Ministry of Economic Affairs

Report of the GlobalResearchAlliance Engagement Workshop in Izmir 2015

Integration of Climate Change in National Strategies, Policies and Practices for Agriculture

Sustainable research for global food production

The Global Research Alliance on Agricultural Greenhouse Gases (GRA) provides a framework for voluntary action to find ways to grow more food without increasing greenhouse gas emissions. Already 46 countries, 100 policymakers, 7 partner organisations, 3000 researchers and 5 researchgroups work together as members of the GRA and exchange policies and collaborate on related research activities.

All GRA members are convinced that meeting the challenges in the triangle of food security, agricultural production and climate change requires combined efforts.

In cooperation with the Turkish Ministry of Food, Agriculture and Livestock, the Dutch Ministry of Economic Affairs and the Embassy of the Kingdom of the Netherlands in Turkey, the GRA organized this workshop.

Focus on IZMIR workshop goals:

- to familiarize non member countries with the work and achievements of the GRA;
- to create an opportunity for discussions on the key issues facing eastern Mediterranean and Central Asian countries with respect to agriculture and climate change and to explore further cooperation and GRA membership opportunities;
- identifying systems to reduce the emissions of GHGs and to extend such knowledge to farmers.

Wednesday November 18th

This GRA-workshop started with the opening speech of Ineke Lemmen, Dutch GRA-coordinator, explaining the program of the Workshop. It is important to link policy and mainstream mitigation and adaptation activities. In sustainable food production systems this requires an integrated approach linking to field, farm and value chain. Today's knowledge and policy is tomorrow's business in a well growing society.
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Impacts on Climate Change

By Ali Osman Sari, Deputy General Director Ali Osman Sari of the General Directorate of Agricultural Research and Policies, Ministry of Food, Agriculture and Livestock

Ali Osman Sari provided information on the latest developments and improvements in the Turkish Agriculture sector, taking into account the impacts of Climate Change; the necessary actions to mitigate these impacts and how these actions are applied through governmental institutes.
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Empowering farmers with GRA knowledge

By Rudy Rabbinge, departing chair of the GRA

Rudy Rabbinge expressed his joy and gratitude for the participation of so many countries and explained the initial establishment process and aims of GRA. See live interview on
www.globalresearchalliance.org
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Climate Change and Food Security

By Fred Snijders, Senior Natural Resources Officer, FAO Headquarters, Rome

Fred Snijders framed the issue of food security and provided information on trends related to population population growth, food demand and agriculture production and yields. Population has been increasing rapidly resulting in increased demand for food. At the same time, better living standards has resulted in a change in diets, with people consuming more dairy products, meat and fish. Yet the availability of arable land and harvested areas have been decreasing steadily. Today, in developed countries, approximately half a soccer field is projected to be available used to feed one person by 2050; in 1960 it used to be one soccer field per capita. In developing countries while the amount of arable land per capita is less then half of that. Increased production increases the pressure on the land and threathens the sustainability of the environment. Right at this point in time a new variable comes into the equation: Climate Change. Changing growing conditions, including increasing temperatures, extreme weather events, disrupt agriculture practices and therefore the agricultural sector needs to be supported to become more resilient to the negative effects of climate change. Examples of production systems that can play a role in this include conservation agriculture or minimum tillage, and crop rotation practices and crop diversification. Agroforestry such as used in Honduras and Quatemala are other examples.

It is a known fact that agriculture is both affected by Climate Change and also contributes to Climate Change. Agriculture accounts for about 11% of global GreenHouseGas-emissions (GHG). The livestock sector produces about 63% of this; with 40% due to enteric fermentation by ruminants and with 16% due to manure management and manure left on pasture. The use of synthetic fertilizers and rice production in paddy fields produce most of the other emissions from the agricultural sectors (13% and 10% respectively). But there are ample opportunities to reduce these emissions while, at the same time, increase productivity and incomes. A well fed and healthy cow produces more meat, more milk and less methane. Through resource use efficiency and management improvements, a combination of emission reduction with productivity increase can be realized. The approach to machive these goals form part of the Climate-Smart Agriculture approach: increase, in a sustainable manner, productivity and incomes, while supporting producers to adapt to climate change and, where possible, reduce emissions of GHGs.
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Making the GRA work: a perspective from New Zealand as host of the GRA Secretariat

By Matthew Hooper, Councellor (Primary Industries), New Zealand Embassy, Rome

Matthew Hooper explained factors that make GRA successful and the significance of overcoming challenges faced by the agricultural sector for growth and development. The GRA provides opportunities to establish cooperation and make the best of the

collective resources of member countries. GRA activities should align with national research and policy objectives. Already funded research can be taken up to international level which will enable building knowledge, awareness and experience sharing. GRA requires cooperation rather than obligation - there is no joining or membership fee, no mandatory reports or funding. Only countries can join the alliance as members but individuals can also sign up to research networks. The GRA can connect researchers, governments and farmers. With its 46 members. GRA is now developing its strategic plan and strengthening partnerships with both new and existing members.
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Modeling and Mapping of Soil Organic Carbon in Turkey
By Mehmet Keçeci & Suat Akgüll, Researchers, General Directorate of Agricultural Research and Policies

Turkish researchers explained their latest project about modeling and mapping of soil organic carbon. The Project aims to create a soil organic database, come up with thematic maps, soil organic carbon maps and WEB-GIS serving result maps. Soil samples taken from 11.800 different points have been used to create the map of soil carbon in Turkey after necessary analyses run in labs. With 18 different variables, 296 geological formations have been identified and they have been classified into 7 and 8 classes to highlight soil carbon formations and deformations. Digital soil mapping, productive soil mapping and RK have been used for SOC prediction along with other soil properties.
Questions highlighted that in order to have thorough results another 30.000 – 40.000 soil samples must be taken.
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Fieldtrip to Agrobay Greenhouse in Bergema

Agrobay Greenhouse Import Export Industry was established under the umbrella of the Group to realize production of natural (ecological) tomato and pepper towards fully export in the most modern and technological greenhouses by employing qualified staff to get product quality in conformity with international standards by applying latest production technologies with the advantages of unique climate and water resources that our country has.

For this purpose, a land of 1.500.000 sqearmeters (SQM) was bought in Izmir-Bergama. On this land, the first stage of 60.000 sqm plastic greenhouse was initiated for production in 2002, the second stage of 65.000 sqm plastic greenhouse in 2003, and the third stage of 80.000 sqm glass greenhouse in 2005. After the fourth stage of 80.000 sqm plastic greenhouse is initiated for production, the closed area for seedling production will reach 320.000 sqm. The company is the biggest greenhouse center not only in Middleast, the Balkans and Turkey in terms of the size of closed area but also the biggest in Europe in this size in terms of heating provided by geothermal resources.
From seed to construction, heating, cooling, air condition, irrigation,engine and equipment everything is imported from the leading countries. Our investment is mentioned not only in its region but also in Europe.
More information:
www.agrobay.com

Thursday November 19th

World-wide agriculture with less growing of greenhouse gases

By Martin Scholten, co-chair GRA Livestock Research Group

Martin Scholten explained the demand for more and more nutritious (the shift from cereal to meat and dairy) food and its effects on agriculture along with Climate Change. This demand naturally causes more production which results in more GHG release due to livestock production and other agricultural practices. It is known that livestock and paddy rice alone make up 64% of total agricultural GHG emissions. Considering Climate Change also affects soil erosion, infectious diseases, water scarcity and land reduction, lowering our carbon footprint is essential. We also need to adapt to Climate Change along with it. This requires science, knowledge and experience sharing and this is where GRA comes in with its 4 research groups, 15 networks and 3000 researchers from 46 member countries.

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Food Security, Agriculture and Climate Change in Turkey

By Ersoy Yıldırım, researcher by the Turkish Ministry of Food, Agriculture and Livestock

Ersoy Yıldırım outlined climatic changes occurring in Turkey due to Climate Change and Turkey's steps against it. There is a significant increase in precipitation in the north of Turkey while in the south precipitation decreases immensely. There are three different working groups. Firstly they have produced scenarios considering temperature rises in Eastern and Southern Anatolia along with possible Spring and Winter run offs in Eastern Anatolia. According to the scenarios, agricultural production may decrease up to 15-20%. Secondly there is a study in Konya, a drought management study over a 50.000 km2 area. Lastly they have focused on drought impact assessment. According to their studies they have determined three critical points, 2024-2025, 2035-2040, 2047-2059. More frequent floods and drought are expected and that's why they have commissioned their institutes to take necessary measures such as changing irrigation systems into a pressurized closed system and determining problem patterns in their areas.

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Evaluation of Agricultural Integrated Management Information System for Climate Change (TARSEY)

By Berk Üstündağ; Agricultural & Environmental Informatics Research and Application Center Istanbul Technical University

Berk Üstündağ started his presentation by giving some figures about the necessary amount of food and water in the upcoming years. Considering water scarcity Turkey can have 25% increased yield efficiency with better crop pattern and water management. In order to do that Turkey integrates all the current databases – 763 projects and 42 databases. With the integration Turkey will be able to manage Assets (how much we have), Efficiency (how much we can produce), Quality (desired quality observation), Market (subsidies) and Sustainability. Through its 1200 robo-stations by having more 2500 temporal phenological sampling and remote sensing capacity by having more than 3000 annual VHRs as spatial data, TARSEY will be the roof of all data collection systems like TARBIL. Collected data will easily flow from bottom to the top, to decision makers, leading to a better and a more coherent grasp on agriculture.

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Climate Change, Agriculture and Carbon Cycle: a case study

By Mehmet Karagöktaş, Researcher, General Directorate of Agricultural Research and Policies

Mehmet Karagöktaş gave information about his ongoing case study. It is known that agriculture is also a source of GHG emissions, that's why they wanted to measure agriculture based CO_2 emissions. They have selected a semi-arid area in Southern East Anatolia region with 400 mm precipitation per year. They have used Automated Soil Gas (carbon) Flux System for wheat and cornplants and have sent the collected data to the data logger. Project was launched on 1 October 2014. They kept measuring for 77 days and evaluated data in short term with these two results: Relative humidity and CO_2 emission has a negative correlation while soil temperature has a positive correlation. The next step will be measuring on different tillage (non and reduced) systems.

More information:

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Quantification of CO_2 –emissions: a case study

By Tuncay Topdemir, Researcher, Directorate of Agricultural Research and Policies

It is crucial to take measures to decrease CO_2 emission and support the studies on global warming which is one of the most fundamental problems in countries over the world. The main purpose of this study, to investigate the effects of different tillage methods on CO_2 emissions, physical, chemical, biological and biochemical properties of soil.
The study will be conducted on the International Agricultural Research and Training Center's experimental field in cotton- wheat+ corn (silage) rotation system. Conventional tillage, reduced tillage and no tillage treatments will be applied in randomized block design in three replications in four years. The amount of CO_2 emissions will be measured with CO_2 analyzer at regular intervals. Changes in physical properties such as soil structural stability, bulk density, bulk density and changes in chemical properties such as cation exchange capacity, plant nutrients, soil organic matter, organic C and changes in nitrogen content and also changes in microbiological and biochemical properties such as microbial biomass of C, CO_2 formation, dehydrogenase, alkaline phosphatase, urease, enzyme activities, N-mineralization and some biochemical and microbiological analysis will be determined.
In the end of this study, comparison of tillage methods in terms of soil, water and environment, and determination of the effects of different tillage methods on some physical, chemical, biological and biochemical properties of the soil and especially on CO_2 emission will be possible. This study will develop capacity for adaptation to climate change and avail us to quantify the amount of the greenhouse gas emissions from agriculture at regional level for short-term, national and global level for long-term.
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Climate Change, Agriculture and National Policies in Kazakhstan

By Kozhakmetov Paiyzkan Director of the Department of the Climate Research and Water problems, Ministry of Energy of the Republic of Kazakhstan

Kozhakmetov Paiyzkan firstly explained the geographical and climatic properties of Kazakhstan. As a landlocked country with a continental climate Kazakhstan is suffering from Climate Change with an intense warming of up to 1.5 degrees. Although vegetation zones have been expanding, increased temperature has also doubled the floods and caused water shortage. In near future glaciers feeding the rivers will completely melt and two rivers coming from China will provide less water due to increased water consumption in China. There will be droughts and desertification will increase 10%. It is estimated that grain production, the main product of Kazakhstan, will decrease 15% by 2050 due to increased temperatures and aridity. However GHG emissions have also decreased – 45% less methane, since 1990 as Soviet factories no longer operate in Kazakhstan. They have signed the Kyoto Protocol and it is their aim to reduce GHG emissions 25% by 2030 and 30% by 2050.
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Actions for Mitigation and Adaptation to Climate Change of Livestock Sector in the Mediterranean Area

By Giacomo Pirlo, Senior scientist at Fodder and Dairy Products Research Centre at Lodi Italy

Giacomo Pirlo presented the steps taken within the Mediterranean Region for mitigation and adaptation. In the Mediterranean Region climatic changes have been observed, such as more and more warm days and less cold days, increased temperature, longer, frequent and intense heat waves. Climate Change also affects livestock production in the Region. Feed and water availability has decreased. It's harder for producers to maintain animal health due to metabolism and exotic diseases occurring with increased temperature. That's why mitigation and adaptation strategies are required such as: Varieties less sensitive to drought should be developed and promoted; forage systems should use water resources more efficiently; resistance to mycotoxins should be enhanced in animals at the same time as reducing their sensitivity to heat stress; manure management and pest management should be improved while using less water and chemicals. The next 5 steps will be launching a scientific network on Livestock Actions for Mitigation and Adaptation to Climate Change in the Mediterranean region.

1. After the end of the GRA meeting at Izmir, about 120 researchers from different countries in the Mediterranean region have been invited to join in Mediterranean network.
2. So far 20 researches have joint in the network. They come from different countries and institutions (research institutes and universities) with background in livestock or crop sciences. They have specific expertise in reduction of GHG and adaptation to climate change, arid and semi-arid crop production systems and pastoral systems. Countries represented in the network at the moment are: Cyprus, Portugal, Spain, France, Italy, Greece, Morocco and Egypt.
3. The activities of the network are those proposed at the Izmir meeting. However, a practical plan will be proposed depending on the specific contributions of network's participants.
4. A proposal of plan and the list of participants will be sent to the GRA secretariat by the end of this year.
5. The plan will be presented at the LRG in Melbourne

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Soil Carbon and Nitrogen Cycling cross-cutting group of the GRA (Integrative Research Group)

By Jean-Francois Soussana, Co-chair GRA Research Group Soil Carbon and Nitrogen Cycling

Jean-Francois Soussana gave information about two different scientific networks – one working on inter-comparison of models simulating greenhouse gases on arable crop (rotation of wheat, corn and rice) and grassland systems, and the other one working on adaptation using different models for analyzing temperate grassland sensitivity to climate change. The first network benefits from more than 40 scientists working on 24 different models using generic data. The more data you have, the less uncertainty there is,

and this will also enable improving calibration for future prediction. According to the sensitivity analysis for temperate grasslands, less temperature and more precipitation results in more carbon in the soil while there is less carbon in the soil if the situation is reversed. Organic carbon is higher in soil than it is in the atmosphere. This can turn into a source of CO_2 emission. On this matter, GRA could host a research initiative with other organizations, the '4/1000 initiative' (soil for food security and climate), and help on the integration of international work for efficient research.
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Influence of climate change in agricultural practices in Croatia
By Milan Mesic, University of Zagreb Faculty of Agriculture, Department of General Agronomy in Zagreb/Croatia

Milan Mesic started his presentation by giving some information about the climate of Croatia. Croatia in the continental part, in average conditions doesn't lack water, in winter there is even a surplus of water. But droughts can be experienced from time to time. In a long term field trial with different nitrogen fertilization rates yields of winter wheat were analysed under treatments fertilized with 0, 100, 150, 200, 250 and 300 kg N ha^{-1}, in years 1997, 2000 and 2003. Winter wheat yields in 1997 and 2000 were realized under average rainfall and temperature regime, while 2003 was extremely dry and hot, especially during the period of winter wheat vegetation. These extreme weather conditions adversely influenced winter wheat yields. He consluded that for efficient adaptation of agriculture to climate change, surely up to possible dimensions of that adaptation, it is important to invent and to continuously perform research programs in agriculture.
More information
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Mitigation and adaptation policies and measures in the agriculture sector in Spain
By Maria Jose Alonso Moya, Agriculture Coordinator from Spanish Office for Climate Change

Maria Jose firstly stated the importance of food and agriculture for Spain. Developed and sustainable agriculture along with international initiatives are essential at this point. Spain wants to improve engagement by staying in contact and designing research policies. It is known that in Spain 10% of total emissions are caused by agriculture – half of it due to livestock production. So Spain launched a National Adaptation Plan with Climate Projects and carbon footprint reduction activities. For example in Spain fertilizers cause 10% of total agricultural CO_2 emissions and that's why Spain needs to train farmers, and make recommendations regarding fertilizer use and necessary amounts in order to reduce emissions while maintaining productivity.
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Agriculture and Greenhouse Gases in Portugal
By Hugo Costa, director of Cabinet of Planning Politics and General Administration in the Ministry of Agriculture

Hugo Costa explained the effects of Climate Change and steps taken against it by Portugal. Climate change has reduced total rainfall and increased temperatures in Portugal causing desertification.
Soil fertility and water availability have decreased as well.
There have been changes in plant and animal health. Therefore, due to these negative effects firstly they need to prevent erosion and be ready and resistant to extreme events. Genetic diversity should be adapted to Climate Change. In August of 2014 were launched by the Ministry of Agriculture and Sea an Innovation Strategy for Agrifood and Forestry with intervention areas related to mitigation and adaptation of Climate Change. In July 2015 a set of low carbon policies were put in motion by the launch of National Strategic Framework for the Climate Policy, which aims contribute to the goals fo the National Green Growth Commitment through a mainstreaming effective of governance.
These government's driven measures for the agricultural context are summarised as follows: gaining resilience by improving agricultural practices; improving livestock and fertilizer management; taking measures against extreme weather events; and focusing on water availability. In addition, at the context of European Innovation Policy Horizon 2020 has already started to identify additional supports to cover the needs of innovation in adaptation and to reduce CO_2 emissions. Portugal also wants to be a part of the GRA and believes that involvement of all stakeholders is required in sharing knowledge and experience especially between countries with similar climatic vulnerabilities.
Portugal also wants to be part of the GRA and believes that involvement is required in sharing knowledge and experience, especially between countries with similar climate vulnerabilities.
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Agrosystems in Canada
By Brian McConkey, Co-chair GRA Research Group Agro systems

Brian McConkey participated in the meeting via Skype call and explained how the GRA can assist countries to overcome challenges relating to measurement of GHG emissions. Canada firstly monitors its carbon footprint inventory. In order to overcome challenges working together is essential. GRA provides a perfect mechanism to find opportunities with likeminded countries where you can improve methods and share information, understand similarities and solve problems together. Brian emphasized that "the more you put in the more you get out", so countries need to 'get involved' in GRA activities and collaborative research.
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Round Table – Final Conclusions

The GRA Engagement Workshop in İzmir was a good chance to learn about other countries, policies and measures. It also demonstrated that GRA is an important mechanism for sharing information and experience.

Five key topics were identified at the end of the workshop as being key issues for this region and which could provide the basis for further collaboration and joint research:

- Soil management and carbon sequestration
- Water management including across catchments and borders
- Climate variability and extreme weather events
- Increasing productivity and reducing emissions intensity
- Vector-borne diseases spread by climate change and by globalization.

Adaptation is clearly a priority issue for this region but participants are also keen to better measure GHG emissions and explore synergies between adaption, productivity increase and mitigation.

With respect to joining the GRA, some participants noted that it may take time to get approval due to decision-making requirements in their countries. It was explained that joining the GRA is a very simple process that only requires a letter to be sent by the appropriate national authority (either Head of Department or Minister) to the GRA Secretariat expressing agreement to adhere to the GRA Charter. Further information on the process is available on the GRA website.

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Useful resources

GlobalResearchAlliance (GRA)
www.globalresearchalliance.org

Agricultural potential and food security in Central Asia in the light of climate change
http://edepot.wur.nl/351542

The Hague, 2015

GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

REPUBLIC OF TURKEY MINISTRY OF FOOD AGRICULTURE AND LIVESTOCK