**The International Assessment of Agriculture Science and Technology for Development**

**Summary from GM Freeze January 2008**

**This summary is published by the GM Freeze to stimulate interest and discussion around the forthcoming intergovernmental plenary of the International assessment of Agriculture Science and technology for Development (IAASTD) currently scheduled for April 2008 (previously postponed from Nairobi, Kenya, in January).**

**Background**

The International Assessment of Agriculture Science and Technology for Development (IAASTD) arose from an initiative by the World Bank following the Earth Summit in Johannesburg in 2002. The initial proposals to assess the role of science and technology in agriculture were changed substantially following global discussions which agreed the involvement of an international panel of experts for drafting documents and the involvement of "Multiple Stakeholders" from non-governmental organisations, the private sector, the scientific community, Multilateral Environmental Agreements and multiple international agencies. The Cosponsoring Agencies are Food and Agriculture Organisation (FAO), United Nations Development Programme (UNDP), World Health Organisation (WHO), United Nations Environment Programme (UNEP) United Nations Educational, Sceintific and Cultural Organisation ( UNESCO) and the World Bank (WB).

An Assessment was defined as:

> 1A scientific assessment is a critical, objective evaluation and analysis of information, including traditional and local knowledge, designed to meet user needs and support decision-making. It applies the judgment of experts to existing knowledge to provide scientifically credible answers to policy relevant questions, quantifying where possible the level of confidence.

The Purpose of the IAASTD was agreed as

> 11. The international assessment on the role of agricultural science and technology in reducing hunger and poverty, improving rural livelihoods, and facilitating equitable, environmentally, socially and economically sustainable development through the generation, access to, and use of agricultural knowledge, science and technology (hereinafter referred to as IAASTD) shall concentrate its activities on a critical assessment of the literature, experience and knowledge pertaining to the scope of IAASTD as defined by the Panel of participating governments.
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> 12. The role of IAASTD will be to comprehensively, openly and transparently assess the scientific, technical and socio-economic literature, experience and knowledge relevant to how agricultural science and technology can reduce hunger and poverty, improve rural livelihoods, and facilitate equitable, environmentally, socially and economically sustainable development through the generation, access and use of agricultural knowledge, science and technology. The IAASTD Report should be policy relevant but not policy prescriptive, and deal objectively with scientific, technical and socio-economic issues.

13. Peer-review of local and institutional knowledge by relevant experts in government and civil society shall be an essential part of the IAASTD process.

Assessments are conducted by a credible group of experts with a broad range of disciplinary and geographical experience, in a balanced transparent way.

Assessments *reduce* complexity by summarization, synthesis and sorting what is known and widely accepted from what is not known (or not agreed).

Assessments relate to the situation at a particular time and in a geographical domain.

Draft reports were published on line for consultation in spring 2007 and a second consultation took place in September 2007.

The next step in the process was to bes a week long plenary in the Kenyan capital, Nairobi, from 14th to 19th January 2008 at which the final text of the report should have be agreed. However. This Intergovernmental Plenary was postponed due to the political unrest in Kenya. It has been re-scheduled for April 2008.

The latest drafts of the reports which will form the basis of discussions at the plenary meeting are now available on line at

http://www.agassessment.org/index.cfm?Page=Plenary&ItemID=2713

These include global report, regional reports and topic reports within an overall synthesis document.

Below the key findings of the Global Summary for Decision Makers are set out (http://www.agassessment.org/docs/Global_SDM_251107.pdf ).

These findings recognize the complexities of the problems for agriculture throughout the world to deliver wholesome safe and affordable food without causing irreparable or long term harm to the environment in a world when there are likely to be significant climatic change over the next half century. The finding also recognize the multifuntionality of agriculture in providing service other than just food, fibre, raw materials and biofuels production, for instance ecosystem services, landscape and cultures. It also acknowledges the key role that the local knowledge of farmers , particularly women, should play in the future in developing appropriate technologies. The failure of past technological innovations and trade to benefit the poorest people and to cause harm to the environment is also acknowledged.

The reports have adopted a very broad definition of biotechnology :

***Biotechnology***

*The IAASTD definition of biotechnology is based on that in the Cartagena Protocol on Biosafety. It is a broad term embracing the manipulation of living organisms and spans the large range of activities from conventional techniques for fermentation and plant and animal breeding to recent innovations in tissue culture, irradiation, genomics and marker-assisted breeding (MAB) or marker assisted selection (MAS) to augment natural breeding. Some of the latest biotechnologies ('modern biotechnology') include the use of in vitro modified DNA or RNA and the fusion of cells from different taxonomic families, techniques that overcome natural physiological reproductive or recombination barriers. Currently the most contentious issue is the use of recombinant DNA techniques to produce transgenes that are inserted into genomes. Even newer techniques of modern biotechnology manipulate heritable material without changing DNA.*

It is therefore important theat this definition is considered whenever the term is used and not taken to imply the use of genetic modification or transgenics.

**Extracts**
**Background**
In August 2002, the World Bank and the Food and Agriculture Organization (FAO) of the United Nations initiated a global consultative process to determine whether an international assessment of agricultural knowledge, science and technology (AKST) was needed. This was stimulated by discussions at the World Bank with the private sector and nongovernmental organizations (NGOs) on the state of scientific understanding of biotechnology and more specifically transgenics.
**http://www.agassessment.org/docs/Global_SDM_251107.pdf**

**Intellectual Property Rights**

*Higher level drivers of biotechnology R&D, such as IPR frameworks, determine what products become available. While this attracts investment in agriculture, it can also concentrate ownership of agricultural resources. An emphasis on modern biotechnology can alter education and training programs and reduce the number of professionals in other core agricultural sciences. This situation can be self-reinforcing since today's students define tomorrow's educational and training opportunities* ."

**http://www.agassessment.org/docs/Synthesis_Report_261107_text.pdf**

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**New Approaches to Research and Development**
*A problem-oriented approach to biotechnology R&D would focus investment on local priorities identified through participatory and transparent processes, and favor multifunctional solutions to local problems. These processes require new kinds of support for the public to critically engage in assessments of the technical, social, political, cultural, gender, legal, environmental and economic impacts of modern biotechnology. Biotechnologies should be used to maintain local expertise and germplasm so that the capacity for further research resides within the local community. Such R&D would put much needed emphasis onto participatory breeding projects and agroecology.*

http://www.agassessment.org/docs/SR_Exec_Sum_English.pdf

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**Shifting Research Priorities**
*Successfully meeting development and sustainability goals and responding to new priorities and changing circumstances would require a fundamental shift in AKST, including science, technology, policies, institutions, capacity development and investment. Such a shift would recognize and give increased importance to the multifunctionality of agriculture, accounting for the complexity of agricultural systems within diverse social and ecological contexts.*

**http://www.agassessment.org/docs/SR_Exec_Sum_English.pdf**

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**Summary of Twenty One Key issues identified by the IAASTD contained in the Global Summary for Decision makers (see annex for full text)**
**http://www.agassessment.org/docs/Global_SDM_251107.pdf**

1. **Agricultural Knowledge, Science and Technology (AKST) has contributed to substantial increases in agricultural production over time, contributing to food security.**
2. **Past AKST benefits have not been evenly distributed for institutional and policy reasons.**
3. **Emphasis on increasing yields and productivity has in some cases had negative consequences on environmental sustainability.**
4. **Demographic and income changes in the next 50 years will change partterns of food consumption and produce new pressures on supply.**
5. **Agriculture in complex and multifunctional.**
6. **AKST needs to be redirected to agroecological to address environmental issues.**
7. **AKST needs to be redirected to address a range of persistent socioeconomic inequities**
8. **AKST needs to be redirected to utilize women's knowledge, skills and experience to advance progress towards sustainability.**
9. **Progress toward sustainable solutions requires the use of formal, traditional and community-based science and technology as well as new approaches for agricultural and natural resource management.**
10. **Some challenges may be resolved only by development and application of new and emerging AKST.**
11. **Increased public research investment in small scale farming systems can help realize *existing* opportunities.**
12. **Significant pro-poor progress requires *creating* opportunities for innovation and entrepreneurship, which explicitly target resource poor farmers and rural laborers.**
13. **New solutions for rewarding small-scale farm sustainability are required.**
14. **New systems of governance and international agreements are need to redress some of the biases in AKST arrangements that often privilege short-term over long-term considerations and productivity over environmental and social sustainability and the multiple needs of the small-scale farm sector.**
15. **Adoption of ecologically and socially sustainable agricultural systems require new institutions to provide access to credit , land and water and allow fair trade to develop for small-scale producers ands rural labourers.**
16. **Opening national agricultural markets to international competition before basic national institutions and infrastructure are in place can undermine the agricultural sector, with potential long-term negative effects for poverty alleviation, food security and the environment.**
17. **Intensive export oriented agriculture has increased under open markets but has been accompanied in many cases by adverse consequences such as exportation of soil nutrients, unsustainable soil or water management, or exploitative labor conditions.**
18. **The choice of relevant approaches to adoption and implementation of agricultural innovation is crucial for achieving development and sustainability goals.**
19. **More and better targeted AKST investments, explicitly taking into account the multifunctionality of agriculture, by both public and private sectors can help advance development and sustainability goals.**
20. **The enforcement of codes of conduct by universities and research institutes, particularly where private funding has complemented public sector funds, can help avoid conflicts of interest and maintain focus on sustainability and development in AKST.**
21. **Achieving sustainability and development goals will involve creating space for diverse voices and perspectives and a multiplicity of scientifically well-founded options, through, for example, the inclusion of social scientists in policy and**

**practice of AKST helps direct and focus public and private research, extension and education on such goals.**

**To be of value in shaping agricultural development in the future based on science and technology, the IAASTD report must retain this analysis. It is known that elements within the US government and World Bank are not happy with these key (underpinning) findings from the expert panels and will seek to change the draft reports substantially in Nairobi in January.**

**The long term value of the IAASTD process will depend on how many of the key finding are retained or strengthened.**

**ANNEX**

http://www.agassessment.org/docs/Global_SDM_251107.pdf

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**Key Findings from The Global Summary for Decision Makers**
**1. Agricultural Knowledge, Science and Technology (AKST) has contributed to substantial increases in agricultural production over time, contributing to food security** This has been achieved primarily through a strong focus on increasing yields with improved high yielding varieties and increased inputs (water, agrochemicals). These increases in productivity have contributed to a net increase in global food availability per person: from 2360 kcal in the 1960s to 2803 kcal per person per day in the 1990s, at a time when world population significantly increased.
**2. People have benefited unevenly from these from these yield increases across regions, in part because of different institutional and policy environments.** While in South Asia the percentage of people living in poverty (<US$2 per day) has decreased from 45 to 30%, in sub-Saharan Africa (SSA), for example, this percentage (around 50%) has remained the same over the last 20 years. Value added per agricultural worker in 2003 (in 2000 US$) in OECD countries was 23,081 with a rate of growth of 4.4% for 1992-2003. For SSA, the figures are respectively 327 and 1.4%.
**3. Emphasis on increasing yields and productivity has in some cases had negative consequences on environmental sustainability.** These consequences were often not foreseen as they occurred over time and, some occurred outside of traditional farm boundaries. For instance, 1.9 billion ha (and 2.6 billion people) today are affected by significant levels of land degradation. Fifty years ago water withdrawal from rivers was one-third of what it is today: currently 70% of freshwater withdrawal (2700 $km^3$ – 2.45% of rainfall) is attributable to irrigated agriculture. Approximately 1.6 billion people live in water-scarce basins. Agriculture contributes about 60% of anthropogenic emissions of $CH_4$ and about 50% of $N_20$ emissions. Excessive fertilization has led to eutrophication and large dead zones in a number of coastal areas, e.g. Gulf of Mexico, and lakes, e.g., Lake Victoria.
**4. Projections based on a continuation of current policies and practices indicate global demographic changes and changing patterns of income distribution over the next 50 years will lead to different patterns of food consumption and increased demand for food.** Projections indicate a probable tightening of world food markets with increasing resource scarcity adversely affecting poor consumers and poor producers. Overall the growing water and land scarcity coupled with projected changes in climate is projected to constrain growth in food production.
**5. Today it is widely understood that agriculture operates within complex systems and is multifunctional in its nature**. A multifunctional approach to implementing AKST will enhance its impact on hunger and poverty, improving human nutrition and livelihoods in an equitable, environmentally, socially and economically sustainable manner.

**6. A systematic redirection of AKST towards agroecological strategies is needed to address environmental issues.** Formal, traditional and community-based AKST need to respond to increasing pressures on natural resources, such as reduced availability and worsening quality of water, degraded soils and landscapes, loss of biodiversity and agroecosystem function, degradation and loss of forest cover and degraded marine and inshore fisheries. Agricultural strategies will also need to include limiting emission of greenhouse gases and adapting to human-induced climate change and increased variability.

**7. The generation and delivery of AKST needs to be redirected to address a range of persistent socioeconomic inequities**, including reducing the risk of conflicts resulting from competing claims on land and water resources; assisting individuals and communities in coping with endemic and epidemic human and animal diseases and their consequences; addressing problems associated with local and international flows of migrant laborers; and increasing access to information and technology to poorer areas and peoples, especially to women. Such redirection requires thorough, open and transparent engagement of all stakeholders, for instance through participatory research councils and citizen juries.

**Multifunctionality**

The term multifunctionality has sometimes been interpreted as having implications for trade and protectionism. This is **not** the definition used here. In IAASTD, multifunctionality is used solely to express the inescapable interconnectedness of agriculture's different roles and functions. The concept of multifunctionality recognizes agriculture as a multi-output activity producing not only commodities (food, fodder, fibers and biofuels), but also non-commodity outputs such as ecosystem services, landscape amenities and cultural heritages.

The working definition proposed by OECD, which is used by the IAASTD, associates multifunctionality with the particular characteristics of the agricultural production process and its outputs; (i) the existence of multiple commodity and non-commodity outputs that are jointly produced by agriculture; and (ii) some of the non-commodity outputs may exhibit the characteristics of externalities or public goods, such that markets for these goods function poorly or are non-existent.

The use of the term has been controversial and contested in global trade negotiations, and has centered on whether "trade-distorting" agricultural subsidies are needed for agriculture to perform its many functions. Proponents argue that current patterns of agricultural subsidies, international trade and related policy frameworks do not stimulate transitions toward equitable agricultural and food trade relation or sustainable food and farming systems and have given rise to perverse impacts on natural resources and agroecologies as well as on human health and nutrition. Opponents argue that attempts to remedy these outcomes by means of trade-related instruments will weaken the efficiency of agricultural trade and lead to further undesirable market distortion; their preferred approach is to address the externalized costs and negative impacts on poverty, the environment, human health and nutrition by other means.

**8. More determined involvement of women's knowledge, skills and experience is required to advance progress towards sustainability and development goals and a redirection of AKST will be required to provide more opportunities for women.** Women farmers, processors and farm workers have benefited less from AKST than men overall and poor women least of all. Efforts to redress persistent biases in their access to production resources, occupational education and training, information and extension services have met with limited success. Many of the societal, policy-related and operational impediments to more equitable progress, as well as the private and public costs of such an uneven pattern of development, are well understood as are the factors that discourage more determined action.

**9. Many of the challenges facing agriculture over the next 50 years will require more integrated applications of existing science and technology (formal, traditional and community-based), as well as new approaches for agricultural and natural resource management.** Agricultural soil, nutrient, pest and water management can be enhanced by

traditional and local knowledge systems and current technologies. New genotypes of crops, livestock, fish and trees and advances in plant and livestock breeding, nanotechnology, remote sensing, agroecology, integrated pest management (IPM), information and communication technologies (ICT) will create opportunities for more resource-efficient and site-specific agriculture. Small-scale, local biofuels and bio-oils could offer diversified livelihood opportunities, especially in remote regions and countries where high transport costs impede agricultural trade and energy imports.

**10. Some challenges may be resolved only by development and application of new and emerging AKST.** Examples include combating livestock diseases, e.g., vaccine development; mitigating greenhouse gas emissions from agriculture; reducing the vulnerability of agriculture to a changing climate through techniques such as biotechnology; reducing the heavy reliance of agriculture and commodity chains on fossil fuels; and addressing complex economic issues regarding national and international public goods through a broad range of economic theories and approaches.

**Biotechnology**

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**11. Targeting small-scale agricultural systems by increased public research investment can help realize *existing* opportunities.** Participatory research partnerships, development-oriented local governance and institutions such as cooperatives, farmer organizations and business associations support small-scale producers and entrepreneurs to capture and add value to existing opportunities on-farm, post-harvest and in non-farm rural enterprises. Some small-scale farming systems have high water, nutrient and energy use efficiencies and conserve natural resources and biodiversity without sacrificing yield. The underlying principles, processes and knowledge may be relevant and capable of extrapolation to larger scale farming systems, particularly in the face of climate change effects.

**12. Significant pro-poor progress requires *creating* opportunities for innovation and entrepreneurship, which explicitly target resource poor farmers and rural laborers.** This will require simultaneous investments in infrastructure and the development of access to markets and trade opportunities, occupational education and extension services, capital, credit and in natural resources such as land and water. The increasing market influence of large scale buyers and market standards are especially challenging for small producers necessitating further innovation in public and private training, education and extension services and suitable legal, regulatory and policy frameworks.

**13. Decisions around small-scale farm sustainability pose difficult policy choices.** Special and differential treatment is an acknowledged principle in Doha agricultural negotiations and may be warranted for small farm sectors without a history of government support. New payment mechanisms for environmental services by public and private utilities such as catchment protection and mitigation of climate change effects are of increasing importance and open new opportunities for the small-scale farm sector.

**14. Public policy, regulatory frameworks and international agreements are critical to implementing more sustainable agricultural practices.** Urgent challenges remain that call for additional effective agreements involving transboundary water, emerging human and animal

diseases, climate change, and the growing concerns about food safety and occupational health. Achieving development and sustainability goals calls for national and international regulations to address the multiple economic, environmental and social dimensions of these transboundary issues. These policies need to be informed by broad-based evidence from natural and social sciences with multistakeholder participation. Improved governance and strengthening engagement of stakeholders can redress some of the biases in AKST arrangements that often privilege short-term over long-term considerations and productivity over environmental and social sustainability and the multiple needs of the small-scale farm sector.

**15. Innovative institutional arrangements are essential to the successful design and adoption of ecologically and socially sustainable agricultural systems.** Sustainable agricultural production is more likely when legal frameworks and forms of association provide secure access to credit, markets, land and water for individuals and communities with modest resources. Creating opportunities for processing and commercializing agricultural products that ensure a fair share of value addition for small-scale producers and rural laborers is critical to meeting development and sustainability goals.

**16. Opening national agricultural markets to international competition before basic national institutions and infrastructure are in place can undermine the agricultural sector, with potential long-term negative effects for poverty alleviation, food security and the environment.** Some developing countries with large export sectors have achieved aggregate gains in GDP, although their small-scale farm sectors have not necessarily benefited and in many cases have lost out. The poorest developing countries are net losers under most trade liberalization scenarios. These distributional impacts call for differentiation in policy frameworks as embraced by the Doha work plan (special and differential treatment and non-reciprocal access). Developing countries could benefit from reduced barriers and elimination of escalating tariffs for processed commodities in developed countries; deeper preferential access to developed country markets for commodities important for rural livelihoods; increased public investment in local value addition; improved access for small-scale farmers to credit; and strengthened regional markets.

**17. Intensive export oriented agriculture has increased under open markets but has been accompanied in many cases by adverse consequences such as exportation of soil nutrients, unsustainable soil or water management, or exploitative labor conditions.** AKST innovations that address sustainability and development goals would be more effective with fundamental changes in price signals, for example, internalization of environmental externalities and payment/reward for environmental services.

**18. The choice of relevant approaches to adoption and implementation of agricultural innovation is crucial for achieving development and sustainability goals.** There is a wide range of such approaches in current use. In the past, AKST policy and practice in many countries was dominated by the ‘transfer of technology’ approach. A critical decision for AKST stakeholders is the selection of approaches suited to the advancement of sustainability and development goals in different circumstances.

**19. More and better targeted AKST investments, explicitly taking into account the multifunctionality of agriculture, by both public and private sectors can help advance development and sustainability goals**. Increased investments in AKST, particularly if complemented by supporting investments in rural development can have high economic rates of return and reduce poverty. AKST investments also generate environmental, social, health, and cultural impacts. More evidence is needed on the actual levels and distributional effects of the economic and non-economic benefits and costs of these investments for better targeting of future AKST investments.

**20. The enforcement of codes of conduct by universities and research institutes, particularly where private funding has complemented public sector funds, can help avoid conflicts of interest and maintain focus on sustainability and development in AKST.** Strong government capacity to understand, and where necessary regulate, the private sector also is needed, for instance by means of monitoring systems and enforcement of rules, which can help avoid conflict of interest in AKST policy making.

**21. Achieving sustainability and development goals will involve creating space for diverse voices and perspectives and a multiplicity of scientifically well-founded options, through, for example, the inclusion of social scientists in policy and practice of AKST helps direct and focus public and private research, extension and education on such goals.** Diverse and conflicting interpretations of past and current events, coupled with the under-valuation of different types of AKST limit progress in the field. Understanding the underlying sources of competing interpretations of AKST is crucial to addressing goals. Some interpretations have been privileged over others and have helped push formal AKST along certain pathways, to the neglect of other scientifically sound options. Some of the by-passed options originate in traditional knowledge or civil society experience and may be better able to contribute to poverty reduction, social inclusion, equity and generate multifunctional outcomes.