

TORs of Papers

Paper 1-A: Water problems in Yemen: three major challenges

This paper should outline to the participants the history of the water problems in Yemen, detail the known

current water issues (in term of quantity and quality) including their geographic variation, and analyze the

causes of the problems, including the non-water sector causes.

The paper is expected to illustrate the following points:

Groundwater boom and bust

Origins and drivers of groundwater over-extraction from the 1970s (advent of the tubewell, growth of market-oriented agriculture etc.)

Benefits to rural growth from groundwater (impact on agricultural incomes and rural economy, on avoiding rural impoverishment and rural-urban migration and slum formation)

The current water resource situation and trends, especially the problem of depletion and its causes

(the ‘tragedy of the commons’, population growth, distorted incentive framework, lack of governance, political economy etc.)

Lack of secure bulk water supplies for Yemen’s settlements

Problems of key Yemeni cities in sourcing water (Sana’a, Ta’iz etc.), and the socio-economic and

political problems encountered in seeking to transfer water from rural areas to urban areas

Rapid increase in urban demand, and future growth

Absence of a legal and practical framework for securing new supplies, particularly lack of a mechanism for equitable transfer of water from lower value uses such as agriculture to higher value uses in water supply

Low access of the population, particularly of poorer people, to safe water and sanitation services

Role of access to safe water and sanitation in welfare and poverty reduction (benefits in terms of

health, education, the position of women, and well being and productivity)

Yemeni coverage in access to safe water and sanitation (by far the lowest of any MENA country),

current programs, and prospects of meeting the MDGs.

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Paper 1-B: If we don’t act - Implications of the status quo position

This paper should trace out what may happen to water resources and Yemen’s economy and society that

are dependent on water resources. The paper would provide 2-3 [maximum] scenarios of what is likely to

occur in Yemen by 2025/2050 in the event of no significant change in water use behavior and trends.

Three recent publications could be taken as bases: (1) the new draft food security strategy; (2) the World

Bank 2010 publication *Yemen: Assessing the Impact of Climate Change and Variability on the Water and*

Agriculture Sectors; and (3) the HR Wallingford 2010 study *Climate Change Impact Assessment on the*

Agriculture and Water Sectors in Yemen.

The paper is expected to illustrate the following points:

- Change in the availability and access to water resources and water availability: about three scenarios projected to 2025 and beyond, including impact of climate change scenarios on water and agriculture
- Impact on agriculture and farm incomes: decline of irrigation, return to dependence on rainwater, shallow groundwater recharge and spring and spate flows
- Impact on the socio-economy of rural areas: shrinking of the rural economy, impoverishment of rural areas, accelerated rural-urban migration
- Political economy implications: conflict, disaffection etc.
- Impact on other sectors such as (Environment, tourism, industries, etc).

Paper 2-A Managing water for social equity, economic efficiency and environmental sustainability

This paper would take the goals and principles of good water management that have been developed

globally in recent years and see (a) how far Yemen has moved towards achieving the goals; (b) what

policies and actions in pursuit of these goals have been implemented in Yemen and in comparable countries; and (c) what lessons can be learned about other policies and actions that can be applied practically in Yemen to move the nation faster towards its goals.

The paper is expected to cover the following topics:

Yemeni progress towards the **goals** of good water management

Social equity requires that:

- Water services are available for all
- Existing water uses are respected
- Benefits of development are shared equitably, with a care for the poorest

Economic efficiency requires that:

- Income per drop is maximized
- Water is available for its highest value economic use

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Environmental sustainability requires that:

- The water resource and the broader environment are not harmed
- The needs of future generations are taken into account

How is Yemen doing, and what are the major problems and lessons?

Extent to which Yemen has implemented **policies and actions of good water management**

Good water management requires:

- Participation of all stakeholders
- Decentralization, and management of water at the lowest possible level
- Efficient management of supply and demand through an incentive structure reflecting the true value of scarce water to society

- Integrated, inter-sectoral management, with the basin as the unit of management

How is Yemen doing, and what are the major problems and lessons?

Good practices from elsewhere, and overall **lessons and recommendations** for Yemen

- Good water management practices applicable to Yemen from comparable countries (e.g. Jordan, Oman, India)

- Lessons that can be learned about other policies and actions that can be applied practically in Yemen to move the nation faster towards its goals.

Paper 2-B Agriculture's contribution to solving the water crisis

This paper should discuss experience and prospects for irrigation improvement in Yemen, and experience

and prospects for a revival of rainfed agriculture, terrace agriculture and water harvesting. Sources may

include: (a) the June 2010 report *Sana'a Basin Integrated Water Resources Management: Action Oriented Policy Paper - Assessment of Phase I*; (b) MAI, 2009, *Groundwater and Soil Conservation*

Project: *Water Savings Report*; (c) NWRA, 2008, *Options for Changing the Economic Incentive Structures for Groundwater Extraction in Yemen*; and (d) the draft World Bank report on rainfed and

terrace agriculture. The paper should also look at the problematic of qat.

The paper is expected to illustrate the following points:

Irrigation improvement

What are the water saving and economic benefits of improved irrigation as practiced so far in Yemen, and

how strong is the empirical evidence for these benefits? What are the economics of water saving through irrigation conservation?

What is the justification for subsidy on irrigation equipment, and could it be phased out? What measures

might be pursued to promote unsubsidized adoption of efficient irrigation? Could local manufacture and

repair industries for irrigation equipment be promoted? What is the international experience in this regard

(for example, from India)?

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How can irrigation improvement be better linked to sub-basin planning? When is improved irrigation

likely to be a good investment? When is it **not** worthwhile to invest in irrigation improvement?

Should further measures be taken to strengthen research and extension on irrigated agronomy and water

management and link it to the NIP irrigation improvement program?

How can subsidized support to irrigation improvement be better integrated with the decentralized water

management framework? For example, should NIP require that there be in place a water user association

working with the local council and NWRA on a water conservation plan for the local area.

Rainfed agriculture and water harvesting

What has been achieved in reviving rainfed agriculture, terrace agriculture and water harvesting?

What

are the successes and how could they best be promoted? What are the economics?

What are the economic and environmental options and ways of support for the crucial ecological balance and function played by the country's terraced agriculture - for example, is 'payment for ecosystems services' a practical option and how would it be implemented?

Qat

What is the role of qat in the rural economy? Why is it considered such a menace? What measures in the incentive system might be used to discourage qat growing, and what would be the impact on rural incomes and employment?

Paper 2-C: Non-traditional water resources and water sector– how to bring them into the fold

This paper would look at the experience of non-traditional water resources to date in Yemen and in the region, and examine the technical and economic scope for developing these resources in Yemen. The paper is expected to illustrate the following points:

- What alternative supply sources could exist e.g. rooftop rainwater harvesting, reuse of treated waste water, inter-basin water transfers, desalination (solar, wind or carbon fuel)? What are the economic and technical aspects of these sources in global and regional experience, and what is their possible application to Yemen.
- What would developing these resources in Yemen mean for water sector investment and tariffs?
- What types of innovative business model (e.g. public/private partnership, build-own-transfer etc.) might be suitable in Yemen's situation?

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Paper 3-A: Options and recommendations for sourcing water for Yemen's towns in an equitable, efficient and sustainable manner

This paper would look at options and plans for ensuring equitable, efficient and sustainable sharing of

water between town and country, with specific reference to major cities.

This paper is expected to illustrate the following points:

- Yemen's cities are growing very fast and finding water to supply them is getting harder and harder. Yet for most cities there is water in surrounding areas. However, up to now, no fair or sustainable way of transferring water from rural to urban use has been worked out. Each urban settlement should have a plan based on principles of fairness, sustainability, efficiency and no uncompensated harm.
- What is current law and practice regarding sourcing new water for towns (e.g. experience over the last twenty years in Ta'iz and Sana'a)? What have been the social, economic and political implications, and what are the lessons?
- What is international and regional good practice in water sharing between town and country?
- What options could be considered for ensuring equitable, efficient and sustainable sharing of water between town and country, with specific reference to major cities. How could these options be implemented? Options might include: (1) reserving certain resources for urban use whilst helping farmers maintain their incomes (for example, reserving the deeper aquifer in

Sana'a basin for domestic and industrial use, and shallower aquifers for farming, with accompanying investment in agricultural water productivity); (2) helping private suppliers or water user associations to develop network supplies; (3) encouraging private suppliers to form a professional association etc.

Paper 3-B: Conserving water is everybody's responsibility, how all stakeholders must work together

This paper would look at water governance i.e. how all stakeholders can work together to manage Yemen's water resources equitably, efficiently and sustainably. The focus would be both on the role of government in working to apply the water law and supporting stakeholder institutions, and on the role of a 'bottom up' network of water governance that would decentralize responsibility to the lowest possible level, in line with international best practice. This paper should look at experiences of water governance both in Yemen and at regional and international regional level, and propose practical improvements for Yemen.

This paper is expected to illustrate the following points:

Regulation

What has been the experience in Yemen to date with regulation, particularly in Ta'iz, Abyan, Sana'a and Amran? What are the next steps? Does regional and international experience have any guidance to offer?

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What is the scope for strengthening the participatory approach to regulation e.g. issuing drilling licenses only if local stakeholders agree, and empowering local stakeholders and water user associations to protest against random drilling, and strengthening the local authorities to stop it?

What is the role of the central and highest authorities in backing up regulation? How can the judicial process be strengthened?

What can be done to help the drilling firms to become 'professionals', with a professional association with self-regulating rules and code of good practice?

Strengthening water governance

How successful has Yemen been in decentralizing responsibility for water governance to basin committees, local councils and water user associations? What are the next steps for decentralizing decisions over water allocation, regulation and investment?

How can basin committees be empowered as the highest governance body for water in each basin, making decisions regarding allocation of water and of water-related financial resources in the basin. How can basin committees most effectively work with local authorities as the intermediate level of water governance, and with water user associations as the front line water managers within an integrated framework.

The new government and multi-donor Water Sector Support program is supporting integrated planning, programming and budgeting for water at the basin level. What are the results, and what improvements are needed?

Building institutions for community-led management and regulation

Water use will only become sustainable if all water users in the local area work together, as Yemenis always did in the past. Water user associations – for irrigation, drinking water, water management – are proving a good way to empower local people for collective action on

sustainable water management.

- What has been learned from recent experience in Yemen (GSCP, CWMP etc.) about rural people managing water sustainably, and what are the next steps?
- How best can water user associations be empowered to resist unilateral actions by influential farmers and how can they best be supported with capacity building. How can they be empowered to: (a) work out how to act collectively; (b) develop local water plans; (c) monitor their own resources; and (d) 'regulate' the behavior of other community members by, for example, preventing random drilling?
- What are the practical lessons for Yemen from regional and international experience in community-led water management, and how should they be applied? For example, the experience of the Andhra Pradesh Groundwater Systems Project and other similar initiatives may demonstrate what are pragmatic approaches to managing over-exploited aquifers.

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Paper 3-C: Raising awareness in water resources conservation: what messages – and for whom?

This paper would evaluate experience to date in public awareness in the water sector in Yemen, draw

lessons from regional and global experience, and set out recommendations on how to set targets, implement programs and measure results more effectively.

This paper is expected to illustrate the following points:

- What has been the experience in Yemen to date with public awareness through various media? Field experiences of National Water Resources Authorities (NWRA), Ministry of Agriculture and Irrigation (MAI) headquarters, branches and projects, and the awareness activities of water projects (GSCP, SBWMP, etc) should be considered. How successful have these programs been in terms of implementation and results?
- What has been the balance between institutional, planning and management themes and technical conservation messages? Is this the right balance? Do we know who are the key stakeholders and which stakeholders should be targeted with which messages?
- What is the role of education and how can water themes best be written in to the national curricula etc (through and with the cooperation of the Ministry of Education)? What is the role of traditional media, such as poetry and song?
- What are regional and international best practices in water awareness, and how could they be applied to Yemen?
- Overall, what are the lessons on how to set targets, adopt appropriate media, implement programs and measure results? What recommendations should be made for the next phase?