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MAPPING AND POLICY RESPONSE TO CLIMATE CHANGE IMPACTS ON AGRICULTURE AND RURAL AREAS

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I. INTRODUCTION

1. Activities of the Food and Agriculture Organization of the United Nations (FAO) in the Europe and Central Asia region, following the recommendations of the 26th Regional Conference for Europe (ERC) in 2008, focus on mapping impacts of climate change and assistance to governments and researchers, as well as farmers through extension and dissemination of good farming practices and research results. Under TCP/RER/3203 *Mapping of and policy orientation for adaptation to climate change*, and as part of regular FAO activities and projects in the 2010-2011 biennium, a series of reports, workshops and training activities will (i) produce an inventory of available studies and adaptation of policy experience, to date not readily available in the region; (ii) offer capacity building to Ministries of Agriculture in climate change impact assessment and good practices' adaptation; (iii) help share successful research approaches for sustainable management of land, water and genetic resources; and (iv) improve policy response to global environmental challenges affecting food and agriculture. National seminars supported by FAO as part of TCP/RER/3203 will address, *inter alia*, impacts of increased summer and winter temperatures and changing humidity and rains on crops, adaptation breeding, water management and irrigation techniques and zero and low tillage potential.

2. Since the 26th ERC, the Regional Office for Europe and Central Asia (REU) with inputs from the Natural Resources Management and Environment Department, Environment, Climate Change and Bioenergy Division, promulgated the outcomes of the 2008 *High-Level Conference on World Food Security and the Challenges of Climate Change and Bioenergy*, and FAO work on climate change and adaptation. REU also facilitated the implementation of projects through regional conferences and thematic seminars, such as the Conference on *Climate Change and European Agriculture* co-hosted by the Hungarian Academy of Sciences (October 2008) and the joint conference with the Hungarian Agricultural Research Institute and the European Union Agrisafe on *Climate Change: Challenge for the Training of Applied Plant Scientists* (March 2009) and the national seminar on *Impact of Climate Change on Agriculture and Rural Development in Slovakia* (Bratislava, July 2009). REU and the Subregional Office for Central and Eastern Europe (SEU) participated in the Global Forum for Food and Agriculture (GFFA) during the International Green Week in Berlin in January 2010 with the theme *Agriculture and Climate Change – New Concept Proposals from Policy-makers and Industry* and organized two panel discussions respectively on (i) Food Safety and Nutrition – Impacts of Climate Change and on Climate Change; and (ii) Policy Options to Improve Sustainability of Agriculture within the Challenges of Climate Change. This provided an opportunity to disseminate FAO's work to a broad international audience but also to collate policy recommendations on links between climate change and food safety and nutrition. These included raising awareness of consequences of food choices for the environment, management of food waste and need for coordination of climate change and nutrition issues in the region. The policy options debate indicated that focus in the immediate years should be more on addressing climate variability in agriculture, for appropriate options for mitigation and adaptation, rather than climate change as such. These activities will continue in 2010 and 2011; the European Commission on Agriculture (ECA) may wish to provide guidance on approaches to dissemination of FAO's global work on climate change and prospective partner institutions in the region.

II. IMPACT OF CLIMATE CHANGE ON AGRICULTURE IN THE REGION: FIRST ASSESSMENTS AND POLICY CHANGES

3. FAO member countries in the European region differ not only in climate, agricultural resources and forest vegetation but also in their status under the United Nations Framework

Convention on Climate Change (UNFCCC) and Kyoto Protocol¹. The agenda of the majority of Ministries of Agriculture in Central and Eastern Europe and Central Asia subregions, for the time being, does not appear to be affected by scenarios of the forecasted 1 to 3°C temperature growth over the 21st century. Adaptation measures and mitigation programmes are rarely included in the mandate of Ministries of Agriculture; most of them are only marginally involved in preparation and implementation of the National Communications (NCs) to the UNFCCC, although they address areas such as land and water resources management.

4. During UNFCCC COP-15 in Copenhagen in December 2009, FAO's work and proposals of the key role of agriculture in reducing GHG emissions were acknowledged; no less important, the potential scope and dimensions of mitigation programmes in agriculture and rural areas (including forestry), including incorporation as a major component into Nationally Appropriate Mitigation Actions (NAMAs) that will require large-scale technical assistance and capacity building, were also noted. From the region's perspective, the shift of interest in climate change negotiations to the developing countries' position and secondly, the issues of the specific status of Central and Eastern Europe transition economies, the latter not accepted by the former group, was a key development. Assistance to countries to regularly prepare, preferably biennially, their NCs to the UNFCCC will remain a key element of both capacity building and reporting. As for forestry, more attention will be given, at the request of the Russian Federation among others, to work on boreal forests, in addition to previous focus on tropical forests.

Climate change is now an inherent component of the assessment of future prospects in agriculture. According to a World Bank report (2009a), many of the region's countries are already experiencing effects of climate change, which are compounded by a legacy of past environmental mismanagement that increases vulnerability to the effects of global warming. Such effects can add local production instabilities to those that arise from global market effects and put even more pressure on land and water constraints in coming decades. Available climate data indicate the countries in Europe and Central Asia, with the exception of Northern Russian Federation, are expected to bear the burden of climate change, i.e. long-term effects associated with the dramatic increase of the GHGs as a consequence of human activities. The negative impacts of climate change will increase, provoking frequent climate variability with progressive enhancement of magnitude in the course of the next 20-100 years, when wider and massive effects are to be expected. The main policy challenge is to address global warming and climatic conditions variability through policy measures that will ensure sustainable growth, whether using new or adopted biotechnologies or cultivation methods.

From: Policy response to challenges in agriculture and rural development in the Europe and Central Asia Region: sharing experience and enhancing cooperation in the region; technical paper for 27th ERC Ministerial Round Table, ERC/10/7.

A. FOOD SECURITY, NUTRITION AND FOOD SAFETY

5. Countries in the Europe and Central Asia region will be affected to a different extent by climate change due to their economic status and geographical positions, as in other regions, with vulnerable groups of the population (smallholders, women, low-income) at greater risk of food insecurity. FAO has developed a series of research and analytical technical policy papers on the impacts of climate change on agriculture and forestry as well as nutrition, food security, food safety and human health^{2,3}. These analyses follow the four-dimensional food security framework

¹ All countries of the region have ratified the UNFCCC and are also Parties to the Kyoto Protocol. They belong either to the Annex I group of countries with the possibility of investing in or hosting Joint Implementation (JI) mitigation projects, or to the non-Annex I group of countries which could benefit from carbon offset projects under the Clean Development Mechanism (CDM)

² FAO: *Profile for Climate Change*, 2009; FAO: *Harvesting Agriculture's Multiple Benefits: FAO: Mitigation, Adaptation, Development and Food Security*, 2009; FAO: *Climate, Agriculture and Food Security: A Strategy for Change*, 2009; FAO: *Climate Change and Food Security: A Framework Document*, 2008; FAO: *Food Security and Agricultural Mitigation in Developing Countries: Options for Capturing Synergies*, 2009; FAO: *Anchoring Agriculture*

defined by FAO: (i) food availability which includes food production and trade; (ii) stability of food supply; (iii) access to adequate quantities and varieties of safe, good quality food; and (iv) food utilization which refers to food safety and nutrition. The ways through which climate change may impact food security, safety and nutrition include:

- increased frequency and intensity of extreme climatic events such as heat waves, droughts, storms, cyclones, hurricanes, floods, etc.;
- decrease of fresh water resources for agriculture and parallel, water and food hygiene and sanitation problems;
- impacts of temperature increase and water scarcity on plant and animal physiology;
- influence on plant and livestock diseases and pest species and livestock diseases:
 - impaired sustainability and potential damages to forestry, livestock and fisheries and aquaculture; and
 - sea-level rise and flooding of coastal lands, leading to salination and/or contamination of water, agricultural lands and food.

B. FOOD SAFETY

6. Climate change will affect food safety. Threats include emerging microbiological hazards resulting mainly from changes in patterns of occurrence and survival, as well as the possibility of the increased virulence of bacteria, viruses, parasites and other biological agents that are traditionally linked with foods of animal origin. These pathogens can cause food-borne illness and can be also transmitted to other types of food, such as fruits, vegetables, nuts and seeds. Climate change is expected to exacerbate undernutrition through its effects on illness caused by infectious diseases. Other food safety issues likely to be exacerbated by climate change are raised levels of mycotoxins, marine biotoxins as well as pesticide residues, heavy metals and environmental contaminants in crops resulting in increased morbidity with a substantial extra burden on health services. Seas' water warming, acidification and changes in salinity and precipitation affect biochemical water properties, water microflora, fisheries distribution, the availability and safety of seafood.

7. Application of Good Practices (Good Agricultural Practices, Good Hygiene Practices, Good Manufacturing Practices, Good Veterinary Practices and Good Aquaculture Practices), etc. and their adaptation to changes remain the cornerstone of national food safety management strategies to address challenges posed by climate change. As new information becomes available regarding the impact of climate change on food safety hazards, Ministries of Agriculture and agrofood industry associations will have a major role in reviewing and updating adequately the current guidance. Early recognition of emerging risks to food safety is central in the preparedness to respond in an efficient manner. Development of methods for early identification of emerging hazards to food safety and their indicators is a stringent need. A series of key issues to address in emerging food safety problems include (i) wider and more consistent application of risk analysis framework at country level; (ii) overall strengthening of food control systems; (iii) rapid identification of emerging risks to prevent and prepare for emergencies; and (iv) effective communication among countries to discuss problems, solutions and collaboration. When developing adaptation strategies, consideration should be given to the fact that it is estimated that the benefits of adaptation capacity would be exceeded with the degree of climate change over a 3°C temperature increase, at which point mitigation strategies are required.

8. Food choices and food consumption itself impact climate change. The first imperative is to raise awareness and understanding of the fact that consumers' food choices have real repercussions on the future of the Earth. Among climate change mitigation strategies with

with a Copenhagen Agreement, 2009; FAO: *Climate Change: Implications for Food Safety*. 2008. For more information on FAO's work on climate change, see: www.fao.org/climatechange

³ FAO/IFPRI. M.J. Cohen, C. Tirado, N.-L. Aberman, B. Thompson. *Impact of Climate Change and Bioenergy on Nutrition*. 2009

immediate protection effect on the environment are the structural shifts in food and agriculture systems and diets. Reducing consumption of meat and dairy products and reducing food wastes are recognized as essential elements of sustainable diets⁴ and environmentally effective food choices⁵. Nutritional and food safety concepts and objectives have to be integrated into agricultural development policies for climate change mitigation, agricultural research and extension frameworks. In order to improve the mitigation potential of agriculture, synergies between climate change policies, sustainable development and improvement of environmental quality should be promoted. FAO could assist countries to assess their capacity-building needs for the development of integrated adaptation, mitigation and sustainable development strategies to address food security, food safety and nutrition challenges from climate change.

C. RESEARCH AND DEVELOPMENT NEEDS

9. Policy options to adapt to and mitigate impacts of climate change call for an integral approach, strengthening the knowledge base for use of new technologies. In all sectors of agriculture, this can be translated into:

- generation of and adaptation to farmers' needs of a science-based know-how combined with traditional approaches and innovative technologies, including biotechnologies;
- technology transfer, coupled with enhanced intellectual property rights capacities;
- capacity building, in particular of Ministries of Agriculture, including improved communication at all levels, both sector-specific and cross-sectoral;
- strengthening research and extension systems National Agricultural Research Systems (NARS) and the functional linkages between them; and
- facilitating public-private partnerships in research and innovations in agriculture.

10. Biotechnologies alone, which include tissue culturing, gene transfer, immunological techniques, molecular genetics, recombinant DNA methods and functional genomics, already play a key role in reducing GHG emissions and helping to address today's challenges of climate change such as water scarcity, malnutrition, reduced availability of agricultural land as well as making available clean, renewable alternatives to petroleum-based fuels, thus greatly reducing the energy consumption and GHG emissions of agricultural practices and processes and creating jobs. Locally bred varieties and races adapted to local conditions and biotic (pests) and abiotic (drought, freeze, heat, soil salinity) stresses are a promising option but the national research and extension systems in transition economies have so far failed to fully bring locally developed inventions to farms and market. Prospective actions in this field that could be supported among others by FAO would include:

- facilitating inventories of the most promising genetic resources, breeds and lines, good practices and success stories from the region contributing to adaptation to climate change impacts and mitigation projects;
- strengthening the functional linkages among all stakeholders of the NARS; researchers, academia, private and public extension, farmers, retailers, small and medium enterprises (SMEs) to allow adopting of innovations and the market implications;
- enhancing the administrative and institutional capacity of the governments to embrace knowledge-based strategies and policies for climate change adaptation and mitigation; and
- advocacy for adopting proper policies and legal frameworks to ensure sustainable use of new high technologies in agriculture, while raising broad public awareness through an adequate communication strategy.

⁴ *Setting the table*. Advice to Government on priority elements of sustainable diets. Sustainable Development Commission (Scotland, Wales, Northern Ireland), December 2009

⁵ National Food Administration and Swedish Environmental Protection Agency (2009). *Environmentally Effective Food Choices*: proposal notified to the European Union 15 May 2009. Stockholm: Livsmedel Verket

D. CROP PRODUCTION

11. Agriculture could, on the one hand, be one of the solutions to mitigation of GHG emissions if adequate sustainable production measures are adopted, and on the other hand, could contribute to adapt food production systems to recurrent drought and flood events and higher temperatures. The policy challenge is how agriculture and the millions of small-scale land users in the agricultural sector (which constitute 75 percent of the poor in developing countries), can improve the sustainability of production systems by adopting practices that sequester carbon effectively especially in fragile environments.

12. A wide range of good and recommended agricultural practices exist that contribute to mitigation through CO₂, NH₄ and N₂O emission reduction, which depend on the different types of soil, crop and climatic conditions and soil carbon sequestration. In order to adapt to climate change, farmers will need to broaden their crop genetic base and use new cultivars and crop varieties, with different thermal/temperature requirements, better water use efficiency and improved resistance to pests and diseases. They will need to shift sowing/planting dates, use of cover crops, live mulch and efficient management of irrigation, and reduce the vulnerability of soil based agricultural production systems through the management of soil fertility, reduced tillage practices and more efficient management of the cycle of soil organic carbon in grasslands and cropping systems. There will be a need to monitor pathogens, vectors and pests and assess how well natural population control is working.

13. FAO could assist farmers to benefit from training and technology transfer that would empower land users to preserve the agro-ecosystems through capacity building and through policy advice. This will call for specific projects, developing unique datasets, promoting adaptation and mitigation practices, and providing a forum for technical discussions and policy advice related to adaptation and mitigation practices in cropland and grassland.

E. LIVESTOCK SECTOR

14. Issues of adverse impacts of the livestock sector on climate and mitigation strategies and programmes are not sufficiently addressed by current livestock development policies and more attention should be devoted to climate change mitigation programmes by the Ministries of Agriculture of Central and Eastern European and Central Asian countries. The effects of climate change on the livestock sector will probably cause an overall decrease in yields, a decline in livestock numbers due to land degradation and desertification, while intensity of all livestock production systems will inevitably be affected.

15. It should be kept in mind that the livestock sector is a significant contributor to climate change and a substantial stressor in many ecosystems. Globally, it is one of the largest sources of GHG emissions and one of the leading causal factors in the loss of biodiversity, while in developed and emerging countries it is perhaps the leading source of water pollution. The livestock sector currently contributes about 18 percent of the global warming effect⁶ (9 percent CO₂, 37 percent of NH₄ and 65 percent of N₂O). GHGs are emitted from rumen fermentation and livestock waste, CO₂ is released when previously forested areas are converted into grazing land or arable land for feed. The livestock sector is a key player in increasing water use and water depletion. The water used by the livestock sector is equal to over 8 percent of global human water use. The major part of this water is in fact used for irrigation of feed crops and considerable amounts of water are used in processing of meat and milk. It is further foreseen that as temperatures increase in the region, so will the occurrence of new infectious pests and animal disease (such as Blue Tongue, West Nile Fever), which may contribute to a more intensive disease spread, including zoonotic diseases.

⁶ Livestock's Long Shadow, FAO, 2006

F. FORESTRY CHALLENGES AND RESPONSE POLICIES

16. Sustainable forest management provides an opportunity for carbon sequestration and for maintaining and conserving biodiversity. Climate change impacts will potentially shift the area of tree species native occurrence northwards. Problems with stability of the current forest cover may become serious in countries like Hungary, the Republic of Moldova, the Russian Federation and Ukraine, which are situated on the border of the temperate forest belt. The very fragile belt of forest steppes in Eastern Europe and Central Asia is found in the region. The tree species structure is also expected to change, as the share of competitive, drought resistant and fast-growing tree species will increase. Larger forest fires and frequent, pathogens and insect calamities will spread particularly in the Mediterranean and Central Europe. Further desertification is also expected especially in the forests and wooded lands of Central Asia. Research of dynamics of the forest ecosystems is needed to develop scenarios for adaptation and mitigation measures for forest management practise, particularly for silviculture. The main research is targeted at temperature change; however, the dynamics of the forest ecosystems would be essential to develop scenarios for adaptation and mitigation measures for forest management practise, particularly for silviculture.

17. The Subregional Office for Central Asia (SEC)/SEU Joint Forestry Initiative on *Climate Change Impacts on Forest Management in Europe and Central Asia* is developed to provide a platform for countries to exchange information on climate change impacts on forest management and to analyse the current status of research and policy framework addressing issues related to forest land use and climate change in Central and Eastern Europe and Central Asia, the countries with emphasis on the identification of potential technical assistance. The objectives of initiative are to:

- collate and analyse stages of national research initiatives, legal issues and communication developments with invited national experts;
- provide a platform for the member countries to exchange information about climate change and forest management;
- explore policy options for developing climate change adoption and mitigation measures, taking into account the national policy frameworks;
- identify the fields for potential FAO technical assistance; and
- establish a network and channels of communication for continued information exchange on climate change and forestry in Europe and Central Asia.

18. The ECA may wish to review the aforementioned first assessments of the impacts of climate change in the Central and Eastern Europe and Central Asia subregions and comment on priority areas for dissemination of good practices and exchange of experience.

III. TCP/RER/3203 MAPPING OF AND POLICY ORIENTATION FOR ADAPTATION TO CLIMATE CHANGE

19. This FAO Technical Cooperation Programme Facility (TCPF) regional project in selected vulnerable Central and Eastern European and Central Asian countries is undertaking a series of analytical studies to map the impacts of climate change on agriculture, forestry, fisheries and rural areas. It aims to determine approaches for the reduction of impacts and risks and to identify policies and programmes to support adaptation to climate change at the sector, village and farm level. The project is being implemented in collaboration with academies of science, agricultural universities and research institutes as well as Ministries of Agriculture and the Environment from Albania, Armenia, Azerbaijan, Belarus, Georgia, Hungary, Kazakhstan, the Republic of Moldova, Romania, Slovakia, Tajikistan, Ukraine and Uzbekistan and will provide training and disseminate methodologies to analyse climate change impacts. Where appropriate, a regional approach to define assistance requirements will be used. The project outputs will include:

- an agreed common methodology on the mapping of available documentation on research, analyses and case studies on climate change and the review of policy scenarios and outlook studies with regional focus;
- an inventory of present status of climate change related research and adaptation activities in ten countries, in-depth review and analyses of impacts of current climate variability and change projections on crop production conditions and yields in four countries;
- technical papers and documentation to support policies and measures as well as dissemination of good farming practices for adaptation to climate variability and change by the member countries of the region. This documentation will serve also as background for FAO's future work programme in the member countries under FAO's Strategic Objective on "Sustainable management of land, water and genetic resources and improved response to global environmental challenges affecting food and agriculture"; and
- developing a proposal for extrabudgetary funding of further studies and works on specific impact projections and adaptation measures to alleviate climate change impacts on farm costs, incomes, employment, gender and migration as complimentary activities reinforcing national implementation of FAO's normative recommendations.

20. The project's capacity-building and methodological workshop was organized by REU, SEU and SEC from 19 to 21 November 2009 in Budapest, Hungary. Following the workshop, four country group seminars will be organized by mid-2010 as part of the TCP project, respectively in Chisinau, Republic of Moldova, for Belarus, Romania, Slovakia and Ukraine; in Serbia for Albania, Bosnia and Herzegovina and Serbia; in Georgia for Armenia, Azerbaijan and Georgia and in SEC Ankara, for Kazakhstan, Tajikistan, Turkey and Uzbekistan, that will map the ongoing research, adaptation measures and applied policies with the purpose of identifying key issues at the country and transboundary level. The project will conclude with a high-level regional expert meeting that will address regional and subregional issues and policy recommendations for both member countries including a medium-term climate change adaptation support programme proposal through potential extrabudgetary funding. For summary of project presentations and discussions, see Annex 1.

A. WORKSHOP RECOMMENDATIONS FOR FURTHER WORK

21. The national presentations on climate change impact and adaptation in agriculture gave an appreciated overview of the impacts and consequences for agriculture in the Central and Eastern Europe and Central Asia subregions. There remains considerable uncertainty about the warming effects, but according to present knowledge, while some agricultural regions will be threatened by climate change, others may benefit. It is accepted that climate and agricultural zones are likely to shift towards the poles. With a global increase of temperature likely, it could have a positive influence near the polar regions. The higher CO₂ level in the atmosphere could boost productivity in colder regions. The changes in the soil moisture can vary from place to place, and their impacts are much less known than those for temperature. The productivity of rangelands and pastures would also be affected but food security risks are primarily local. The reviewed manifold impacts and emerging problems in agriculture include high variability of yields due to weather extremities, potential losses in agricultural and food production, experienced already and expected, expected qualitative deterioration of food and feed products, lack of sustainable technologies to counteract warming effects and limited expertise in warming effects' forecasts for prevention.

22. The ensuing main tasks of science, practice and policies regarding adaptation to climate change impacts were listed during the workshop as follows:

- develop agrotechnologies and apply these to counteract and adapt to climate change impacts;
- maintain ecological equilibrium of production sites regarding organic matter, soil fertility and biodiversity;

- secure food production capacity, while establishing energy crop production;
 - create new job possibilities and challenges in the rural sector based on green technologies and clean development mechanisms;
 - establish sustainable cropping and landscape preservation systems in favour of environmental protection and nature conservation;
 - provide a quality management system to cover all technological aspects in the food production chain from soil tillage to post-harvest stage for adaptation and mitigation; and
 - provide technologies for early warning and emergency observation and hazard management systems.
23. Experience was presented and reviewed that climate change impacts in crop production can be prevented or reduced through the following measures and recommended good practices:
- water-preserving soil tillage may contribute to storage of higher amounts of annual precipitation and increment irrigation;
 - breeding and use of drought tolerant crop varieties;
 - establishment of appropriate cropping structures and crop rotation, as higher temperature may result in a change of duration of crop vegetation periods and alter yields, winter hardiness and phenological phases;
 - there is scientific evidence that high levels of mineral fertilization may counteract the harmful effects of drought;
 - agricultural mechanization is also facing new challenges induced by climate change, such as water-preserving tillage technologies and a combined or reduced number of field operations to prevent or reduce deteriorating soil conditions.
24. Plant protection will also be highly affected by climate change. There is a possibility of an invasion of new plant diseases, insect pests and weed species. To counteract the harmful effects, the major actions will be comprehensive and efficient: forecasting systems, alert extension services, integrated pest management and site-specific precision methods. Genetic resistance and/or tolerance of crop plants have to be improved by breeding and biological control is a promising option. For region and country groups' specific areas and topics for further research and FAO activities, see Annex 2.

B. FUTURE ACTIVITIES AND CONCLUSIONS

FAO action in international negotiations

25. Some areas for FAO action in the context of international negotiations can be highlighted:
- promotion of agriculture as a player in the reduction of atmospheric GHG and promotion of practices that reduce GHG emissions or sequester carbon, while contributing to sustainable development;
 - increase the resilience of production systems against vagaries of the current climate and the threats of climate change, and improve adaptation capacities through conservation agriculture, afforestation, sustainable management and monitoring of forests and rangelands, soil storage of carbon, improved fertilizer use and ruminant digestion as well as with non-structural measures such as crop insurance and the careful promotion of bioenergy as a substitute for fossil fuels in climatically suitable areas;
 - improved use of tools to assess the impact of atmospheric conditions on crops (forecasting), the use of weather and climate forecasts in farm-level decision-making and the development of techniques, which optimize the use of climate resources; and
 - developing policies, legislation and activities in natural resource management that can lead to sustainable livelihood, mitigation and adaptations to climate change.
26. While most countries in Central and Eastern Europe and Central Asia have in fact prepared and submitted NCs, it is noted that Ministries of Agriculture were relatively little involved in the process, most work being carried out by Ministries of the Environment, etc., often

with the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF) assistance. One of the ideas proposed during the TCP/RER/3203 workshops was an FAO TCP regional project/s to offer training and capacity building in this field, specifically for Ministries of Agriculture to increase their capacity allowing their greater involvement in this work.

27. This would serve to amend the present situation when NCs contain a number of specific recommendations for the agriculture and rural sector but there is little record of these being implemented or even note taken by the Ministries of Agriculture.

Cooperation with UNECE in the climate change area

28. The Regional Coordination Mechanism (RCM) meeting, convened by the United Nations Economic Commission for Europe (UNECE) in Geneva in October 2009 and chaired by the United Nations Deputy Secretary-General, decided to establish a thematic working group on Climate Change Adaptation and Mitigation, co-chaired by the United Nations Environment Programme (UNEP) and UNECE. The main objectives were to:

- provide a platform for further exploiting synergies among agencies, funds and programmes of the United Nations system active in climate change adaptation and mitigation in Europe and Central Asia, based on the compendium compiled by UNECE on UN entities' capabilities and activities⁷;
- produce a Regional Action Plan of the UN agencies, in coordination with the United Nations Development Group Team for Europe and Central Asia (UNDG-E&CA) in order to link the joint approach at the regional level with operational coordination mechanisms at the country level such as the United Nations Development Assistance Frameworks (UNDAFs); and
- provide policy guidance and advice, focusing on regional/transboundary issues, to: (i) participating United Nations entities, with possible submission to their respective governing bodies on behalf of the RCM; and (ii) member countries of the region, in the framework of relevant ministerial conferences and other high-level events organized under the aegis of participating UN agencies. This guidance would apply mostly to policies, awareness raising and capacity building in areas identified in the compendium.

29. It was agreed that the UNFCCC's past work, methodology and guidelines would remain the framework for activities discussed. Some common areas and issues of interest by the prospective participating UN programmes and agencies⁸ could include:

- links between climate change and poverty alleviation, in particular in rural areas;
- sustainable management of land and water resources and forest management;
- regional and country group projects to support green investment and green jobs, transforming climate change impacts into a development opportunity and low carbon development;
- climate change implications for food safety and health;
- impact of climate change on migrations and gender aspects;
- exchange of experience in good/best practices to mainstream climate change considerations into policies and programmes; including
- moving country level experience and project outcomes to regional and country group levels for dissemination and sharing.

⁷ This compendium is a dynamic document that is permanently updated; it would include (i) a concise agency/programme statement on its mission re climate change adaptation and mitigation; (ii) summary of main activities recently concluded, under way or planned if relevant; and (iii) areas for synergy and cooperation with other UN system agencies in the region

⁸ The following participated: UNECE, UNEP, International Labour Organization (ILO), World Health Organization (WHO), United Nations International Development Organization (UNIDO), UNDP, Office of the United Nations High Commissioner for Refugees (UNHCR), United Nations International Children's Fund (UNICEF) and FAO.

Conclusions

30. The ECA may wish to review the aforementioned technical issues and recommendations of meetings and projects and provide guidance on future priorities for FAO activities in the Central and Eastern Europe and Central Asia subregions, including (i) areas that should be allocated priority; (ii) approaches to mapping and dissemination of climate change mitigation and adaptation related experience and, no less important; (iii) institutions for cooperation. It may wish to review the first assessments of the impacts of climate change on crop production, livestock and forestry as well as on food safety in the Central Eastern Europe and Central Asia subregions and comment on priority areas for dissemination of good practices and exchange of experience.

31. The TCP/RER/3203 methodological workshop collated an extensive list of themes and research and policy areas to be addressed, where FAO has earmarked Net Appropriation resources and holds a comparative advantage but also new areas where additional, extrabudgetary resources would be required. The workshop noted requests for FAO projects from a number of countries, in particular to provide assistance and capacity building to Ministries of Agriculture in work on UNFCCC NCs in order to increase their involvement in the process. The ECA may also wish to provide guidance on this approach as well as comment on potential benefits for cooperation with the UNECE at regional level.

32. The ECA may wish to consider recommending for the 27th ERC debates on Priority Activities for the 2012-2013 biennium that the relevance of climate change and the role of FAO in the European region are reflected and that adequate resources are ensured in the Programme of Work and Budget (PWB) and priorities for 2012-2013 in view of the growing importance of FAO assistance to mitigate and adapt to climate change impacts under Strategic Objective F: Sustainable Management of Land, Water and Genetic Resources and Improved Responses to Global Challenges Affecting Food and Agriculture.

ANNEX 1 - TCP/RER/3203 MAPPING OF AND POLICY ORIENTATION FOR ADAPTATION TO CLIMATE CHANGE

Capacity-building and methodological workshop, 19 to 21 November 2010 REU, SEU and SEC, Budapest, Hungary

Summary of workshop presentations of FAO and national approaches to climate change impacts

The project's initial capacity-building and methodological workshop afforded an opportunity to present FAO approaches and work on climate change impacts, adaptation to and mitigation. Thus, the FAO Interdepartmental Working Group on Climate Change has to date generated technical outputs in the following areas:

- assessment of the potential and means for incorporating poverty alleviation into climate change mitigation strategies;
- assistance in the preparation of the Intergovernmental Panel on Climate Change (IPCC) studies and good practice guidelines and provision of technical input to expert meetings organized by the IPCC and UNFCCC;
- methodologies to promote the productive use of renewable energy;
- observations of terrestrial carbon stocks and fluxes in the agriculture and rural sectors; methodologies and training with regard to the application of CDM in agriculture and forestry, including collaboration with the United Nations Environment Programme (UNEP) and the International Union for Conservation of Nature (IUCN); preparation and diffusion of information regarding FAO's activities and approaches to climate change in agriculture, forestry and fisheries; and
- assessment of non-carbon dioxide GHG emissions and methodologies and models on carbon sequestration in soils, crops, grasslands and forest areas.

FAO's work and reports indicate that adaptation in agriculture varies depending on the climatic stimuli (to which adjustments are made), thus farm type and location, as well as the economic and political and institutional conditions, while response strategies and policies and adaptation options can be grouped as follows:

1. Farm production practice

- choice of crop species and cultivar; more heat- and/or drought-resistant varieties;
- crop diversification; an increased number of crops can decrease risk;
- time of sowing the crop and irrigation management that can increase yields or reduce water demands or increase water use efficiency;
- fertilizer use; adapt timing and amount of application;
- degree of land preparation; minimum and/or no tillage for better water economy and carbon sequestration; and
- adjustment of pest and weed control; new problems require new practices.

2. Farm financial management

- crop, farm and income insurance; to cope with extreme conditions;
- diversify income and increase off-farm income; mixed farming, agrotourism, nature and environment services and management, to supplement income and decrease variability;
- increase farm size; to cope with per hectare losses; and
- investment and saving; to increase financial capital for future adaptations.

3. Technological developments

- development of new crop varieties for more heat- or drought-resistance;
- improved short-term weather forecasting for short-term adaptation; and
- resource management innovations, for example, to improve the efficiency of water use.

4. Government programmes and insurance

- subsidy, support and incentive programmes to assist farmers to adjust to change and rural communities to mitigate impacts;
- education and information programmes to increase awareness of all stakeholders;
- research and development to search for new alternatives in production and sustainable farming; and
- revise water retention policies to reduce impacts of floods and droughts and improve water use efficiency and land use policies for example decisions on biofuels or food crops.

Workshop presentations and discussions

National presentations during the workshop allowed review and discussion as well as sharing experience of work in particular countries on NCs to the UNFCCC⁹. In most countries, the NCs were prepared, with the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP) support with relatively small involvement of the Ministries of Agriculture, although the latter provided technical specialist inputs. While extensive research and analyses are available on dimensions, impacts, mitigation and adaptation policies and there is growing recognition of climate change as a major policy and economic challenge, also for agriculture among other sectors, it was noted that most Ministries of Agriculture have yet to initiate and implement specific policies and actions to target climate change issues and in particular those related to the agriculture sector development. The macroeconomic context of climate change response that determines support to increase of production of environment-friendly farm products, research and development for products resistant to climate change impacts and the increased awareness campaign was reviewed. National sector strategic and policy documents in turn should include support for sustainable development, including increase of renewable energy production, prevention of soil degradation and reduction of pollution and emissions.

A broad presentation was made for information during the workshop on European Union approaches to climate change. Thus, it was noted, based on IPCC and European Environmental Agency (EEA) publications, even though soils and water resources, agriculture and forestry are special chapters in the EEA reports on the indicators and potential impacts, unfortunately, agriculture is not among the most important sectors of national adaptation strategies (NASs). There is a need not only for NASs, but for regional adaptation strategies as well. The development of the European Adaptation Strategy by the European Union would have the following basic elements:

- climate-related European Union policies and Directives;
- integrated adaptation into European Union funding programmes;
- support to member countries and integration of adaptation in European Union external programmes (developing countries);
- enhancing the knowledge base, e.g. regarding regional scale and information on costs of mitigation;

⁹ The NCs include

1. National circumstances relevant to GHG emissions and removals
2. GHG inventory information
3. Policies and measures
4. Projections and the total effect of policies and measures
5. Vulnerability assessment, climate change impacts and adaptation measures
6. Financial resources and transfer of technology
7. Research and systematic observation
8. Education, training and public awareness

Agriculture is as a rule given as a major sector contributing to GHGs emissions and parallel, as having potential for mitigation projects

- involvement of civil society, business sector organizations and enhanced information exchange.

The European Commission White Paper 2009-2012 recommends that the measures for adaptation and water management have to be embedded in rural development national strategies and programmes for 2007-2013; adequate support has to be given for sustainable production and the Common Agricultural Policy (CAP) contribution to the efficient use of water in agriculture. In turn, farm advisory systems have to develop and reinforce training, knowledge and adoption of new technologies that facilitate adaptation and update forestry strategy and launch debates on options for a European Union approach on forest protection and forest information systems.

ANNEX 2 - TCP/RER/3203 MAPPING OF AND POLICY ORIENTATION FOR ADAPTATION TO CLIMATE CHANGE

Capacity-building and methodological workshop, 19 to 21 November 2010 REU, SEU and SEC, Budapest, Hungary

Region and country groups' areas and topics specific for further research and FAO activities

The following areas and specific topics were recommended for further research and inclusion into climate change impact combating activities, to be validated during the TCP/RER/3203 country groups' seminars and considered for future FAO work in the Central and Eastern Europe and Central Asia subregions:

1. Mainstreaming climate change adaptation and mitigation into national agricultural, rural and environmental policies:

- incorporation of climate change impacts into national and regional agriculture and rural sector strategies and policies;
- NCs as a basic tool for development for agriculture and rural sector strategies for climate change impacts adaptation and mitigation;
- monitoring implementation of NC policy recommendations and proposed adaptation measures;
- monitoring and assessment and policies and programmes for prevention of human activities, induced weather changes and disasters;
- regional approaches to climate change impacts and mitigation programmes and activities, including capacity building and training; and
- public awareness raising of climate change implications.

2. Assessment of potential of agriculture sector losses due to climate change:

- assessment of potential losses of crops due to climate change; approaches, methods, pilot assessments;
- improving methods for assessment of GHG emissions from agricultural activities; and
- assessments of costs of use of instruments and programmes for adaptation of agriculture to climate change negative impacts.

3. Sustainable management of agricultural land and water resources:

- water management methods in agriculture under changing climate and improved management of water resources and sustainable irrigation in period of and facing climate change;
- combating climate change related land and soil degradation; and
- adaptive plant breeding to climate change.

4. Climate change-related risk assessment in agriculture:

- policies and instruments to prevent or alleviate damage to agriculture from floods, droughts, erosion and land degradation;
- risk management and insurance schemes to protect farmers from climate change impacts;
- risk assessment in climate change adaptation and mitigation, including improvement of weather index data and analyses; and
- economic mechanisms for implementing climate change projects, including insurance instruments.

The ECA may wish to comment and review the aforementioned proposals and areas to be covered and provide guidance on priorities for FAO assistance in the region.