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Item 10 of the provisional agenda
Issues relating to agriculture

Views on the current state of scientific knowledge on how to enhance the adaptation of agriculture to climate change impacts while promoting rural development, sustainable development and productivity of agricultural systems and food security in all countries, particularly in developing countries, and taking into account the diversity of the agricultural systems and the differences in scale as well as possible adaptation co-benefits

Submissions from Parties and admitted observer organizations

Addendum

1. In addition to the 13 submissions from Parties contained in document FCCC/SBSTA/2013/MISC.17, five further submissions have been received.

2. In accordance with the procedure for miscellaneous documents, these submissions are attached and reproduced* in the language in which they were received and without formal editing.[1]

* These submissions have been electronically imported in order to make them available on electronic systems, including the World Wide Web. The secretariat has made every effort to ensure the correct reproduction of the texts as submitted.

[1] Also available at <http://unfccc.int/5901.php>.

Contents

Paper no. 1: Brazil

VIEWS OF BRAZIL ON THE CURRENT STATE OF SCIENTIFIC KNOWLEDGE ON HOW TO ENHANCE THE ADAPTATION OF AGRICULTURE TO CLIMATE CHANGE IMPACTS WHILE PROMOTING RURAL DEVELOPMENT, SUSTAINABLE DEVELOPMENT AND PRODUCTIVITY OF AGRICULTURAL SYSTEMS AND FOOD SECURITY

1. The Government of Brazil welcomes the opportunity to submit views on the current state of scientific knowledge on how to enhance the adaptation of agriculture to climate change impacts while promoting rural development, sustainable development and productivity of agricultural systems and food security, taking into account the diversity of the agricultural systems and the differences in scale as well as possible adaptation co-benefits, as per paragraph 2 of document FCCC/SBSTA/2013/L.20.

2. Brazil believes that the main aspect of the discussions related to agriculture under the UNFCCC, as expressed in the ultimate objective of the Convention, is to ensure that food production is not threatened (article 2). Therefore, along with the efforts undergoing in the Convention to hold the increase in global average temperature below 2 °C above preindustrial levels, it is important to define actions which will support the maintenance of food production capacity and its increase, taking into consideration population growth and increased access to food. Such actions should strengthen the capacity of different agricultural production systems to face the negative impacts of climate change, build up resilience, reduce vulnerability, ensuring therefore the production capacity of agriculture is maintained. Such actions shall not constitute disguised distortions to agricultural trade and production, and shall fully comply with the multilateral trade rules embodied in the WTO, especially the Agreement on Agriculture.

3. Climatic conditions have a crucial influence on the production capacity of agriculture, affecting productivity, as well as the continuation of rural livelihoods and food security. Furthermore, the inability to adapt to climate change might lead to the degradation of production systems, loss of herbaceous cover, increase of erosion, all factors that increase GHG emissions intensity originated from agriculture.

4. Modeling of different possible climatic scenarios, and vulnerability assessments of agricultural systems, indicate that tropical and sub-tropical regions will suffer the most with the impacts of climate change. In those regions, the forecast of adverse climatic scenarios encounters a context where agriculture is the main support of the population. This scenario is further aggravated due to agriculture subsidies in developed countries that have a depressive effect on agricultural commodities prices, among others, reinforcing the greater vulnerability of developing countries to climate change.

5. Reducing vulnerability and building up the resilience of agricultural production systems define adaptation measures. Agricultural systems have shown through time a great adaptation capacity vis a vis social dynamics and economic changes. Climate change, however, bring new challenges, considering the complexity and uncertainty of this new context.

6. Adaptation measures are at the forefront of the efforts to guarantee food security and establish the environmental resilience of agro-ecosystems. The kernel of these measures implies the construction of sustainable agricultural production systems, founded on the conservation of production factors, mainly soil and water, but as well biodiversity and other ecosystems structural components. The

increase of agriculture productivity along with conservationist technologies is also demonstrated by studies that show greater incomes related to the adoption of sustainable practices. These, in turn, increase productivity and bring economic strength to environmentally resilient agro-ecosystems, with positive consequences to social and economic development and poverty eradication. These concepts are, among others, some of the building blocks of the Brazilian National Plan for Adaptation and Mitigation in Agriculture (the ABC Plan).

7. Brazil believes that the UNFCCC may promote, , in collaboration with the work of FAO, the CGIAR Consortium, CBD and other relevant international organizations, as appropriate, adaptation measures directed to decrease the vulnerability of agroecosystems to the adverse effects of climate change. Such measures should aim at supporting capacity building and technology transfer initiatives, as well as developing an information sharing tool to facilitate scientific and technical cooperation, as well as access to available scientific and technological solution, through information exchange on the following issues:

– Studies on topics such as vulnerability, early warnings, and potential scenarios and impacts on agriculture (plant varieties, animals, pests and diseases, production factors) considering temperature variation, water availability and rain distribution, light intensity, gas concentration in the atmosphere, extreme events, among others.
– Research and development (R&D) on topics such as:
- plant and animal diversity;
- water management: harvesting, storage and use, irrigation technologies, studies on irrigation impacts;
- conservation agriculture;
- alternative sustainable production systems;
- control of food waste and loss during production, harvest, transportation, storage, industrial plants and market; monitoring systems for food access, including food quality, the relation between poverty and hunger as well as the logistics of food access;

– Information services and climate networks
– Strategies to promote the adoption of sustainable and resilient agriculture at national level, including financial instruments;
– Evaluation of social, economic and environmental aspects related to climate change, including social perception of changes, participation, food access and consumption patterns.

Paper no. 2: Chile, Colombia, Costa Rica, Guatemala, Panama and Peru

Agenda Item: Matters related to Agriculture

SUBMISSION FROM AILAC (Independent Alliance of Latin America and the Caribbean - Chile, Colombia, Costa Rica, Guatemala, Panama and Peru)

October 2013

Agriculture is fundamental for food security and human well being worldwide, and is central to the economies of the Independent Alliance of Latin American and the Caribbean (AILAC). Climate change is expected to significantly impact agricultural production in the region, and is likely to be particularly damaging to rural populations and regional food security. Urgent action must be taken both to reduce the climate change impacts and to adapt production systems to changing environmental conditions. Agriculture is a key sector not only regarding food security but also as a source of livelihood, raw materials and national income. As such, agriculture is a sector with a significant need and potential for adaptation to the adverse effects of climate change. It is also a sector with a great potential of co-benefits that include water cycle regulations and efficiency, improved productivity and mitigation, among others. As agriculture activities are the source of approximately 13% of all global greenhouse gas emissions, undertaking measures to reduce emissions within the sector can offer key opportunities for mitigation and is vital to achieving the overall objectives of the Convention. Thus, further discussion within the UNFCCC is required in order to promote agricultural systems and approaches that contribute to adaptation and its co-benefits regarding mitigation, and food security solutions at local, national and international levels.

1. Identifying the potential for adaptation efforts in agricultural systems and associated co-benefits.

Climate change mitigation and adaptation actions related to agriculture should be integrated into broader strategies to help the sector adopt sustainable, climate smart agricultural practices. Mitigation is one of adaptation's co-benefits in the agricultural sector, given that many strategies to reduce GHG emissions from agriculture or enhance carbon storage within or around agricultural land also enhance the overall adaptive capacity of agricultural lands, making them more resilient to climate change (e.g. through the establishment of agroforestry systems on degraded lands, soil conservation techniques, conservation agriculture, diversification, genetic improvement, conservation of remaining natural habitats through REDD+, etc.) Additionally, many adaptation strategies that seek to sustain agricultural productivity in the face of climate

change enhance carbon sinks, contributing to climate change mitigation (e.g. via practices that increase soil organic matter, plant growth, protection of water sources, waste management, manure management, etc.). Therefore, we propose creating a Work Program that will consider different co-benefits for adaptation that will help to achieve a sustainable development and contribute to the Convention's ultimate objective**.**

2. Promoting integrated landscape level approaches to climate change and food security.

Rather than focusing solely on improving agricultural productivity or enhancing the adaptive capacity of a given crop, an integrated landscape view takes a holistic approach to designing and managing agricultural plots, farms and landscapes so that they contribute to both climate change mitigation and adaptation while also providing a full suite of benefits to meet food security and other livelihood needs, contributing to poverty alleviation, and at the same time conserving biodiversity and ensuring the provision of ecosystem services. Agriculture is identified not only as a driver of deforestation, but also as a priority sector for delivering REDD+ goals, hence an integrated landscape approach in agriculture can provide key strategic input to REDD+. Integrated landscape approaches should also complement tried-and-tested, no-regret, and low-regret options, risk management, diversification, and integrated land use planning measures. There is ample literature on integrated landscape management that can serve as a guide for UNFCCC approaches to agricultural landscapes, a theme which should be examined with interest, and engaged in detail within the SBSTA working group.

3. Supporting implementation through access to financial resources, technology transfer and capacity building.

In addition to continued discussion under the UNFCCC, financial resources, technology transfer and capacity building support should be made available to developing countries to address agricultural climate change adaptation and co-benefits, particularly to ensure food security and resilience goals. Support mechanisms should include:

- Research, development, and transfer of technology that improves natural resource use efficiency through systematized means of providing information to producers at all scales and regions through appropriate outreach mechanisms;

- Financing and budget tracking for adaptation and co-benefits in the agricultural sector;
- Assistance with the implementation of pilot projects and scaling up successful strategies to a national level;
- Use of financial mechanisms such as the Green Climate Fund and Global Environment Facility, as well as the inclusion of climate and agriculture in the portfolios of multilateral and regional institutions in more ambitious ways;
- Promoting non-traditional market incentives such as payments for ecosystem services;
- Capacity-building with a strong emphasis on MRV, climate policy integration, human resources improvement, methodologies and metrics;
- Building on previous experiences of both developed and developing countries in areas such as NAMAs, NAPAs, REDD+, LULUCF, and the Nairobi Work Program, amongst others.

Paper no. 3: Switzerland

Switzerland is pleased to submit its views on the current state of scientific knowledge on how to enhance the adaptation of agriculture to climate change impacts while promoting rural development, sustainable development and productivity of agricultural systems and food security in all countries, particularly in developing countries, taking into account the diversity of the agricultural systems and the differences in scale as well as possible adaptation co-benefits, in response to the invitation of the SBSTA (paragraph 2 of the draft conclusion FCCC/SBSTA/2013/L.20).

Introduction

Agriculture is a key sector for food security, for rural development and the livelihoods of millions of people in the world, and for the functioning of vital eco-systems. The agricultural sector is severely affected by climate change, and at the same time it is also responsible for a significant share of greenhouse gas emissions. Accordingly, Switzerland is addressing both challenges, adaptation of the agricultural sector to climate change and mitigation of greenhouse gas emissions from the agricultural sector, with the same level of priority.

To respond adequately to the invitation of the SBSTA mentioned above, emphasis in this submission will be put on the current state of scientific knowledge on how to enhance adaptation of Switzerland's agriculture to climate change impacts while promoting productivity of agricultural systems and food security, and taking into account adaptation co-benefits such as mitigation of greenhouse gas emissions from agriculture.

The Swiss policy setting

The Swiss Government (Federal Council) is currently working on a strategy on adaptation to climate change which will serve as a national framework to coordinate the course of action in responding to the expected impacts of climate change. The adaptation strategy is divided into two parts. The first part, which was adopted by the Swiss Federal Council in 2012, describes the goals, challenges and fields of action in adapting to climate change in Switzerland. In the second part, sectoral (including agriculture) and cross-sectoral adaptation measures are presented and coordinated in a joint action plan. It will be completed by the end of 2013 and is expected to be adopted in early 2014. The legal basis for adaptation activities by the Government is provided by the revised CO_2 act (article 8 on coordination of adaption measures), which came into effect on 1 January 2013. It mandates the Government to coordinate measures to prevent and cope with damages to people and assets caused by increased greenhouse gas concentrations in the atmosphere, and to ensure that the basis for adaptation are made available.

The adaptation activities planned in the agricultural sector under the frame of the adaptation strategy will help to achieve the targets of the Swiss climate strategy for agriculture. The Swiss climate strategy for agriculture is a voluntary commitment of the agricultural sector to: a) increase productivity while b) reducing greenhouse gas emissions.

Accordingly, the strategy has a two-fold target (see Fig. 1):

(1) With regard to adaptation, the Swiss agricultural sector should be able to improve production and public services over the long term;

(2) With respect to the reduction of greenhouse gases, the target comprises two parts: firstly, emissions by the agricultural sector are to be reduced by at least one-third through

technical and operational measures by 2050; and secondly, an overall reduction of two-thirds should be achieved if food consumption patterns support greenhouse gas reduction.

These are ambitious, yet realistic targets, given the long time horizon of the climate strategy of 40 years. The Swiss climate strategy for agriculture describes various fields of action to reduce greenhouse gas intensity of agricultural production and possible measures to adapt agricultural production to climate change.

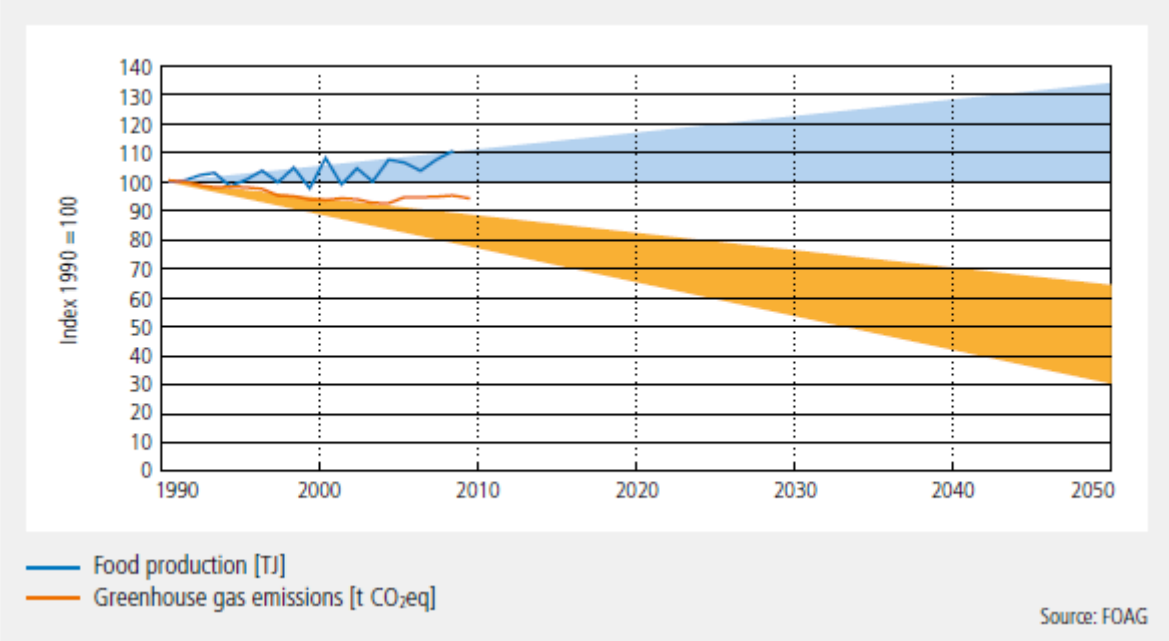

Figure 1: Target paths with regard to food production (blue, upper curve and range) and greenhouse gas emissions (orange, lower curve and range) as well as trends since 1990 (base year). Source: Swiss Federal Office for Agriculture FOAG.

Climate change impact on Swiss agriculture

The recently released Swiss Climate Change Scenarios “CH2011” provide a new assessment of how climate may change in Switzerland over the 21st century.

In the course of the 21st century, Swiss climate is projected to depart significantly from present and past conditions. Mean temperature will very likely increase in all regions and seasons. Summer mean precipitation will likely decrease by the end of the century all over Switzerland, while winter precipitation will likely increase in Southern Switzerland. More specifically, the length of summer dry spells is likely to increase. Switzerland is part of a larger area experiencing an increasing risk of drought and dry spells along with a decrease in the number of precipitation days. On the other hand, despite a decrease in total summer precipitation amounts, several studies suggest a potential increase in extreme daily summer precipitation over central Europe (Frei et al. 2006).

At a general level, climate change in Switzerland is resulting in a shift of suitable areas for agricultural production, and involves both positive aspects (e.g. a longer vegetation period due to rising temperatures) and negative aspects (e.g. increasing problems regarding pests owing to the

milder winters). The increase in extreme weather events is a major problem since they reduce the reliability of harvests. Similar to other countries, the effects of climate change are not homogenously distributed: there are regional differences and it can depend on the individual farm's starting point, if the changes are positive or negative.

Adaptation needs

To achieve good production results, crops and animals must be optimally adapted to local climate. Accordingly, this needs to be taken into account when selecting and breeding. How climate change affects pest infestation and control, for example, must be clarified, as well as how the extension of the growing season can be optimally used for crop production. With an increase of hot days, animal farming also requires solutions that enable animal welfare and high performance.

Droughts increase the need for water and restrict the soil's ability to absorb water. Conversely, heavy rains erode arable land. Which management measures (such as adapted tillage, crop rotation or variety selection) can counteract such developments thus must be examined. More frequent periods of water scarcity require careful handling of available water. Water-sparing production systems should therefore be encouraged and new forms of water storage and irrigation developed and propagated.

Which kind of agricultural production is best suited for climatic influences in each location must be more carefully considered in the future. Currently existing data and information sources need to be adapted to create, for example, soil moisture and pest infestation forecasts and regionally differentiated cultivation. The many open questions about the impact of climate change on agriculture as well as existing adaptation options will be addressed in the next few years within the framework of a research programme and a participatory consultation process with all stakeholders concerned.

Interactions between climate change impact, adaptation, agricultural productivity and mitigation

In the following, we would like to illustrate the current state of scientific knowledge on interactions between climate change impact, adaptation to climate change, agricultural productivity and mitigation of greenhouse gas emissions in Switzerland with two examples.

Crop-specific climate suitability map: Increasing temperatures and increased drought risk during summer are likely to cause a change in the suitability of areas for crop production in Switzerland. To be better able to cope with this change, Swiss Federal Agricultural Research presently develops and applies a flexible method for quantifying climatic production potentials and limitations for important crops in Switzerland under current and projected future climate conditions. A spatially explicit evaluation highlights regions with greatest production potentials and identifies the region-specific limitations (e.g. heat, frost, water limitations) today and in the future. This information can help to support decisions in short- and longterm regional agricultural planning (e.g. planning of irrigation infrastructure, spatial shifts in cultivation zones) (Holzkämper et al. 2013). The crop-specific climate suitability map is an important scientific basis to maintain – or even increase – agricultural productivity under changing climatic conditions. Generally speaking, cropping systems that are well adapted to the agro-ecological conditions of a site can often achieve higher performance with less inputs (such as fertilization, plant protection, irrigation and energy). As a consequence, greenhouse gas emissions per product unit are usually lower than in sites where agricultural activities are less well supported by agro-ecological conditions.

Further tools that are presently being made available to farmers are an erosion risk map and a compaction risk calculator ("Terranimo"). These tools enable farmers to manage their soils in a careful way, also under changing climatic conditions such as more extreme rainfall events, und thus to secure soil productivity on a longer term. At the same time, these tools, through reduced erosion and compaction, will help to maintain soil carbon content and prevent an increase of nitrous oxide and net methane emissions from soils, respectively.

Temperature-humidity index in animal husbandry: Climate change is leading to higher temperatures across Switzerland, increasing the risk of heat stress in livestock. Analysis of a «Temperature-Humidity Index» at various locations showed that the heat stress risk for dairy cows grew substantially on a daily average over the past 30 years, whereas the maximum of the index did not change much. Projections on the basis of two climate scenarios for the time period 2036–2065 show a marked increase in the number of days with heat stress, particularly at warmer sites in the Southern and Western parts of Switzerland. The results emphasize the need for measures to be taken in order to adapt animal husbandry to future climate change. Such measures could be: ensure availability of drinking water to cover increased fluid requirements, provide shaded areas in pastures and free-range areas, change grazing management to increased night grazing and/or seasonally shift grazing to higher altitudes, and adaptation of breeding programs (Fuhrer and Calanca 2012). As ruminants have a high basic turnover of greenhouse gas emissions, maintenance or increase of performance per animal by the measures mentioned to lower heat stress and increase animal health contributes to reducing greenhouse gas emissions per unit livestock product (milk, meat).

Conclusions

According to Switzerland's experience, climate change impacts, adaptation measures, increase of agricultural productivity and mitigation achievements must and can be closely interlinked: knowing the impact is a necessity to conceive effective and efficient adaptation measures, and adaptation measures are a prerequisite to maintain – or even increase - agricultural productivity in a changing climate. As more is produced with less emissions, increased agricultural productivity can bring along the co-benefit of greenhouse gas emissions mitigation effects, which, in the sum, reduces climate change impacts globally – an approach that addresses the problem at its roots and at the same time contributes to food security. To cope with climate change challenges efficiently, adaptation measures are most useful when bringing along mitigation effects. Thus, from a strategic point of view, it is most expedient to give priority to those measures where synergies between adaptation and mitigation can be expected.

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Paper no. 4: Thailand

Thailand Submission to the Subsidiary Body for Scientific and Technological Advice Views on Climate Change Adaptation for Agriculture

1 In response to the Subsidiary Body for Scientific and Technological Advice (SBSTA) at its' Thirty–eighth Session inviting Parties and admitted observer organizations to submit to the secretariat, by 2 September 2013, the views on the current state of scientific knowledge on how to enhance the adaptation of agriculture to climate change impacts while promoting rural development, sustainable development and productivity of agricultural systems and food security in all countries, particularly in developing countries, Thailand herein submits its views as follows:

2 Thailand reaffirms the principles and provisions of the Convention, in particular the principle of common but differentiated responsibility as stated in the Preamble and the commitments in Article 4 of the Convention. Ways and means to enhance the adaptation of agriculture to climate change impacts should comply with these principles and provisions.

3 Thailand today faces a number of challenges affected by climate change such as, flood, drought, land-slide, rising sea level, biodiversity loss, and health risk. Agriculture, which is a fundamental part of the Thai economy and plays a significant role in food security, poverty reduction, and sustainable development, is at risk. Due to the lag in technology, the weakness in infrastructure, and the low adaptive capacity, agriculture becomes one of the most vulnerable sectors. Thailand recognizes that agricultural adaptation to climate change impacts is an instant need and the priority. Thailand recognizes the need to improve agricultural practices and technology and promote the adoption of the technology that will help to strengthen farmers' capacity and build resilience and sustainable agriculture.

4 In the past few years, Thailand has formulated several plan to respond to climate change impacts and prepare for agricultural adaptation. Among the most important plans that frame the works of adaptation in Thailand are Long-term Climate Change Master Plan, the 11th National Economic and Social Development Plan (2012-2016), and the Agriculture Strategic Plan on Climate Change (2013-1016). Key adaptation strategies includes building capacity of stakeholders, such as farmers, agricultural extension officers, policy makers, and scientists to better understand and appropriately respond to climate change, raising awareness and promoting public participation, supporting research and development on technology and practices, information collection, data analysis, and modeling, as well as supporting international cooperation to accomplish the common goal of climate change adaptation and sustainable development.

5 Priority Adaptation Technology Needs in Agriculture

(1) Forecasting and Early Warning Systems

Increasing the forecast ability of the weather and pest or disease outbreaks is the first target for technology transfer and diffusion of the forecasting and early warning systems.

This group of technology could reduce the risk of farm damage and increase crop yields by allowing farmers to select more appropriate planting times and crop cycles.

Forecasting and early warning systems are being used to monitor and predict weather patterns. The software supporting these systems is typically imported. Furthermore, the use of simulation models to predict pest/disease patterns is still rare, with several research institutes only beginning the preliminary development work, therefore requiring technology and knowledge transfer from more technologically advanced countries.

It is noted that long term forecasting technique is also needed.

(2) Crop Improvement Technologies

This group is the technology that reduces the risk of yield loss while improving the efficiency of resource consumption for sustainable agriculture development. Crop improvement strategies under climatic variability may include (2.1) increasing the resilience of agricultural ecology to changing climates, (2.2) improving tolerance to abiotic stress such as drought, flash flooding, stagnant flooding, salinity, and temperature variation, (2.3) increasing photosynthetic efficiency, (2.4) increasing water-use and nitrogen-use efficiency, (2.5) decreasing non-photoperiod sensitivity, and (2.6) improving pest and disease resistance.

Technical development and training programs for plant breeders are needed, especially those in crop improvement programs for adapting to climate change, molecular breeders, physiologists, plant pathologists and entomologists. Enhanced capacity in the field of physiology is urgently needed. Advanced technologies needed for research in crop improvement technologies are costly and require the help of the government and international support.

(3) Precision Farming Technologies

Precision farming in Thailand is at an initial stage of development. Even though some technologies such as drip irrigation system, customized fertilizer and closed system for aquaculture have already been transferred to pioneer farmers, the number of technology recipients is quite limited. Most projects and initiatives are still at a pilot/ prototype-building stage.

This group of technology is to enable farmers to make informed decisions concerning their farming operations as well as to reduce inputs while maintaining maximum productivity and minimizing the effects on the environment. To apply this technology, a number of data are required, for instance, regional data on soil conditions, available water, wind, temperature and sunshine levels, local pests and diseases, and biological data of animals, plants, pest and diseases. Therefore, suitability of imported technologies (especially sensor technologies) is needed.

(4) Water Resource Management

Water resource management barriers mostly are, for example, the lack of funding for the initial project investment and program maintenance, the lack of know-how in the design of a reservoir network and the lack of an essential database such as geographic data. Adaptation technology prioritization is as follows:

(4.1) Networking (via pipes or canals) and Management of Infrastructure under the operation of water infrastructure technology.

(4.2) Seasonal Climate Prediction under the weather and hydrological modeling technology
(4.3) Sensor Web using observation and/or modeling data under the early warning technology

(5) Modeling Sector

The modeling sector is working at the interfaces between climate change and other affected sectors, including the agricultural sector and water resource management sector. It provides adaptive tools for coping with undesired consequences of climate change. Modeling tools are recognized as needed technology for both the agricultural and water resource management sectors. Priority technology needs are as follows:

(5.1) National Data Center (containing an essential hardware and a large collection of data from various relevant and creditable sources)
(5.2) National Data Transfer/Management
(5.3) Integrated Modeling using the Weather Forecasting Technology

6. To enhance the adaptation of agriculture to climate change impacts as well as to ensure world food security and sustainable development, Thailand welcomes ways and means to support adaptation and adaptation co-benefits in the above-mentioned sectors/areas as follows:

(1) Information and Best Practices Sharing/Exchange
(2) Technology Development and Transfer
(3) Expert Exchange/Assistance
(4) Collaboration on R&D
(5) Capacity Building (training, workshop)
(6) Finance (including the Adaptation Fund)/ Grant/Scholarship
(7) Building Network of Researchers/ Practitioners/ Experts in Related Fields.

Paper no. 5: Uruguay

Inputs on the current state of scientific knowledge on how to enhance the adaptation of agriculture to climate change impacts while promoting rural development, sustainable development and productivity of agricultural systems and food security in all countries, particularly in developing countries, taking into account the diversity of the agricultural systems and the differences in scale as well as possible adaptation co-benefits. These inputs are provided in response to the call for submissions per the document FCCC/SBSTA/2013/L.20 paragraph 2.

Uruguay welcomes the opportunity for submission of its points of view on the relevant issues of adaptation in the agriculture and acknowledges the progress made in during SBSTA 38.

General aspects

Several multilateral institutions and Parties have stressed the relevance of agriculture to development. Agriculture contributes to economic growth, poverty reduction and the protection of the environment. Agriculture is the source of income for the majority of the rural poor and it is also a source of national growth, a provider of opportunities for private investment, and the basis of agriculture-related industries.

Climate change affects the productivity of the agro-ecosystems, food availability and food accessibility. It has the potential to impact severely on rural development and, generally, on sustainable development. Its impacts are both short and long term, due to more frequent and intense extreme weather events (droughts, floods, etc.) and to changing temperatures and precipitation patterns.

Countries as Uruguay, with natural resources of high aptitude for agricultural production during the whole year (grains, meet, milk, etc.) have their economical development based on agriculture and food and fibers exports, contributing to food security. In recent years the agriculture sector has increased its productivity a lot, but at the same time, sensitivity to climate variability and climate change has also increased, and damages and losses due to extreme weather events are more significant, making the sector and the economy more vulnerable. For this type of countries, climate change threatens the very basis of our livelihoods. This is the reason why climate adaptation has been defined as highly strategic by the government of Uruguay, including also actions to cope with present interannual and seasonal variability, to which we are not well adapted. Our croplands, pastures and forests are progressively being exposed to threats from increased climatic variability and, in the longer run, to climate change.

Adaptation to climate change in agriculture is a huge challenge, in particular for developing countries, and a set of different actions are needed to adjust to the physical changes in the climate and its impacts. These changes in climate are already underway and it is necessary to prepare for the risk of bigger changes in the future.

IPCC says in AR4 V II that “adaptation to climate change is already taking place, but on a limited basis. Many adaptations can be implemented at low cost, but comprehensive estimates of adaptation costs and benefits are currently lacking (high confidence). There are significant barriers to implementing adaptation. These include both the inability of natural systems to adapt to the rate and magnitude of climate change, as well as technological, financial, cognitive and behavioural, and social and cultural constraints. There are

also significant knowledge gaps for adaptation as well as impediments to flows of knowledge and information relevant for adaptation decisions".

There is a long catalogue of practices to adapt to the impacts of climate change and natural climate variability (e.g. El Nino-Southern Oscillation). However, a successful implementation requires local research, validation, technical assistance, and the combination of the new knowledge with the valuable traditional knowledge and experience of local farmers and technical advisers. An enabling environment is needed to bridge science and technology with policies and stakeholders, and this means strengthening institutional adaptive capacity.

A 'wait and see' or reactive approach is inefficient and inadequate, so Uruguay has started the implementation of adaptation policies in agriculture, working on research, extension and incentives to small-holders with the support of the Adaptation Fund and the World Bank .

Promoting the effective development and transfer of environmentally sound technologies is critical in enabling developing countries to pursue their objectives for adaptation in the framework of sustainable development. As per article 4.5 of the Convention, the developed country Parties and other developed Parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly to developing countries, to enable them to implement the provisions of the Convention. Success on adaptation depends on factors related to biology, ecology, technology, institutional capacities and management regimes. Countries with limited economic resources and insufficient access to technology will be least able to keep up with the changes.

Among the key challenges will be to assist developing countries, as they are generally constrained by limited economic resources and infrastructure, low levels of technology, poor access to information and knowledge, and limited empowerment and access to resources.

Elements to contribute to prioritisation of actions in SBSTA

There is a lot to do to fill the gaps in knowledge already existing for adaptation at local and national level. Adaptation has not been a high priority of research and development within national and international centers until the last years. So there are many areas that deserve close attention from science and technology, in support of policies and decisions by farmers.

In order to facilitate the work of SBSTA Uruguay proposes to structure it and focus it on a few main thematic areas, such as the following four:

(1) Assessing climate impacts and improving future climate scenarios:

- Characterization of the short and long term social, economic and environmental impacts of climate change on farmers (in particular small-holders) and in the economy as a whole, especially on developing countries.

- Identification of the main factors that promote climatic sensitivity and reduce the adaptive capacity of the agro-ecosystems and strategies to decrease vulnerability and build that capacity.
- Improving understanding of the mechanisms behind past and present climate trends, as well as projected ones, which is critical for developing sound adaptation policies.
- Generation of regional climatic scenarios, supported by the new IPCC AR5 scenarios.

(2) Enhancing research and technology transfer to farmers

- Undertake technology needs assessment for the implementation of national adaptation strategies.
- Identification, assessment and deployment of technologies and good practices to reduce vulnerability and build adaptive capacity.
- Improvement of natural resources management to enhance adaptive capacity of agriculture (land, water, soil, biodiversity, plant breeding, pest and diseases control, etc.
- Barriers to access (e.g. Intellectual property rights).
- Sharing of lessons learned.

(3) Developing information for decision making and risk management

- Information for better decision making and risk management, including seasonal forecasts and early-warning systems oriented to policies and farmers.
- Improve weather monitoring capacities.
- Evaluation of climate risk and mapping in different agricultural production and systems. Design of and support for climate index-based insurances that are accessible to farmers.

(4) Building capacities and means for implementation

Creation of the means and endogenous capacities for implementation of adaptation policies at national level in developing countries, based on Art 4.5 of the Convention, including: financing, technology transfer and access to environmentally sound technologies.

Regional and global networks, institutions and programs (as PROCISUR in South America, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), and others) have a key role to play in providing practical technological responses to farmers to facilitate adaptation. In this context we think that a very interesting and promising progress has been initiated in the Technology Executive Committee (TEC), as the policy arm of the Technology Mechanism of UNFCCC, whose goal is to sharpen the focus, step up the pace, and expand the scope of environmentally-sound technology development and transfer in a highly qualitative way. The Nairobi Work Program should also be taken into account.

SBSTA should discuss how to harmonize the different institutional efforts, looking for synergies and avoiding duplication.

In terms of co-benefits, the main ones to identify at this stage of SBSTA work are those linked to promoting rural development, sustainable development, poverty alleviation, and productivity of agricultural systems and food security.

Given the multiple relations of climate change adaptation and agriculture, Uruguay proposes to explore how to support the creation of national adaptation research and technology transfer plans and networks. Establishing and maintaining international adaptation research networks to link together key researchers and assist them in focusing on national research priorities could be a very important contribution to developing countries. Developing science and technology in support of implementing national adaptation plans requires significant financial and human resources; this is why the Convention´s principle of common but differentiated responsibilities is of central importance. Developed country Parties and Annex II Parties should play a key role in the development and transfer of technologies to developing countries, including the development of endogenous capacities in the field.

Uruguay believes that an in-session workshop at SBSTA 39 on the issues mentioned above and open to all participants would be a great opportunity to share Parties and relevant organizations views and experiences, contributing to the discussion and understanding of the different positions. Thus, it would facilitate the SBSTA process ahead. Uruguay would be honored, for example, to present its national policies on grasslands management to build adaptive capacity in the livestock sector. In addition, Uruguay would like to suggest inviting panelists from IPCC (to present advances from the 5th AR), FAO and CCAF´s program of CGIAR, among others, to provide state of the art technical inputs to enrich the discussion by Parties.