

CWANA Summary for Decision Makers

PREFACE

The IAASTD, as a process is comprised of a global assessment and five sub-global assessments (sub-Saharan Africa; South and East Asia and the Pacific; Latin America and the Caribbean; Central and West Asia and North Africa (CWANA); and North America and Europe).

The assessment (i) assesses the efficacy of the generation, access, dissemination and use of public and private sector agricultural knowledge, science and technology (AKST) in terms of development and sustainability goals, integrates local, traditional and formal knowledge, and emphasizes gender dynamics; (ii) analyzes existing and emerging technologies, practices and policies and their impact on the development and sustainability goals; (iii) provides robust information for decision makers on how to ensure that policies, practices and organizational arrangements enable AKST to meet these goals; (iv) brings together the full range of stakeholders (governments, NGOs, private sector, producers, consumers, international research organizations, the scientific community and international agencies) involved in the agricultural sector and rural development to share experiences, views, and gain a common understanding and vision for the future; and (v) provides information to guide future public and private investments in AKST.

<p>CWANA COUNTRIES: Afghanistan, Algeria, Armenia, Azerbaijan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kyrgyzstan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tajikistan, Tunisia, Turkey, Turkmenistan, UAE, Uzbekistan, Yemen</p>
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The IAASTD goals are to use AKST to help achieve development and sustainability goals: reduction of hunger and poverty, improved rural livelihoods, and equitable, environmentally, socially and economically sustainable development. The CWANA sub-global Assessment looks to the future based on a 'business as usual,' appreciating the fact that countries of the region can not remain in oblivion, and are bound to be influenced by forceful global trends such as globalization.

Business as Usual. In this backdrop, the CWANA sub-global Assessment has helped to identify following gaps that need to be addressed, if AKST is to play an active role towards the attainment of the development and sustainability goals:

- Poor governance, including *inter alia* AKST related governance;
- Lack of accountability and transparency;
- People are a missing link in public policies;
- Weak regional integration, especially in terms of AKST capacity development and general development objectives;

- 1 ▪ Lack of policy focus on agriculture in terms of priority and its potential role in terms of the
- 2 development goals;
- 3 ▪ Lack of integration of research and development (R&D) agenda and economic growth
- 4 targets;
- 5 ▪ Little connection between research policies and development goals;
- 6 ▪ Weak infrastructural, institutional & human resource base;
- 7 ▪ Loosely knit and fragmented National Agricultural Research Systems (NARS), lacking
- 8 direction, coordination, required human capital, investment and innovation capacity;
- 9 ▪ Inadequate capacity for strategic planning, and lack of participatory approach; and
- 10 ▪ Inadequate AKST-related capacity development initiatives.

11 Having identified these gaps, seen as potential challenges for AKST, the CWANA sub-global
 12 authors assessed policy options. This assessment is neither prescriptive nor judgmental, but
 13 evidence-based. To the extent the regional countries exploit the strength of AKST and other
 14 direct and indirect drivers of change will finally determine the way future unfolds.

15
 16 The key messages emerging from the CWANA assessment are:

- 17 • People-centered policies, good governance and respect for human rights are
- 18 prerequisites for attaining development goals;
- 19 • Development goals need to be prioritized;
- 20 • AKST is a potential driver of change in terms of economic growth in general and
- 21 development goals in particular
- 22 • R&D/S&T needs to be integrated in national economic and development plans;
- 23 • An enabling environment (infrastructural, institutional and human capital base; policy
- 24 environment; and investment in agricultural research) is essential for AKST to contribute to
- 25 achieving the development and sustainability goals;
- 26 • Innovation-driven agricultural research is needed component in national research
- 27 agenda;
- 28 • On-farm and participatory research culture needs to evolve; and
- 29 • Proactive engagement at regional and international level for trade & development
- 30 negotiations/initiatives is critical.

31
 32 Given the fragile and volatile context (e.g., ecosystem, weak ICT, geopolitical disputes) of
 33 CWANA, it is important to understand the factors/drives that trigger changes regarding agriculture
 34 in the region. A direct driver unequivocally influences agricultural production and services and can
 35 therefore be identified and measured to differing degrees of accuracy. An indirect driver operates
 36 more diffusely, often by affecting the outcome of one or more direct drivers, and its influence on

1 agriculture is established by understanding its effect on a direct driver. Drivers are also linked to
2 decision-making, as many of the drivers can be influenced by policy choices.

3
4 Given that context, the future of agriculture and related sectors in CWANA will definitely be
5 affected by the interaction of potential drivers with changing socio-economic, political and
6 technological environments. The “business as usual” scenario visualizes a situation where
7 because of inward-looking policies, national government’s capacity to deal with the development
8 objectives, in general, and development goals, envisaged under international commitments like
9 Millennium Development Goals (MDGs) would be limited at least in the short to medium term. As
10 such, this scenario does not provide an enabling environment in general for AKST to play its
11 effective role towards attainment of the objectives of development goals. However, in the global
12 context, national policies are likely to be influenced with more space for AKST as driver of
13 innovation and growth in the long run.

14
15 **What are the CWANA development and sustainability challenges to be addressed through**
16 **AKST?** The CWANA countries differ in AKST capacity development and capabilities. Enabling
17 human, equity, and political factors are most often evaded while remarkable efforts are made in
18 terms of infrastructure and economic development in general in most of these countries.

19
20 CWANA, a region with fragile ecosystem, a weak social safety net, weak information
21 communication and technological (ICT) base, has witnessed in many of its countries, the ills of
22 authoritative regimes, and has been home to several geo-political disputes and geo-economic
23 volatility. In the CWANA region policies are neither adequately informed nor is agricultural
24 research development-oriented. Poor governance prevails: devolution of power to associations
25 and civil society is done sparingly and the weakness or lack of regulation and policy instruments
26 e.g., legislation, and of orientation tools such as ‘down up strategies’ worsen the situation. The
27 population itself has been conditioned by years of oppressive colonialism followed by an
28 independence characterized by a mix of dictatorship and paternalism (e.g., pervasive relief
29 programs. This paternalism has resulted in an insufficient wealth creation by the population.

30
31 The socio-economic aspects of development are neglected and often no bottom-up
32 representative participatory socio-professional structures are created (e.g., Miaad of the Tribes or
33 Arouch in South Tunisia are governed by tradition and customs). What is at stake in CWANA is
34 the social sustainability of new agricultural development initiatives.

35
36 **Illiteracy is high within the farming community in CWANA especially among women** which
37 hinders the potential of technology adoption and advancement. Strongly stratified gender

relations in farming persist and are inadequately addressed by research programs. This hampers effective decision-making in the agricultural sector. There is high population growth rate in the Arabian Peninsula (3.2%) and the Nile valley (2.9%). In North Africa, the average population growth rate is 2%, whereas in the Caucasus the population growth rate is low at (1.2%). More than 2/3 of the population lives in urban areas. Overall life expectancy is very high: it ranges from 67 years to 73 years in the Arabian Peninsula, West Asia and the Caucasus. However, life expectancy is very low (less than 50 years) in a few countries such as Afghanistan. GDP is low and reflects poverty and malnutrition. In countries dependent mostly on agriculture, between 30 and 40% of the population live on less than US\$ 1/day.

In CWANA countries few resources are allocated to agricultural research: less than 1% of GDP (except in Tunisia, which at 2% is still much lower than the world average). Nevertheless CWANA is gradually moving towards farmer demand-driven and problem oriented agricultural research in most countries. This situation is as a result of the various activities of NARS in collaboration with many CG Centers. These activities are supported by many donors and are aimed at strengthening the community participatory approach in working with the farmers to better respond to their needs. Key research areas in CWANA include crop genetics and water harvesting systems and techniques.

In CWANA, extension systems are generally weak. Transmission of knowledge is impossible without a good “transmission belt.” More often than not extension takes a “technician approach,” i.e., it does not include social and land tenure aspects. Innovations or new techniques are not extended properly (especially in marginal areas). However, some countries are putting much effort into improving their extension system by increasing funding, improving facilities and providing more trained staff. Extension efforts with respect to large scale irrigation schemes focus on encouraging farmers to adopt “modern” techniques (use of inputs: fertilizers, pesticides).

In CWANA region the major factors contributing to agricultural production and vulnerability are the following: (1) the limited availability of natural resources (land and water) and their degradation, (2) the extreme climate variability, recurrent and severe drought episodes aggravated, (3) recent and rapid changes in the organization of input and output markets (privatization, trade liberalization).

About 67.4% of the region is hyper-arid (desert), 7.5% is arid, 17.3% are semi-arid and 7.6% are dry sub-humid (dry land susceptible to desertification) with high rainfall variability and frequent drought incidence. During the last 50 years and despite these constraints, agricultural production and yields increased mainly in the irrigated sector. In the rainfed crops sector, the yields' increase

1 has remained much lower than the world average and is characterized by high interannual
2 variability. This trend has been associated with major environmental and natural resources (NR)
3 degradation.

4
5 Insufficient consideration of rainfed agriculture in AKST policies and the development of
6 monocropping systems have led to the reduction of the number of crops and species cultivated in
7 the area and has resulted in important loss of diversity, thus threatening the environmental and
8 social sustainability of farming systems. In the irrigated sector, environmental problems are
9 expressed in overexploitation of water resources, soil degradation and pollution resulting from the
10 misuse of chemicals.

11
12 **Most countries in CWANA have become water scarce during the last 50 years and this**
13 **trend will intensify in the future. Scarcity of water is a key challenge to agriculture in**
14 **almost all CWANA countries.** About 70% of the available water is used for agriculture in very
15 low efficiency systems such as basin irrigation. Traditional water harvesting is still practiced in the
16 semiarid areas in CWANA although large scale systems (e.g., 'Foggaras' in Morocco, Algeria and
17 Tunisia) are deteriorating because of the collapse of local societies. Even though mountainous,
18 forested water sheds are the highest freshwater yielding areas, they can also be the source
19 zones for torrents and flash floods. The problems of water quality deterioration are expected to
20 intensify in CWANA due to anthropogenic interventions and increasing possibility of extreme
21 events of climate change (saline water intrusion is projected to increase from sea level rise and
22 over exploitation of groundwater in costal zones). At present more than half of the major rivers in
23 CWANA are seriously depleted and polluted. A majority of lakes (natural or artificial) are eutrophic
24 as a result of diffuse pollution and urban wastewater. Climate change may lead to drought and
25 famine. Because of continued intensive damage to land, the region continues to be vulnerable to
26 climatic change.

27
28 **Low agricultural productivity and profitability are due to the fact that CWANA arable land**
29 **resources have been pressured by overgrazing; extension of the cropped area; loss of soil**
30 **organic matter and soil nutrients; and by salinization caused by irrigation.** Rangeland
31 reduction resulted in increased erosion and loss of fodder crops with consequences for animal
32 production. Desertification continues to be the most significant environmental issue in most of the
33 CWANA region. Soil erosion is a very critical issue affecting almost every CWANA country.
34 Seventy percent of the degraded soils in North Africa are due to wind erosion; while in Yemen
35 50% of soils are affected by water erosion. Farm land is also being lost due to urbanization. This
36 situation is aggravated by the lack of appropriate regulation to protect farm land. Corporate

1 business farming is beginning to replace small-scale farming. This is accompanied by a shift from
2 traditional farming methods to intensive cropping and the use of agrochemicals.

3
4 **Land tenure, ownership rights and communal rangeland are key issues affecting natural
5 resource management and consequently agricultural development in the CWANA.**

6 CWANA is characterized by a wide range of diversity in terms of climatic, topographic and
7 edaphic environments, genetic diversity of numerous crop species and their wild relatives.

8
9 **Unique agrobiodiversity in CWANA region is in danger** despite the fact that CWANA is rich in
10 flora and fauna and is the center of origin/diversity of globally important crop species and also
11 origin of agriculture. According to the IUCN, around 1500 plant and animal species, including
12 biological diversity relevant to food and agriculture are threatened for various reasons. This
13 diversity refers to genetic variability in cultivated plants and domestic animal CWANA and their
14 wild relatives, at genetic, species and ecosystem level in support of food production and food
15 security, or for the promotion of natural resources based activities, such as medicinal plants.

16
17 **Weak coordination between CWANA nations results in economic losses and increased
18 natural resources depletion (Tragedy of the Common for collectively owned goods) and
19 conflicts.**

20
21 **What are the likely positive and negative consequences of AKST on the development and
22 sustainability goals?** On the organizational side it is clear that administrations have the upper
23 hand on decisions. This top down relationship prevails even though this is being more and more
24 questioned. The countries of CWANA region vary significantly in terms of per capita income,
25 living standards and economic performance. With regard to the nutritional status of the
26 population, countries of CWANA region made significant progress in raising per capita food
27 consumption in terms of Kcal/person/day. However, undernutrition and hunger still prevail in
28 some regions, including in rural areas. This situation appears to be closely related to the
29 insufficient attention given to food security objectives at farm household level.

30
31 Moreover the reduction in public investment and support mechanisms for research has negative
32 impacts on small and medium size farms (which play a major role in agricultural production), rural
33 employment, including female employment, and urban migration. Rising private ownership
34 securing intellectual propriety rights will likely raise barriers to accessing international research
35 spillovers. The shift from family farming to business farming is resulting in a loss of local and
36 traditional knowledge, biodiversity, water pollution and soil degradation.

1 Sustainability of agriculture in CWANA is dependent on more efficient and effective water use. In
2 CWANA, large-scale irrigation projects have emerged during the twentieth century and onwards
3 in the Sudan, Egypt and Pakistan. The sustainability of such efforts is becoming problematic as
4 populations grow, demands for water and water pollution increase and conflicts over water use
5 arise.

6
7 Overgrazing by livestock on uncultivated lands will continue resulting in soil erosion and
8 eradication of some plant species and small herbivores, e.g. insects and mites (both beneficial
9 and injurious insects). Strong interests for using insecticides widely during the last 50 years
10 resulted in the emergence of new pests and renewed outbreak of old pests.

11
12 The concept of Technological, Institutional and Policy Options (TIPOs) has many implications
13 including:

14 a. Utilization of local knowledge has positive impacts on biodiversity, ensuring food security,
15 adoption of new technologies and developing human resources and moving on to AKST driven
16 agricultural innovation- oriented towards enhanced productivity, quality and profitability can be
17 based on the **conservation and development of local and traditional knowledge**, practices
18 and social norms.

19 b. TIPOs will have positive and negative impacts on the environment and the natural resources
20 including land, water and biodiversity.

21
22 For mitigation purposes of negative aspects of TIPOs corrective measures may include:

23 a. Using measures to balance impacts on natural resources including public education, public
24 awareness and sufficient regulation.

25 b. Measures to protect biodiversity include: research and training, institutional building, investing
26 in information acquisition and exchange

27 c. Measures to reduce negative impacts on food safety include: Partnerships at local, national
28 and international levels, improving food testing and monitoring of quality, harmonization of
29 national standards and guidelines

30 d. Measures to improve food security include: Institutional building and improving linkage
31 between agricultural research and agricultural extension services.

32 33 **What are the enabling conditions required to optimize the uptake and diffusion of AKSTD?**

34 The knotty problem of sustainable development resides in solving all climatic, natural resources
35 management and technological issues, but that is not enough. Policies, good governance,
36 participation of the population and democracy are a must if any sustainability success is to be
37 realized. TIPOs are needed to overcome constraints and enhance and sustain human capacity.

To this end all stakeholders are required to engage in radical changes in capacity development and capabilities. Among the enabling drivers which drive the different development pathways of AKST are human capacity development through integrating and improving education, research and extension. If no public deliberate agricultural **people-centered policies** are initiated, it is likely that AKST will fail in meeting IAASTD development and sustainability goals.

AKST-driven development strategy requires:

- Active participation of women and youth at all levels in development in general and AKST in particular needs to be emphasized in national planning and development
- Cultivation and prioritization in national planning of a culture of participatory R&D and technological development. Promotion of participatory and cultural sensitive and multidisciplinary approaches, involving all stakeholders is a key element in fostering AKST systems at local, national and regional levels.
- Transparent and participatory mechanisms to developing relevant policies and implementation mechanisms to ensure that generation and application of AKST is truly geared towards poverty and sustainability goals. Improved governance, transparency, accountability and efficient information management along with demonstrated commitment to this end will enhance the credibility of the institutions.

While adjusting to the new context, CWANA agricultural research portfolio has to cover newer issues in addition to the conventional still pending agenda. Self-reliant research policy is required to build domestic AKST capacity. TIPOs to overcome constraints include increasing food supply and food security utilizing nutrient cycling methods, GMOS, organic farming and other available options to produce more nutritious food and high yielding crops with minimum impacts on the environment. Compliance with food safety and quality assurance has been relatively slow and is mostly in response to importing countries' provisions to secure traditional export markets. In order to provide the required conditions for food safety and the adoption and implementation of standards, legislation needs to be enacted and strictly enforced. NARS in CWANA region should be structurally empowered and their activities should be supported by national, regional, and international funds, in order to effectively meet national expectations. AKST effectiveness will require better interaction between agricultural education, extension and research institutions.

TIPOs to overcome constraints include increasing participation of women to attain gender equity and cooperation between countries and international organizations to attain social sustainability and reducing conflict.

It is essential to **make economic growth policies including trade more development-oriented**, especially with reference to the goals identified in the assessment in parallel with

1 refurbishing and revamping of AKST institutions and related infrastructure including academia,
 2 research and development settings and quality control infrastructure and forging effective
 3 linkages between AKST and development institutions
 4

5 **There is also a great need for evidence-based policies in CWANA.** Proactive engagement
 6 based on informed policy in negotiations in the multilateral/regional economic cooperation
 7 including the World Trade Organization (WTO) and MEAs. Further, a strategic plan towards
 8 market oriented agriculture policy closely integrated with national development objectives, without
 9 compromising food security/food sovereignty in this regard would be required
 10

11 **The governments of CWANA would proactively engage in multilateral agriculture**
 12 **negotiations under WTO**, as Members, to secure required policy space and economic reforms
 13 to make adjustments necessary to develop competitiveness and to secure market access in other
 14 countries. **Good Agricultural Practices (GAP) and Total Quality Management (TQM)** would be
 15 promoted across the value chain, thus adding quality premiums to produce, and thereby helping
 16 secure required market access. This in turn will help generate foreign exchange, underpin
 17 economic growth and facilitate in attaining development goals in the longer time frame.
 18 Trade globalization and market liberalization favor AKST as a key factor to improving CWANA
 19 agricultural products compositeness in domestic and international markets as well.
 20

21 Comprehensive planning to develop effective and efficient water resource development projects
 22 within the framework of sound dry land management is essential, particularly in watershed areas.
 23 In addition to adoption of water saving or water reuse measures CWANA countries have to:

- 24 ➤ Increase water use efficiency at different levels: irrigation techniques, choice of crops,
 25 crop management and cropping systems;
- 26 ➤ Improve water policies at national and international level as water resources depend on
 27 transboundary watersheds;
- 28 ➤ Revise dams management as there is great variability in the performance of hydraulic
 29 infrastructure;
- 30 ➤ Study the development of middle and small size hydraulic works as complementary or
 31 alternative to large dams;
- 32 ➤ The management of uplands and riparian areas must be coordinated among
 33 stakeholders in a way that makes good economic and ecological sense. Watershed and
 34 political boundaries rarely coincide; as a result, the necessary coordination of land and
 35 water management depends upon functional organizations that can resolve
 36 transboundary issues and water use disputes. Since water is the most restricting factor
 37 for agricultural development in CWANA, more emphasis should be placed on optimal

1 utilization of water in agriculture and water demand management options. Regional
2 cooperation is essential in managing water resources, improving water use in agriculture,
3 attaining integrated water resources management, and resolving conflicts over water
4 resources.

5

6 Adequate research on water saving techniques, taking into consideration social aspects, is
7 needed. A social assessment should be carried out to better understand the social groups likely
8 to use such techniques. Such assessments and consultations with the communities are being
9 carried out in the studies to sustainable management of the Nile watersheds management under
10 the project of "Nile Basin Initiative" of the World Bank. Special attention should be focused on the
11 management of mountainous, forested watersheds, which are the highest freshwater yielding
12 areas in CWANA. Available and required TIPOs to respond to major deficits regarding
13 management of natural resources and sustainable development goals in CWANA include: market
14 orientation, diversification and risk management in agricultural production. TIPOs measures that
15 can be undertaken in order to overcome constraints may include:

- 16 - Mitigation options for global climate change.
- 17 - Expansion of woodland and rangelands to reduce desertification
- 18 - Use of biotechnology in coping with biotic stress.

19

20 The richness of agrobiodiversity in the region is key to food security and sustainable agricultural
21 production world wide.

22

23 Agricultural risk management policies in the CWANA region have mainly consisted in the
24 implementation of emergency measures, especially to cope with the consequences of drought
25 and epidemiological situations, as well as in programmes aiming at improving farm production
26 techniques. **However what is at stake for most countries of the region is the design and**
27 **implementation of a comprehensive and pro-active risk policy, which would include the**
28 **establishment of early warning systems, development of crop insurance schemes,**
29 **improvement of public investment in public works, in water management, in agricultural**
30 **and extension, implementation of policies that protect the environment and discourage**
31 **cultivation of marginal land, the reinforcement of marketing systems and the promotion of**
32 **farmers' organizations.**

33

34 **If development and sustainability goals are to be achieved, then the CWANA countries**
35 **need to coordinate and collaborate.** Some of the important domains of cooperation are:
36 coordination and collaboration within the CWANA region to deliver the development objectives
37 especially with reference to poverty alleviation, amelioration of hunger, socio-economic and

sustainable development; also establish network for preservation and development of natural resource capital and mitigation of natural disasters such as droughts and floods, and resolution of conflict over natural resource management.

What investments are needed to help realize the potential of AKST in realizing the development and sustainability goals? AKST has an important and essential role in meeting sustainable development goals of reducing hunger, improving human health, reducing poverty, improving livelihoods, and attaining environmental, social and economic sustainability. With more targeted investments in research, capacity building and public awareness leading to appropriate AKST, more efficient practices could evolve both in parenthood planning and agricultural production that may in the long run help satisfy food demand locally.

Agricultural activities in CWANA are undergoing major changes, due to movement of liberalization and reorientation of public policy, which reduce public investment and support mechanisms in favor of farm production. To mitigate the effect of these trends CWANA countries need to create an AKST-driven development strategy based on:

- A focus on practical client oriented problem-solving agricultural and NR research and contributing towards generation of new knowledge through investment in basic research guided towards innovation and development; and
- AKST linkage with rural development and investment in public goods/social safety nets especially for marginalized communities.

National governments seek to promote human welfare by helping to increase productivity in agriculture while sustaining the resource basis. One potentially efficient way to increase productivity is to foster an environment that enables private firm to invest in R&D and product delivery. The private sector needs to be mobilized to invest in agriculture research, and building public private partnerships to cater to national development agenda. Agricultural productivity improvements will depend on substantial and deliberate investments in agricultural research and development in order to contribute to poverty alleviation, food security and economic progress.

AKST is generally reckoned to be an engine of transformation or change, appreciating its role towards agricultural development, poverty alleviation and sustainability. In this context, investment in agricultural Research and Development (R&D) is considered to be a prerequisite.