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CSD-17

PRIORITIES FOR ACTION RECOMMENDED BY THE SCIENTIFIC AND TECHNOLOGICAL COMMUNITY (S&TC)

Agriculture, land, rural development

Sustainably meeting the world's growing food demands is an urgent global challenge. Increasing agricultural production, while maintaining critical ecosystem services, will require massive public and private sector investments. The advancement and application of *agricultural knowledge, science, and technology (AKST)* must be at the centre of efforts to address this challenge. The long trend of declining investments in AKST and extension services by many governments and by international donors must be reversed. Additionally, AKST must be applied to the needs of small-scale farmers in developing countries, such as those in sub-Saharan Africa, who are among the poorest in the world and particularly threatened by ecosystem degradation.

To address these challenges, S&TC recommends:

- major increases in national, international, and private donor *investments in science, engineering and technology, including extension services*, achieving:
 - global and regional food security;
 - improved livelihoods for the rural poor;
 - sustainable use of natural resources;
 - effective, integrated research on agriculture, and agroecosystem services; and
 - mitigation of and adaptation to climate change.
- *public and private partnerships* targeting small-scale agricultural systems, for greater opportunity for development of science, technology, and extension services

Development and adaptation of AKST for use by small-scale farmers requires interdisciplinary, integrated research, education, information dissemination and extension that:

- uses enhanced data collection and research to better understand the diverse environmental, socio-economic, cultural and gender contexts in which farmers/pastoralists live and work;
- blends science, engineering and technology with local knowledge to develop innovative methods in soil and water management, and agricultural production;
- empowers farmers through appropriate policies and investments, notably in health services, education for all, and institutional arrangements and infrastructure development that provides access to markets;
- enhances North-South and South-South partnerships.

Climate change has major, mainly negative impacts for food systems. Urgent efforts must be made to reduce the vulnerability of the agricultural sector to climate variability and change, especially floods, droughts and other extreme weather events to protect regional and global food supplies. There are *critical gaps of knowledge* in this area, as well as a lack of climate-informed early warning and response systems.

To fill these knowledge gaps, CSD-17 should call for stronger linkages between the climate change science and development communities to strengthen research and monitoring aimed at:

- a better understanding of climate change impact on agriculture;
- developing and evaluating policy options, technologies and practices needed to decrease the vulnerability of food systems and adapt sustainably to climate change.

Biotechnology developments could significantly contribute to increasing agricultural production, especially in drought-prone areas, and to improving the micronutrient status of major crops. Optimal utilization of genetically modified crops (GMCs) will only occur if public concerns are addressed. When crops, including GMCs, are developed, they need to be assessed for health and environmental risks through pre-market regulatory review on a case-by-case basis. Small farmers in developing countries must be ensured direct benefits from GMCs.

The S&TC recommends increasing research and deployment of new and emerging scientific knowledge for increasing yields and making plants more resilient to climate factors, in particular drought. It recommends greater transparency through:

- enhanced involvement of researchers in public debate on GMOs;
- government regulatory systems that are science-based, transparent and involve community participation; and
- invasive species management through appropriate regulations and monitoring.

Biofuel agriculture versus food production is an important sustainable development topic. A scientific, engineering, social, economic and sustainability analysis should be conducted on a case-by-case basis, of the comparative advantage of extensive planting of food or biofuel crops, especially given the ongoing global food crisis. Focusing on second generation biofuels which do not compete with food production can offer promising results to mitigate climate change and to stimulate economic and rural development.

Drought and desertification

Drought and desertification rank among the greatest environmental challenges and are a major impediment to meeting basic human needs in drylands of the developing world. Inappropriate land and water management, combined with recurrent drought, are the main causes of desertification. While the impacts of climate change in drylands will vary by region, the frequency and duration of droughts are predicted to increase further reducing water availability and vegetation productivity for the vast drylands of sub-Saharan Africa and Central Asia.

Capacity building, focused on effectively sharing existing knowledge must be a priority. Additional knowledge is needed about integrated land and water management, engineering, and technology suitable to drylands conditions, as well as a thorough assessment of irrigation and other technologies currently used in drought- and desertification-prone regions.

CSD 17 should call for:

- *prevention of desertification in at-risk regions* by promoting policies that:
 - integrate land and water management, including water harvesting;

- enhance vegetative cover (through reseeded, promotion of higher plant establishment, reforestation and protection of riparian areas);
 - develop soil quality (by restocking soil organic matter and preventing erosion);
 - phase out inappropriate irrigation methods that initiate or accelerate desertification processes; and
 - integrate locally-available traditional technology with the selective transfer of appropriate “new”, innovative technologies for optimal water management;
 - facilitate active participation of recipient communities in these processes.
- implementing *restoration and rehabilitation of desertified drylands*.

Long-term observations. Decision makers and the scientific and engineering communities face a widespread lack of reliable and easily accessible data on land and water resources, weather and climate, drought and desertification, biological diversity, land-use and -cover and other parameters related to the topics of CSD-17.

To address this information gap, S&TC recommends that:

- countries review and strengthen national data collection and long-term environmental monitoring networks; and
- increase efforts to (i) strengthen the CSD-17 related components of existing observing systems, and (ii) fully operationalise existing global environmental observing systems, within the context of the Global Earth Observation System of Systems.

Partnerships and Multi-stakeholder Dialogues

The S&T community is committed to developing strong partnerships with all other stakeholders concerned. Partnerships are required at local, national, regional and global levels with governments, farmers, the private sector, and all other major groups. Governments need to support such partnerships, and enhanced interaction between scientists, engineers and educators, with farmers and pastoralists, as well as public and private decision makers and civil society groups.