Special Briefing

Practical Action, GM Freeze and Friends of the Earth

International Assessment of Agricultural Knowledge Science and Technology for Development (IAASTD) – Meeting the Challenge

This briefing explains the background to the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) and outlines its main recommendations and findings. 57 governments approved the summaries and reports in the final plenary in Johannesburg on 12th April 2008 with the UK approving them two months later on 9th June 2008[1]. DFID contributed over £500,000 to the Assessment. The briefing also looks at the changes needed in UK development policy in order to meet the challenges set down in the IAASTD documents[2].

IAASTD

IAASTD is a wake-up call for the future of food production and the environment, as the impacts of climate change and peak oil begin to bite. IAASTD states that "*Business as usual is not an option*". In a world that is short of resources needed to feed future generations, such as land, water and biodiversity, IAASTD found that "*agriculture has contributed to land degradation in all regions [of the world]… On average 35% of severely degraded land worldwide is due to agricultural activities"* that also have to cope with "*declining water availability and quality, the loss of biodiversity, farmer access to seeds and local plant and animal genetic resources, and local capacities to mitigate and adapt to climate change...*" [3]

> *"Agriculture has a footprint on all of the big environmental issues, so as the world considers climate change, biodiversity, land degradation, water quality, etc. they must also consider agriculture which lies at the centre of these issues and poses some uncomfortable challenges that need to be faced. We've got to make sure the footprint of agriculture on climate change is lessened; we have to make sure that we don't degrade our soil, we don't degrade the water, and we don't have adverse effects on biodiversity. There are some major challenges, but we believe that by combining local and traditional knowledge with formal knowledge these challenges can be met."*
>
> Professor Robert Watson - Director IAASTD & Chief Scientist DEFRA[4]

Purpose of IAASTD

"*The purpose of IAASTD is to assess agricultural knowledge, science and technology (AKST) in order to use AKST more effectively to reduce hunger and poverty, improve rural livelihoods, and facilitate equitable, environmentally, socially and economically sustainable development"[5].*

Background

The Assessment process was initiated by the World Bank with other UN co-sponsors: FAO, GEF, UNDP, UNEP, WHO and UNESCO. Governments, civil society organisations, private sector and scientific institutions from around the world formed the
60 person governing Bureau of the IAASTD that set the methodology for conducting the assessment in a transparent and inclusive way[6].

Professor Bob Watson (former Director of Intergovernmental Panel on Climate Change) was appointed IAASTD Director. Professor Watson is currently Chief Scientist at Defra. The IAASTD Bureau then selected 400 scientists, from a wide range of relevant disciplines including biological, biotechnological, environmental and social sciences, who analysed the impact of AKST on the current state of agriculture, food supply and the environment and the role of AKST,

trade policies and socio-economic factors had played in the development of agricultural economies in the global south. The authors also examined the potential role of AKST on the future development of agriculture in the Global South and what structural, institutional, economic and social changes would be needed to achieve the purpose of IAASTD.

IAASTD Output

IAASTD recognised the complexities of the problems facing world agriculture in delivering wholesome safe and affordable food without causing irreparable or long term harm to local communities and the environment in a world facing significant climatic change over the next half century. It emphasised the multifunctionality of agriculture in providing more than food, fibre, raw materials and biomass, for instance ecosystem services and functions, landscape and cultures. It also acknowledged the key role that the local knowledge of farmers, particularly women, and other small-scale food producers should play in the future in developing appropriate technologies and knowledge systems. The failure of past technological innovations and trade to benefit poor people and to cause harm to the environment was acknowledged.

These outcomes were summarized in 22 Key Findings and 8 themes ranging from bioenergy to women in agriculture.

The IAASTD Process

400 authors were appointed to produce a global report and five sub-global reports:

- Central and West Asia and North Africa
- Sub Saharan Africa
- East and South Asia and Pacific
- Latin American and the Caribbean
- North America and Europe

Each was reduced to a summary for decision makers (SDM) and a global synthesis report with an executive summary was also prepared... The final set of reports covered nearly 2,500 pages. The Synthesis Report was wide ranging in the topics is covered in detail. These were:

- Bioenergy
- Biotechnology
- Climate change
- Human health
- Natural resource management
- Trade and markets
- Traditional and local knowledge and community-based innovation
- Women in agriculture

Each report was peer reviewed twice to ensure that data and information used as evidence was accurately interpreted by the authors. Late in the process an author from the biotechnology industry withdrew[7] after failing to meet deadlines for their contribution but not without criticism[8]. A number of groups and institutions also chose to withdraw from the IAASTD process when it became clear that GM crops were not going to receive enthusiastic endorsement in the final reports[9].

At the intergovernmental plenary in Johannesburg in April 2008, the summaries for decision makers (SDMs) and the executive summary of the Synthesis Report were debated and

amended and finally approved by 57 countries, mainly from the Global South. The UK approved the documents two months later. Three countries (Australia, Canada and the USA) did not fully approve the documents and added reservations, which are included in an annex. Their *reservations were:*

Australia
"The wide range of observations and views presented however, are such that Australia cannot agree with all assertions and options in the report. The report is therefore noted as a useful contribution which will be used for considering the future priorities and scope of AKST in securing economic growth and the alleviation of hunger and poverty".

Canada
"*While acknowledging considerable improvement has been achieved through a process of compromise, there remain a number of assertions and observations that require more substantial, balanced and objective analysis. However, the Canadian Government advocates the Global SDM be drawn to the attention of governments for consideration in addressing the importance of AKST and its large potential to contribute to economic growth and the reduction of hunger and poverty".*

USA
"As we have specific and substantive concerns in each of the reports, the United States is unable to provide unqualified endorsement of the reports, and we have noted them.

The United States believes the Assessment has potential for stimulating further deliberation and research. Further, we acknowledge the reports are a useful contribution for consideration by governments of the role of AKST in raising sustainable economic growth and alleviating hunger and poverty".

USA's objections are set out in the form of reservation posted at the end of the Global Summary and included:

- Objections about moving [AKST] "towards" agroecology.
- Lack of balance in reflecting the use/range of new technologies, including modern biotechnology.
- Emphasising that GMO concerns are about "safety".
- Opting out of the sentence "These options imply a fundamental transformation of AKST and economy wide approach to agricultural policy"
- Reserved the right to protect their negotiating position at future trade talks

These reservations may seem trivial but underlying them is the USA's belief that GM technology and free trade are major parts of the potential the solutions to global poverty and food shortages or "business as usual". The IAASTD was not convinced. However, despite not signing up to the final paper because of particular issues around trade and GMOs and the need for fundamental transformation of AKST, the US did otherwise support the majority of the text.

The UK's Position

The UK Government was fully committed to the IAASTD process from the start and contributed over £500,000 to its budget[10]. The UK sent representatives to the inter-governmental plenary and participated in the discussions about the text. It did not exercise the option to object to any part of the text by footnotes in the text in the way Australia, Canada and the USA did. Despite this it took 8 weeks to get agreement between the Departments for International Development (DFID) and Environment, Food and Rural Affairs (DEFRA) to approve the texts.

Immediately before the Plenary, DFID and DEFRA issued a joint press statement which endorsed the IAASTD process:

> *The UK welcomes the reports of the International Assessment of Agricultural Science and Technology for Development (IAASTD) and congratulates the authors, editors, Director and all those involved with the process. Given increasing food prices and their impact on poor people combined with the challenges to agriculture by climate change, they are very timely.*
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> *The IAASTD is a unique assessment involving governments, civil society and academics. The IAASTD reports are a very valuable and important contribution to the debate and understanding on agricultural knowledge, science and technology and its potential to reduce poverty and hunger around the world.*
>
> *The UK is pleased to see that many leading British social and agricultural scientists have been involved, and that Professor Bob Watson was the Director of the Assessment. The UK Government also provided over £500,000 to support the Assessment*[11]*.*

The UK Government finally approved the IAASTD texts on 9th June (an 8 week delay compared with the other 57 countries that did likewise in Johannesburg...

> ***The Secretary of State for International Development (Mr. Douglas Alexander):*** *I am today announcing the Government's position on the reports of the International Assessment of Agricultural Science and Technology for Development (IAASTD). The UK Government approve the global summary for decision makers, the North America and European regional summary for decision makers, and the executive summary of the synthesis of the global and regional reports, and accept the chapters of the synthesis report. We would note these reports, and the background IAASTD reports, provide a valuable contribution to our understanding on agricultural knowledge, science and technology for development, and while presenting an overall consensus they also provide a diversity of views.*
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> *The IAASTD has produced a series of options for governments and other stakeholders to consider to help ensure that agricultural knowledge, science and technology fulfils its potential to the reduction of hunger and poverty. The Government will be considering these options in their support of agricultural knowledge, science and research for developing countries.*[12]

More efficient use of increasingly scarce land, water and biological resources
would need public investment in legal and management capabilities [and] to support effective change in agricultural knowledge systems directed to:

- promote interactive knowledge networks (associating farmers, farmers' communities, scientists, industrial and actors in other knowledge areas) and improve access for all actors to information and communication technologies.
- support ecological, evolutionary, food, nutrition, social and complex systems' sciences and the promotion of effective interdisciplinarity.
- establish capacities and facilities to offer life-long learning opportunities to those involved in the agrifood arena.

The answer to why the UK government was so slow to approve the IAASTD reports may lie in part in the report's ambivalence about GM technology and trade liberalisation purported benefits for the relief of poverty and hunger; the multidisciplinary analysis by the IAASTD authors failed to find convincing evidence, despite examining hundreds of references. As a result of approving the IAASTD reports DFID should now / the UK Government will have to examine and review its policies and positions across a range of Departments and negotiating positions at international level, including on trade liberalism and the adoption of GM technology.

The 2005 DFID Agriculture Policy paper[13] supported the role of biotechnology saying that it *"has the potential to provide significant benefits for poor people"*[14] and dismissed traditional breeding by boldly stating *"there is limited potential to improve yields of major staples from existing varieties".*

Whilst DFID acknowledges that trade rules, and in particular agricultural subsidies in OECD countries, need reform it is also committed to the view that liberalising trade will work for the poor:

> *The move to a more liberalised international agricultural trade regime will not bring the same benefits to all countries. It may cause difficulties for some developing countries, in particular those dependent upon food imports or those losing preferential access to markets. Measures will be needed to help these countries to adjust. Nevertheless, in the long term, liberalisation should result in a more favourable international structure of agricultural prices which should benefit most poor countries[15].*

Key Findings of the IAASTD Report

The Global Synthesis for decision makers[16] sets out 22 key findings (see annex for quick guide)

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 germplasm, and increased inputs (water, agrochemicals) and mechanization.

2. People have benefited unevenly from these yield increases across regions, in part because of different organizational capacities, sociocultural factors, and 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.

3. Emphasis on increasing yields and productivity has in some cases had negative consequences on environmental sustainability. For instance, 1.9 billion ha (and 2.6 billion people) today are affected by significant levels of land degradation.

4. **The environmental shortcomings of agricultural practice associated with poor socioeconomic conditions create a vicious cycle in which poor smallholder farmers have to deforest and use new often marginal lands, so increasing deforestation and overall degradation.** Loss of soil fertility, soil erosion, breakdown in agroecological functions have resulted in poor crop yields, land abandonment, deforestation and ever-increasing movement into marginal land, including steep hillsides. Existing multifunctional systems that minimize these problems have not been sufficiently prioritized for research.

5. Projections based on a continuation of current policies and practices indicate that 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. In the reference run, global cereal demand is projected to increase by 75% between 2000 and 2050 and global meat demand is expected to double. More than three-fourths of growth in demand in both cereals and meat is projected to be in developing countries.

6. 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.

7. An increase and strengthening of AKST towards agroecological sciences will contribute to addressing environmental issues while maintaining and increasing productivity. 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.

8. Strengthening and redirecting the generation and delivery of AKST will contribute to addressing 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 and opportunities associated with local and international flows of migrant labourers; and increasing access to information, education and technology to poorer areas and peoples, especially to women.

9. Greater and more effective involvement of women and use of their knowledge, skills and experience will advance progress towards sustainability and development goals and a strengthening and redirection of AKST to address gender issues will help achieve this. Women farmers, processors and farm workers have benefited less from AKST than men overall and poor women least of all.

10. Many of the challenges facing agriculture currently and in the future will require more innovative and integrated applications of existing knowledge, science and technology (formal, traditional and community-based), as well as new approaches for agricultural and natural resource management. Agricultural soil and biodiversity, nutrient, pest and water management, and the capacity to respond to environmental stresses such as climate change can be enhanced by traditional and local knowledge systems and current technologies.

11. Some challenges will be resolved primarily by development and appropriate application of new and emerging AKST. Such AKST can contribute to solutions provided appropriate institutions and capacities are in place. Examples include combating livestock diseases, e.g. vaccine development; mitigating greenhouse gas emissions from agriculture; reducing the vulnerability of agriculture to a changing climate; reducing the heavy reliance of agriculture and commodity chains on fossil fuels; and addressing complex socioeconomic issues regarding local, national and international public goods

12. Targeting small-scale agricultural systems by forging public and private partnerships, increased public research and extension investment helps realize *existing* opportunities. Strengthening participatory research and extension partnerships, development-oriented local governance and institutions such as cooperatives, farmer organizations and business associations, scientific institutions and unions support small-scale producers and entrepreneurs

to capture and add value to existing opportunities on-farm, post-harvest and in non-farm rural enterprises.

13. Significant pro-poor progress requires creating opportunities for innovation and entrepreneurship, which explicitly target resource poor farmers and rural labourers. .. 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.

14. Decisions around small-scale farm sustainability pose difficult policy choices. Special and differential treatment for developing countries is an acknowledged principle in Doha agricultural negotiations and it is accepted that developing countries can have this special treatment especially on the grounds of food security, farmer's livelihoods and rural development.

15. Public policy, regulatory frameworks and international agreements are critical to implementing more sustainable agricultural practices. Urgent challenges remain that call for additional effective agreements and bio-security measures involving transboundary water, emerging human and animal diseases, agricultural pests, climate change, environmental pollution and the growing concerns about food safety and occupational health.

16. 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.

17. Opening national agricultural markets to international competition can offer economic benefits, but can lead to long term negative effects on poverty alleviation, food security and the environment without basic national institutions and infrastructure being in place. 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.

18. Intensive export oriented agriculture has increased under open market operations but has been accompanied by both benefits and adverse consequences depending on circumstances such as exportation of soil nutrients and water, unsustainable soil or water management, or exploitative labour conditions in some cases. 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 or reward for environmental services.

19. 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, most AKST policy and practice in many countries were undertaken using 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.

20. 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 (for example, infrastructure,

telecommunications and processing facilities) can have high economic rates of return and reduce poverty.

21. While public private partnerships are to be encouraged the establishment and enforcement of codes of conduct by universities and research institutes can help avoid conflicts of interest and maintain focus on sustainability and development in AKST w**hen private funding complements public sector funds.**

22. 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.

How Should UK Government Policy be adapted to meet the challenge of IAASTD's Key Findings?

Agricultural Knowledge Science and Technology, Traditional Knowledge and Women (IAASTD Key Findings 1, 2, 8 and 9)

All Government departments need to acknowledge and utilise the fact that traditional knowledge held by individuals and communities should carry equal weight to the products of formal scientific research and practice. More meaningful involvement by farmers and, in particular, women farmers and other small-scale food producers, needs to be demonstrated in UK funded projects. Projects which solely focus on production need to be adapted so that accompanying socio-economic changes ensure poor people benefit, are fully included in decision making and are the primary beneficiaries.

Assessing Risks (IAASTD Key Findings 3 and 4)

All applications of AKST carry some form of risk, the consequences of which can outweigh the purported benefits e.g. long term contamination of groundwater with nitrates or pesticides or the loss or degradation of natural ecosystems or soil losses. The poor are often the victims of such mistakes. It is essential that the Government adopt appropriate risk assessments on projects they fund, based on "the appropriate implementation of regulatory frameworks as a principled matter of precaution", and seek to promote the same approach by other funding bodies and research institutions.

Consumption Patterns (IAASTD Key Finding 5)

As the over consumption of high fat animal products is a major cause of health problems around the globe, from obesity to heart disease to bowel cancer. The Government needs to look at policy across all departments to reflect the impacts of over consumption on human health, the local environment and climate change, both here and overseas.

Agroecology and Multifunctional Land Management (IAASTD Key Findings 6, 7, 10, 11, 18, 19 and 20)

Agroecology appears to be on the margins of DFID's thinking at present. A search of the DFID website for "agroecology" and "agro-ecology" produced just seven documents where it is mentioned fleetingly. Similarly, attention to the multifunctional aspects of agriculture receives

scant attention in DFID's documents. Recent R&D funding from DFID has been targeted at the Consultative Group for International Agricultural Research (CGIAR) centres (87% of a £150 million DFID research grant announced recently fund will go to CGIAR[17]) who openly attacked the IAASTD process and findings immediately before the final reports were published[18] . This research focus has to change and all Government departments need to put farmer-led agro-ecology at the heart of research and development and policy.

Trade Reform (IAASTD Key Findings 14 and 17)
All sections of government subscribe to the view that opening up markets and free trade is the best way to alleviate poverty.

The move to a more liberalised international agricultural trade regime will not bring the same benefits to all countries. It may cause difficulties for some developing countries, in particular those dependent upon food imports or those losing preferential access to markets. Measures will be needed to help these countries to adjust. Nevertheless, in the long term, liberalisation should result in a more favourable international structure of agricultural prices which should benefit most poor countries[19]

The IAASTD process found conflicting evidence and found that often any benefits from new trading opportunities bypass the poorest communities and people. The Government needs to review its approach to trade policy to ensure that small farmers gain advantages from open markets, are protected from unfair dumping of agricultural products and are adequately rewarded for environmental service they provide e.g. soil conservation, protection of forest and aquifers.

Targeting the Poor (IAASTD Key Finding 13 and 16)
In recent years DFID's policy has shifted from helping the poor to giving "*priority to agricultural development in places where significant productivity gains are possible and the potential links to the wider economy are strongest"* [20] The IAASTD report highlights reasons why smaller farmer are unable to gain full benefits and need specially crafted support. The Government needs to urgently review its policy in the light of the IAASTD findings and provide protection from the growing influences of transnational retail and food corporations currently using farmers in the Global South to produce fruit, flowers and out–of-season vegetables.

Governance and Guidance (IAASTD Key Finding 15, 21 and 22)
The IAASTD findings also point to the need to strike the correct balance between the public and private sector in research and development projects and ensure that weaker voices are heard when shaping research and prioritising expenditure. At present much of DFID's funding is in the form, of core grants to governments and institutions and there is a lack of accountability for how the money is spent and with what outcomes. The Government recognise that *"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".* All bodies receiving funding from the UK need to address this and the introduction of monitoring of processes with recipient governments and institutions should be thorough and failure to do this satisfactorily should result in aid being withdrawn.

Conclusion

There seems to no valid reason for the UK Government not to promote the IAASTD Reports, yet in recent high-level ministerial statements no mention has been made of IAASTD. The UK Government and in particular DFID, DEFRA and the Department of Business, Enterprise and Regulatory Reform should take on board the report's well founded challenges by prioritizing a review of relevant policies and of the direction of their scientific research programmes in the light of the significance of the IAASTD findings.

ANNEX: 22 KEY FINDINGS OF IAASTD – at a glance

1. PRODUCTION INCREASES: Agricultural Knowledge, Science and Technology (AKST) has contributed to substantial increases in agricultural production over time, contributing to food security.

2. UNEVEN BENEFITS: People have benefited unevenly from these yield increases

3. NEGATIVE CONSEQUENCES: Emphasis on increasing yields and productivity has in some cases had negative consequences on environmental sustainability.

4. ENVIRONMENTAL DEGRADATION: The environmental shortcomings of agricultural practice [is] increasing deforestation and overall degradation.

5. INCREASED DEMAND EXPECTED: Global cereal demand is projected to increase by 75% between 2000 and 2050 and global meat demand is expected to double.

6. MULTIFUNCTIONALITY OF AGRICULTURE: Agriculture operates within complex systems and is multifunctional in its nature.

7. STRENGTHEN AGROECOLOGICAL SCIENCES: An increase and strengthening of AKST towards agroecological sciences will contribute to addressing environmental issues while maintaining and increasing productivity.

8. REDIRECT AKST: Strengthening and redirecting the generation and delivery of AKST will contribute to addressing a range of persistent socioeconomic inequities,

9. INVOLVE WOMEN: Greater and more effective involvement of women and use of their knowledge, skills and experience will advance progress towards sustainability and development goals and a strengthening and redirection of AKST to address gender issues will help achieve this.

10. BUILD ON EXISITING KNOWLEDGE: [using] more innovative and integrated applications of existing knowledge, science and technology (formal, traditional and community-based).

11. USE NEW AKST APPROPRIATELY: Some challenges will be resolved primarily by development and appropriate application of new and emerging AKST.

12. RESEARCH FOCUS ON SMALL-SCALE: Targeting small-scale agricultural systems helps realize *existing* opportunities.

13. CREATE OPPORTUNITIES FOR POOR FARMERS: Significant pro-poor progress requires creating opportunities for innovation and entrepreneurship, which explicitly target resource poor farmers and rural labourers.

14. DIFFICULT POLICY CHOICES: Decisions around small-scale farm sustainability pose difficult policy choices.

15. PUBLIC POLICY AND REGULATION CRITICAL: Public policy, regulatory frameworks and international agreements are critical to implementing more sustainable agricultural practices.

16. NEW INSTITUTIONAL ARRANGEMENTS REQUIRED: Innovative institutional arrangements are essential to the successful design and adoption of ecologically and socially sustainable agricultural systems.

17. NEGATIVE IMPACT OF INTERNATIONAL TRADE: Opening national agricultural markets to international competition can lead to long term negative effects on poverty alleviation, food security and the environment.

18. EXPORT AGRICULTURE UNSUSTAINABLE: Intensive export oriented agriculture has adverse consequences such as exportation of soil nutrients and water, unsustainable soil or water management, or exploitative labour conditions, in some cases.

19. CRUCIAL CHOICES: The choice of relevant approaches to adoption and implementation of agricultural innovation is crucial for achieving development and sustainability goals.

20. MORE INVESTMENT IN MULTIFUNCTIONALITY: More and better-targeted AKST investments, explicitly taking into account the multifunctionality of agriculture.

21. CODES OF CONDUCT NEEDED: Codes of conduct by universities and research institutes can help avoid conflicts of interest and maintain focus when private funding complements public sector funds.

22. MULTIDISCIPLINARY APPROACHES REQUIRED: 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.

END NOTES

[1] Ministerial Statement by Douglas Alexander Secretary of State for International Development House of Commons Hansard 9th June 2008 col 6WS – www.publications.parliament.uk/pa/cm200708/cmhansrd/cm080609/wmstext/80609m0001.htm#08060920000006
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