areas of Myanmar results in more than 33% of the population being exposed to unsafe drinking water (WHO, 2015). Our efforts help provide some solutions such as the means to harvest water from rain, and effective extraction and storage systems for water from natural springs and aquifers.

In Laos

Rural areas of Laos also hampered with life-threatening diseases among children and adults due to poor water management and sanitation, lack of awareness of water safety and hygiene and the common practice of unregulated defecation. There are frequent occurrences of health and nutrition complications such as diarrhoea, stunting and underweight (UN, 2017). Women and young girls still collect water from distant rivers and lakes, a strenuous and dangerous task.

In Cambodia

The provision of sustainable sources of water remains a key challenge in Cambodia's remote areas due to recurrent dry seasons and droughts. There is deficient water quality and low hygiene. These long-standing problems cause many children in rural areas to suffer from the severe consequences of diarrhoea, respiratory diseases, skin diseases and other waterborne infections. The poor management of water systems results in an estimated 10,000 deaths annually (UNICEF, 2015).

Implementation

In responding to these urgent calls for action, we have supported a number of government schools in constructing water supplies and storage systems such as protected wells, electric pumps and pipes connected to natural springs and other groundwater sources, providing water that is clean and accessible to schools and entire communities.

Students, teachers and community members can use the water for drinking or personal hygiene and sanitation.

Process

- A local, professional foreman is hired for the construction work.

- Construction of a concrete water storage system (concrete tank, basin, etc.) usually take 3-4 weeks to complete, and approximately 3 months for a water supply system (water kiosk, system of electric pump and pipes etc.)
- 5% of the total cost will be held back for 6 months as guarantee for the work.
- The school leaders and community members will be responsible for the regular cleaning and the maintenance costs of the water tanks after completion.

Monitoring

- During the construction phase, our team conducts regular site visits to monitor the progress of the work and to ensure our high quality standards are being met.
- Once completed, our team regularly returns to the facilities to assess the proper use and the effectiveness of the water tanks.

What we achieve

Ensuring that the school and local community have reliable access to clean and safe water for consumption, sanitation and hygiene.

The improved drinking water source leaks to a decrease in waterborne infections, diseases and epidemics.

Instructions and training on usage and maintenance will result in effective water and sanitation management.

The projects also strengthen the local community's understanding and participation in improving water and sanitation management.

Providing adequate levels of water supply, sanitation and hygiene can ensure better educational opportunities and improve students' success rates, livelihood standards and food security for the many children and families.

Part III: Water Ethics

Ethical Overview

Benoît Girardin

The shortage of drinking water in the South African city of Cape Town, which was announced in 2015 and became critical in the spring of 2018, has recently made headlines around the world. It calls to mind a new form of gender, social group and racial equality.

This new equality concerns the quest for water, but also the perception of water stress. Now everyone shares these concerns. Of course, we are likely to see the development of a new social function, a new paid job, namely water collectors could develop rapidly (Individuals who are ready to spend hours in line to bring a few jugs of water to people who can afford to pay to avoid queueing themselves). Nevertheless, everyone will experience the perception of water stress.

In terms of ethical reflection, it is important first to recall that **equality** between men and women when it comes to water stress is far from being a reality in practice. However, equality conceived in terms of interchangeability or reversibility - as if men are supposed to do the same thing as women and vice versa - leads to social impasses. Rather than thinking in terms of identity, equality should be considered in other terms, namely **balanced sharing** of tasks and efforts, or **fairness** adressing the risks involved.

In the same way that we can distinguish in rural pre-industrial societies the activities of hunters from those of farmers, the care of small farmyard animals from that of large livestock or forest-clearing from crop-growing, we can imagine that women are mainly or exclusively responsible for collecting water, washing or caring for children in a way that is not applicable to men. Men should be responsible for building and maintaining wells, pipelines or aqueducts. In the modern urban context, a more flexible division of labor can be negotiated, aimed at achieving a fair and balanced share of the total burden. Here too, justice is considered in terms of fairness, not interchangeability or substantive equality of roles.

Equity and fairness should be determined with respect to the total burden, including the effort required, the responsibility assumed, the risks incurred and the time spent. Ethical concerns encourage us to achieve a certain parity in all these burdens. This presupposes that we have the means to measure the efforts, risks and time spent, and to compare them with the total burden are made available. Verifiable and impartial markers are needed to evaluate and measure the respective burdens, not just one phase or activity such as collection, but all phases, from finding and maintaining water sources, to collecting, transporting, using, disposing of and treating/recycling the water. This could make it possible to achieve an equitable gender distribution of all efforts, risks and funding.

As for the distribution of water and the payment of costs as well as the management of shortages, we can imagine an equitable allocation that does justice to the needs of both women and men. The practices in Senegal clearly illustrate this change in roles: many women now have water kiosks and guarantee that water resources are used in a less complacent, more efficient and more sustainable - self-sufficient - manner.

When men and women learn to negotiate to determine fair quantities, restrictions and savings at household, street, neighborhood, city or village level, this is an ethical achievement. The opposite

option amounts to endorsing the habits and interests of the most influential people. By asking both sides to measure the burden, we can move towards greater fairness, as we can by soliciting innovative proposals from both sides for sustainable management and water savings. The public appeal made by the Cape Town authorities to families and households to promote water-saving showering, reuse and recycling is one illustration of this.

This presupposes that there is a sort of **social contract** between genders, but also between social groups, and that the contract can be negotiated based on a system for measuring burdens, which itself is socially acceptable. This system will make it possible to quantify the burdens and risks assumed by the two genders respectively, and to measure how the gap between the two evolves - for the better or the worse.

The second requirement to satisfy within the framework of an ethical reflection consists in covering the **entire chain**, from collection to evacuation, but also in ensuring **optimal coherence between the three levels:** regulatory policies and frameworks, community and non-profit initiatives and commitments, and family and individual practices - in the other words at the macro-, meso- and micro-levels. Too often we operate at just one or two levels. Only experience shows that sustainable success can be achieved only when the three levels converge. Taking the example of water management education as an example, coherence is crucial between 1) a clear policy priority and framework conditions, 2) the course content, teaching methods and teacher commitment, and 3) the practices that schoolchildren can inspire their families to follow. Taking the example of the acquisition of instruments to filter or purify or convey water, there must be coherence between sustainable development-oriented policy, the commitment of financing and microcredit institutions as well as associations and foundations - such as Helvetas, the Access to Water foundation and the GAB association in Batchingou, Cameroon - and finally the individual practices of families.

In this respect, it is worth mentioning the results of recent studies conducted by Bank of America for investors. They show that women are more willing than men to invest in sustainable development - 84% versus 67%.[11] Contrary to common prejudices, lending to women represents an opportunity rather than a concern.

Similarly, cultural prejudices or the traditional distribution of roles cannot change lastingly until family practices and community commitments have led to policies that take women's perspectives into account and reflect them more directly. Experience shows that a critical look at social constraints and innovative practices must influence framework conditions.

Here again, constructive social change must be driven by alliances between multiple protagonists: industries, farmers, families, cities, fishermen with diverging interests, all brought together by their belief in an explicit ethical platform. In Rwanda, where sustainable transformation of roles and better gender parity are firmly rooted, the change stems from the work of a number of women's associations, but also a men's association that is committed to promoting positive masculinity.

Finally, ethics cannot be separated from an aesthetic and festive dimension: the joy of **celebrating the beauty of diversity**, the rich diversity of cultures, of roles and genders, of rhythms and rites. Support for diversity as a concept is certainly important. But by rejoicing in diversity and celebrating it in a festive way, we experience diversity on a different level - that of emotion, vibration, body, gratitude and appreciation. Without this festive and joyful dimension, ethics would remain confined to its legacy of seriousness, distant restraint and emotional and physical neutrality. It is important for diversity to be experienced as that of a body, in all its dimensions.

[11] *Gender Lens Investing,* co-written by Jackie VanderBurg, managing director and investment strategist, US Trust, Bank of America.

Panel and guests
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