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SUSTAINABLE PRODUCTIVITY FOR CLIMATE CHANGE MITIGATION

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SUSTAINABLE PRODUCTIVITY FOR CLIMATE CHANGE MITIGATION

Luis Felipe Arauz Cavallini
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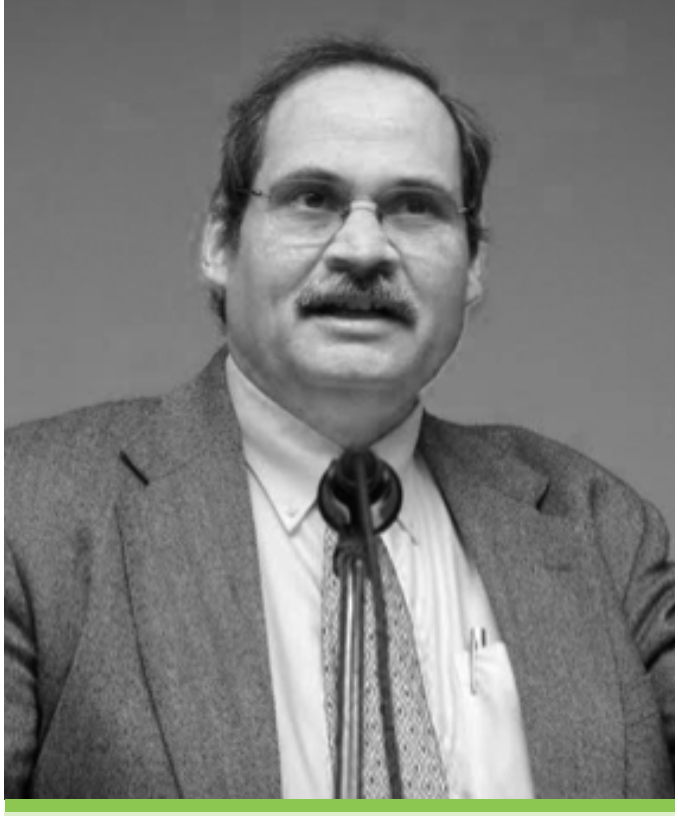

Sustainable development is a planetary aspiration that the United Nations has outlined in 17 interrelated goals. Achievement of two of these goals, Goal 2: Zero Hunger and Goal 13: Climate Action depends on the dynamic and complex relation between agriculture and climate change. To fully appreciate this relationship, we need to understand that food security depends on food availability (i.e. production), access to food (related to poverty), and food utilization (related to human health), all of which are influenced by climate change. We also need to realize that agriculture has a three-fold relationship with climate change. Agriculture is a victim of the negative effects of climate change on productivity, while it is at the same time a contributor to CC through production of greenhouse gases, yet agriculture can provide solutions for CC through the multiple possibilities to mitigate GHG and slow down global warming.

Agriculture must continue to be productive, to feed the world and to foster prosperity in rural areas. It must become climate resilient in order to adapt to climate-change related perturbations. It needs to mitigate by sequestering carbon and/or reducing GHG production by agriculture and related activities, not only as a moral imperative and a world commitment, but because the less we mitigate, the more difficult it becomes to adapt.

Climate smart agriculture, an approach put forward by the United Nations Food and Agriculture Organization (FAO), refers exactly to this concept: agriculture that is productive, resilient and capable of mitigating greenhouse gases. The key to achieving these three objectives lies in the word "smart", which must be understood as "knowledge-based". Whether it is scientific or traditional knowledge, climate smart agriculture requires agro-ecological knowledge in its broadest sense. This knowledge must come from an understanding of how agro-ecosystems work and how processes relate to each other to bring about new processes related to system resilience and productivity, such as nutrient cycling, carbon sequestration in soil and root health.

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He earned his doctorate in plant pathology from the University of North Carolina State University, United States in 1990.

He has served as a research professor of Plant Pathology and Agroecology at the University of Costa Rica and Dean of its College of Agricultural and Food Sciences. He was also director of the College of Agricultural Engineers of Costa Rica and the Institute for Innovation and Transfer of Agricultural Technology of the Ministry of Agriculture.

On several occasions, he has coordinated international cooperation actions in the agricultural area.

Costa Rica has raised its forest cover restoration goals from 22% to 52% – based on innovative policy reforms that aggressively tackle deforestation. The country also introduced the world's first payment for ecosystem services (PES) scheme.

Currently, Costa Rica is committed to restoring 500,000 hectares of degraded lands– around 10% of the country's total land area.

Clearly, the basis for climate-smart agriculture is also the basis of sustainability in agriculture. This holistic approach results in enhanced biodiversity, better roots and plant health, less need for chemical inputs, and other benefits associated with sustainable agricultural production. Two relevant questions in this context are: How do these principles apply specifically to climate change mitigation? How does climate change mitigation relate to sustainability in its environmental, social and economic dimensions?

Agriculture contributes to global warming through the production of greenhouse gases, primarily nitrous oxide (N2O) and methane. Nitrous oxide has a global warming potential 310 times of that of carbon dioxide, while the global warming potential of methane is 21 times higher than carbon dioxide. Strategies for climate change mitigation include both reduction of emissions of GHG and formation of carbon sinks for sequestering atmospheric carbon.

From an agro-ecological perspective, the production of GHG in agriculture results directly or indirectly from the inefficient use of inputs to the system. For example, the N2O produced in agriculture is often related to the excessive use of nitrogen fertilizer and represents nitrogen that was not incorporated into the protein necessary for plant and animal growth, production and nutritional value. The inefficient use of this input translates into economic losses through higher production costs, environmental damage from groundwater pollution, and contributes to CC through the release to the atmosphere of N2O.

Methane emissions from livestock are affected by feed quality and intake and represent carbon that did not contribute to animal growth and productivity. Inefficient water management in rice cultivation leads to the anaerobic conditions that result in methane production in flooded rice fields.

One approach to reducing GHG production in agriculture is to identify and correct these inefficiencies so that losses of C and N are minimized. Reducing GHG emissions through more efficient use of resources often has the added benefits of increased productivity or reduced costs, or both. Climate-smart agriculture is then eco-efficient agriculture.

In addition to reducing GHG production in agro-ecosystems, climate change mitigation can be achieved through carbon dioxide sequestration in biomass and in soil. Increasing the number of trees within agro-ecosystems (agro-forestry systems) or in the landscape where agriculture is practiced is a very effective mitigation practice. Given the right combination and arrangement of trees, crops and pastures, this practice can bring additional benefits such as nitrogen fixation, increased biodiversity, water conservation, and better animal productivity because of shade and nutritional supplementation. Forest areas in landscapes also buffer impacts of extreme weather, mitigating flooding and soil erosion, and aiding in water conservation during dry periods.

Recently, the carbon sequestration potential of soil and its crucial role in climate change mitigation have been recognized. Plant covers on soil (cover crops, improved pastures for example) can sequester large amounts of carbon in soil organic matter. Restoration of degraded land is essential to enhancing carbon sequestration in soils. The 4x1000 initiative promoted by France is a very important step towards GHG mitigation by means of soil carbon sequestration.

Many agricultural practices which aid in GHG mitigation also help in climate change adaptation, as seen in the following examples. There are numerous other examples in animal production systems, perennial cropping systems, annual arable crops and vegetable production, but we need to keep in mind that there is no universal prescription. There is no one-size-fits-all solution. Every system is different, every region is different, but what all solutions have in common is that they should be based on agro-ecological principles.

RICE: It is a well established fact that paddy rice is more productive than upland rain-fed rice, but the anaerobic conditions in paddy rice result in high methane production. A growing body of scientific research is showing that efficient use of water, which is an adaptation practice especially in areas where reduced water availability is anticipated, can reduce methane production without reducing yields. Also, optimization of fertilization application can reduce N2O production and increase yields in irrigated rice.

TOMATO: Research conducted in California by Taryn Kennedy, Emma Suddick and Johan Six showed that tomato grown in an "integrated" system (drip irrigation and fertigation) yielded more, produced less N2O and used less water compared with tomato grown under "conventional" conditions (furrow irrigation and sidedress fertilizer injection.

COFFEE: The aim of the coffee NAMA project in Costa Rica is low carbon emission coffee production. Carbon sequestration by shade trees and reduction of N2O emissions from soil through optimization of fertilizer applications are two key components of the coffee NAMA project. The use of shade trees in coffee plantations provides long-term benefits in productivity and quality and also contributes to adaptation by enhancing soil and water conservation. Conversion of waste products into energy through gasification is another key component for reducing methane emissions. With these practices, reduction of GHG plus economic benefits through reduced costs and increased productivity are expected.

CATTLE: Low-carbon livestock production is also being implemented in Costa Rica. Key components are rotational grazing, live fences, improved pastures and better timing of fertilizer application. These practices are expected to reduce GHG production in soil and increase carbon capture in soil and tree biomass. Increased animal density and healthier pastures should lead to increased productivity and a reduction in methane production from enteric fermentation. The adaptation benefit of lower temperatures under shade will also help increase productivity by reducing thermal stress of the animals.

In conclusion, the three objectives of climate-smart agriculture, mitigation, adaptation and productivity, can be obtained simultaneously. To achieve this, an agro-ecological approach that considers multiple interactions within agro-ecosystems or at the landscape level is necessary. As we understand these interactions, climate smart practices can be devised. To do so we need to move from input-intensive to knowledge-intensive agriculture. It is not easy, but it is the intelligent, responsible and ethical way.

TIME FOR A FARMERS' CONVENTION ON CLIMATE CHANGE

Theo De Jager
PRESIDENT OF PAN AFRICAN FARMERS ORGANISATION (PAFO), PRESIDENT OF SACAU AND DEPUTY PRESIDENT OF AGRI SA

Farmers are, in every sense, the main characters in the story of climate change. No one is more vulnerable than farmers to the effects of climate change. And no sector can do as much as agriculture, in as short a time, to address the causes, to mitigate the effects and to adapt to the change.
During the first week of negotiations at COP22 in Marrakech, there was raised excitement and new hope that agriculture would be allowed to take up its rightful place in the global climate debate. These hopes were crushed before the start of the second week.

The time has now come for farmers to plan a reduction of emissions in agriculture, to make the adaptations relevant to a changing climate, and to present their proposals to the UNFCCC, and to COP 23 in Bonn in 2017.

Farmers as change architects
For far too long farmers have pleaded for the inclusion of agriculture in a global agreement to replace the Kyoto Protocol, and to allow for a SBSTA on agriculture.
For far too long the farmers' constituency has relied on parties and governments to come up with, and agree on, a climate change plan that fits agriculture.
After 22 years, nothing has happened. So, it's time to put our heads, our experience and our expertise together, and design an agricultural plan by farmers for farmers, that allows us to take control of our own destiny.

This plan could be a real game-changer if it were mandated by the world's largest representative farmers' organisations like the World Farmers' Organisation (WFO), the Pan African Farmers' Organisation (PAFO), the International Foundation for Organic Agriculture (IFOAM) and the Asian Farmers Association (AFA).
It is the only logical vehicle for a broad-based solution, unless there is someone out there with the capacity to travel the world from farmgate to farmgate.

Let global organised agriculture secure the sustainability and profitability of the sector, and establish a reliable food supply in the face of rapidly changing climatic conditions, through a farmer-to-farmer planning session.

Here, we could tackle the most urgent questions about sectoral emissions, and engage on issues like strengthening the resilience and adaptability of farmers, from the giant industrial producers to the smallholder farmers in the world's forgotten rural corners.

Farmers, more than anyone else, bear the brunt of climate change and very few farmers will question its existence, impact or urgency. Some may question agriculture's role in mitigation and adaptation, but never before have primary producers world-wide convened for an open debate on climate change.

But this is not enough. We need action.
Agriculture is, after the energy sector, the second biggest source of greenhouse gas emissions and responsible for 24% of all emissions[1].

[1] Source: IPCC (2014) Exit based on global emissions from 2010. Details about the sources included in these estimates can be found in the Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

Farmers cannot shy away from their responsibility and accountability with regards to emissions. And they don't need to. Climate-smart agriculture does not have to be a burden to the sector; on the contrary, it can increase the profitability and sustainability of farming operations across the board from grass roots level to large swathes of corporate precision-farmed land.

High tech innovations, no-till cropping, nature friendly and awareness-driven agricultural practices all have the potential to produce more, on less, with less.

Wiser ways

For farmers in Africa and Asia, climate-smart farming brings with it a whole new paradigm.

For the poorest in our sector, those farming on less than a hectare, planting unimproved seed, using a hand hoe to cultivate, and driving annual expansion through deforestation, 'climate-smart' can mean mechanisation, modernisation and commercialisation.

Poverty is a major driver of climate change. If climate-smart agriculture does not offer a real and concrete prospect of slaying the dragon of poverty and hunger, it has no chance of winning the battle for the hearts and minds of the vast majority of the world's farmers, for whom household food security is a daily issue.

There is no silver bullet for emissions in agriculture, and no one-size-fits-all solution that is sustainable. However, different targets for different places on the earth, pursued differently, could help reduce emissions, and encourage commitment to nature-friendly practices.

For the highly industrialised North it would mostly revolve around high tech innovation.

In the smallholder environment, the first fruits to be plucked could be a step as simple as stopping the fires that burn down more than half of the area of Central-, West- and East Africa every dry season. These fires put the worst kind of black carbon into the atmosphere and strip the soil of vital nutrients[2].

Since they make a living from the land, farmers are the primary custodians of nature's resources in the modern world. But farmers do not make their living from nature.
On the contrary; they manipulate nature to earn a living from her. Nature has no surpluses, but surplus production is the very essence of commercial farming. Efficient farmers must eliminate competition, predators and diversity, and constrain the very elements through which nature restores balance to the system.

This is the complex, imperative tension between farming and nature.

Because of this, farmers owe nature their best, and their most diligent efforts to ensure the continued health of the natural system.
More than anyone, farmers realise and appreciate this.

Experts inform, farmers implement

It makes absolute sense then, that there is no multi-national institution, government, NGO or random interest group, that could dish up a plan on how to deal with climate change, and serve it to the global agricultural sector. Were any such groups to try this, it would probably not raise broad-based buy-in or committed execution by the farming fraternity.

No circle of experts, or exclusive group of influential farmers, can design a road map for climate-wise agriculture either; the sector's diversity would never allow for that. We need an intense workshop; informed by experts, populated by farmer leaders, to map out a strategy. A process of internalisation, in which farmers have the opportunity to contribute, question principles and endorse or reject the strategy, should follow.
Without going through this process, farmers will never take ownership or give that firm mandate, reach consensus and commit to change.
We need it, though it may be cumbersome and consume time and resources, because the alternative is too ghastly to contemplate.

There is no reassuring signal that the petty politics, which have kept agriculture out of its rightful place in the climate debates, and at COP agreements for the last 22 years, will disappear in the next 22 years.
In the long term, global food security is threatened. In the much shorter term, farmers' livelihoods are. There is too much at stake to risk taking shortcuts or going for discounts.

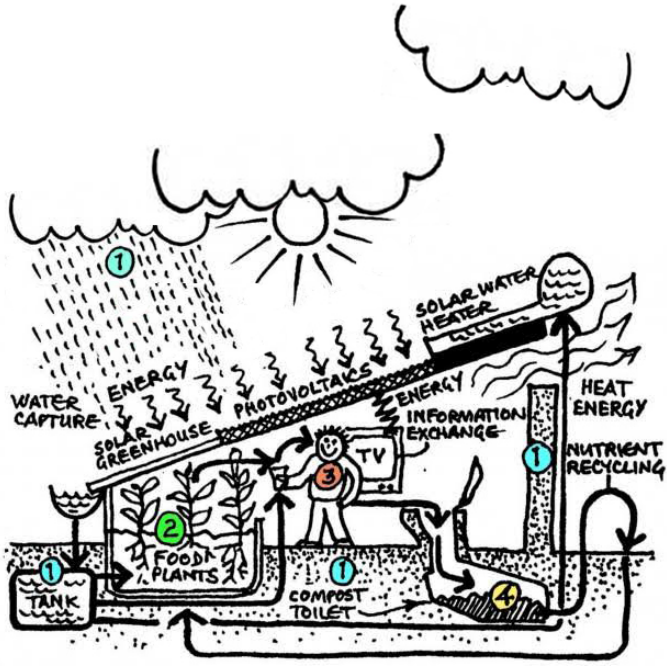
And we can do it.

I am calling for a comprehensive workshop of farmers' leaders, world-wide, to develop a plan for agriculture; a plan as practical and sensible as only farmers can make it.
And I am calling for the global sector to change tack in its approach to the UNFCCC and COP.
A united sector, ready to engage COP with a tailor-made plan, mandated by the most representative farmer's organisations on earth, would be difficult to refuse.
Of course, we can always wait and see what outcomes the current process generates. But, it has been said, that bad things happen because good people do nothing.

[2] Average distribution of African wildfires over the first 10 days of February 2016 - Anthony Sagliani, Meteorological Operations Manager at @EarthNetworks/@WeatherBug.

THE FUTURE OF FARMING IN A WARMING, WATER-STRESSED WORLD

Robert Glennon
REGENTS' PROFESSOR AND
MORRIS K. UDALL PROFESSOR OF LAW
AND PUBLIC POLICY
UNIVERSITY OF ARIZONA



Overview

A recent United Nations' report predicts that the Earth's population will increase from 7 billion to more than 9 billion by mid-century. Farmers will be expected, somehow, to feed an additional 2 billion people. That's a daunting challenge, made even more difficult by climate change. Farmers will need to grow more food with less water. Yet a U.S. Bureau of Reclamation study of the Colorado River Basin found that it would take five percent more water to produce the same amount of food for each one-degree Fahrenheit increase in temperature.

Changing food consumption patterns will complicate the task. As China's economy has boomed, its citizens have increased their consumption of meat. It takes more water to produce beef, chicken, and pork than for a vegetable-based diet. The rising middle class across the globe prefers food that requires more water to produce.

Many places around the globe are running out of water or using water in unsustainable quantities. Consider groundwater. In China, India, and the United States, excessive groundwater pumping has caused water tables in aquifers to plummet, land to subside, ocean water to infiltrate potable supplies, and nearby streams and springs to dry up. An aquifer is like a giant milkshake glass and each well is like a straw in the glass. Lenient laws allow a limitless number of straws in each glass, creating a classis tragedy of the commons problem: limitless access to a finite supply. It's a recipe for disaster.

The Challenge

Finding enough water for farmers to feed two billion more people will confound nations, corporations, scientists, consultants, and NGOs. The magnitude of the challenge is encapsulated in one stark statistic: farmers currently consume approximately 80 percent of the world's fresh water. This statistic is not a criticism of farmers. The simple reality is that it takes a lot of water to grow our food.

Farmers aren't the only ones who need or want more water. According to some experts, biofuels such as ethanol offer a way to escape our reliance on fossil fuels. Whether the energy return on investment (EROI) is positive is debatable. What is clear is that it takes a lot of water to produce ethanol. During the refining process, it may take four liters of water to refine one liter of ethanol. But first, farmers must grow the corn. In the Western United States, it may take as much as 2,500 liters of water to grow enough corn to refine one liter of ethanol. Do the multiplication and you arrive at a huge number to produce one liter of ethanol. Oh, and the U. S. Congress has mandated that the country produce 144 billion liters of ethanol by 2022.

Ethanol production consumes corn previously used by food and livestock producers, who must find substitute supplies. Sometimes, this demand can be met by planting additional acres of corn. But the net result is the same: corn used for ethanol cannot be used to produce food for a world of nine billion people.

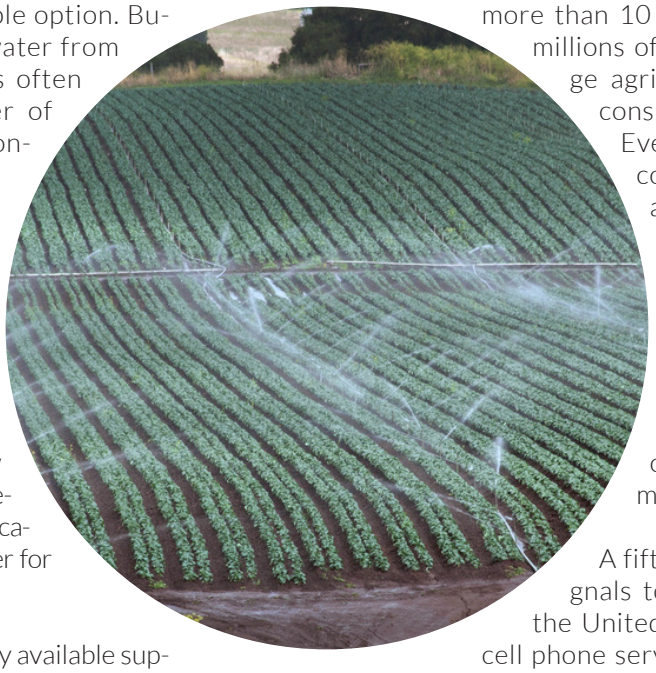
Another increasing demand for water comes from the energy industry. As the ethanol example illustrates, it takes a lot of water to produce energy; conversely, it takes a lot of energy to pump, transport, deliver, and treat water. And the world seems to have an unquenchable desire for more power. Consider for example the "Cloud," where data is stored by companies such as Google, Facebook, and Amazon.com. Contrary to popular belief, the Cloud is not in the sky. It's housed in data centers in industrial areas, ranging from Finland to Washington State. Tens of thousands of data centers, each with thousands of computers inside, run on electricity and need water to dissipate the heat generated by the computers.

Another factor complicates the challenge for farmers to produce enough food for a growing population: the conversion of agricultural land to municipal and industrial uses. In rings around many of the world's largest cities, farmland is being turned into apartments, factories, and shopping centers. This process often involves prime farmland -- the highest quality, and the process of conversion is irreversible.

In short, farmers need more water to feed nine billion people but face challenges from urban, municipal, and industrial interests whose water use is increasing.
ple but face challenges from urban, municipal, and industrial interests whose water use is increasing.

Solutions

An immense challenge demands steadfast resolve. Fortunately, we have available a menu of policy and institutional reforms that could enable farmers successfully to meet the challenge. One thing is abundantly clear: business as usual is not a viable option. Building dams, diverting more water from rivers, and drilling new wells often simply deprives another user of water and has horrific environmental consequences.



The first solution is the easiest and the most obvious: conservation. In the United States, we consume an immense quantity of drinking water growing lawns and watering golf courses in the desert and flushing away human waste. We need to rethink how and why we use this precious resource. Changing outdoor landscaping practices would free up water for other more important uses.

Reuse of water provides a readily available supply of "new" water, as water managers in Singapore call it. Use of reclaimed water is not the sole solution but it's a partial answer. Treated wastewater provides a viable supply to water golf courses, parks and fields, cemeteries and highway medians. It can run power plants and data centers. If treated through reverse osmosis, it can provide a new drinking water supply. Best of all, the supply grows as the community does. Surprisingly, some water-stressed regions of the American West reuse precious little wastewater. In Los Angeles, the city's Hyperion Treatment Plant produces a volume of water equal to the seventh largest river in the United States. Yet, virtually every drop gets dumped into the Pacific Ocean. The recent severe and ongoing drought in California is prompting a fresh look at reusing wastewater.

Because the Earth mostly covered by water, some have wondered whether the solution to our water problem is right in front of our faces. Desalination of ocean water is already occurring and provides another partial response to water shortages. But it's not a magic potion that will end the global water shortages. It faces three obstacles: it's expensive, energy intensive, and yields a brine steam that must be disposed of. Still, if a city has a high value use for water and few other alternatives, desalination has a place in its water portfolio.

A fourth option is to increase the efficiency and productivity of agricultural water use. Precision agriculture, digital farming, and sub-surface drip irrigation are but a few of the innovative tools being refined in crop science laboratories across the globe. In this arena, genetic engineering must play a part. GMOs, in particular, are controversial. But the need to keep people from starving is so urgent a humanitarian concern that no option should be dismissed without proof that it poses human health risks. Thus far, there is no evidence that GMOs adversely impact human health.

In the United States, the regulatory process for bringing genetically engineered crops to market takes more than 10 years and costs hundreds of millions of dollars. As a result, only large agricultural companies can even consider undertaking the process. Even then, they must focus on commodity crops, such as corn and soybeans, because only these crops offer the potential profit to justify the time and money spent developing them. The world has an acute need to foster investigation into the production of other genetically engineered crops, especially, ones that may improve yields.

A fifth option is the use of price signals to encourage conservation. In the United States, people pay more for cell phone service and cable television than they do for water. Because water is so inexpensive, people often don't use it wisely. To protect people of modest means, I advocate for recognizing a human right to water for drinking, cooking, and sanitation. For use beyond this threshold, we should develop sensible price policies with increasing block rates that send a clear conservation message: you may use more water, but you are going to pay for it.

Finally, we should use market forces to encourage the shift of water from lower to higher-value uses. Across the planet, we're entering an era of reallocation. The reality is that we are drinking the same water that the dinosaurs did. To put it metaphorically, we are drinking from the same milkshake glass. If someone wants to stick a new straw into a water-stressed supply, that person should be required to persuade someone else to remove his straw. A system of quantified and transferable water rights would facilitate the growth of water markets and exchanges.

Here comes the hard part. Because farmers consume such a high percentage of water, a water market would usually involve farmers selling or leasing water. Won't this transfer of water away from agriculture make it more difficult to meet the challenge of feeding nine billion people? Not if done properly.

A low single-digit reduction in agricultural water consumption yields a very high percentage of municipal and industrial consumption. In the American West, farmers use flood irrigation on millions of acres. It's very inefficient. But, it would be very expensive, perhaps $2,500 per acre, for a farmer to switch to a highly efficient system, such as sub-surface drip irrigation. The solution I propose is for municipal and industrial interests to pay farmers to modernize their water infrastructure. This arrangement would allow farmers to grow the same amount of crops while using less water. The water conserved would go to the M & I users. It's a win-win solution.

Optimism

It will not be easy to meet the challenge of feeding nine billion people, but I have outlined a framework for moving toward reaching this goal. We have multiple tools available. Now we need the moral courage and the political resolve to act.

SUSTAINABLE USE OF FERTILIZERS FOR PRODUCTIVITY AND CLIMATE CHANGE MITIGATION

Dr. Deborah Hellums
IFDC CHIEF PROGRAM OFFICER AND
FARMING FIRST SUPPORTER

Every person alive depends on agriculture for food, but agriculture accounts for 12 percent of annual greenhouse gas emissions. About half of these emissions come from arguably a most necessary component of agriculture: the use of nitrogen fertilizers. Mineral fertilizers, combined with organic fertilizers (along with other inputs and best management practices), currently keep about **half of the global population alive**. Without them, soils become devoid of nutrients, leading to low and declining yields and soil degradation, including loss of soil carbon.

However, if fertilizer is overused (especially nitrogen fertilizer) this can lead to water pollution, acidification, and can contribute to greenhouse gas emissions. So, what can be done to ensure sustainable agricultural productivity while mitigating fertilizer's contribution to climate change?

At the **International Fertilizer Development Center** (IFDC), we are working to turn these anticipated climate change threats into opportunities. With expertise in soil and plant nutrition science, we know agriculture's impact on climate can be reduced by increasing soil biomass to sequester atmospheric carbon dioxide (CO_2), by intensifying crop production to reduce deforestation, and by developing and disseminating fertilizer technologies that reduce nutrient losses, especially those from nitrogen.

Fertilizer Increases Biomass to Sequester Carbon

It is sometimes easier to see the negative effects of fertilizer overuse; it is more difficult to see the negative effects associated with fertilizer underuse. In sub-Saharan Africa (SSA), fertilizer application **averages a rate of 12 kilograms per hectare (kg/ha)**. Though it varies by region and crop, this is only about 10 percent of the recommended rate. In West Africa, IFDC's research has shown that this continuous non-fertilized cereal cultivation decreases crop yield, soil organic matter content, overall soil fertility and culminates in degraded land.

These agricultural soils hold the potential to be very productive and to serve as huge sinks for carbon capture, or "sequestration". But this can only be accomplished by the application of appropriate fertilizers and best management practices including minimum tillage, residue management, and nutrient recycling (e.g., the reincorporation of biomass back into the soil).

Incorporation rates of 1-6 tons of biomass per hectare can gradually increase soil organic matter, sequestering up to 1,000 kg of carbon per hectare per year. However, this practice is limited due to low availability of biomass in SSA and the labor associated with incorporation. When this practice is sustained for more than a decade, good soil health will support yields, and good management practices, such as crop rotation, legume introduction, agroforestry, and integrated crop-livestock systems, will continue the process of carbon sequestration.

Fertilizer Intensifies Yields to Reduce Land Conversion

In addition to sequestering carbon, appropriately applied fertilizers may prevent deforestation and conversion of other lands into agricultural land. Currently, land conversion is the annual source of 12 percent of all greenhouse gases.

A further wrinkle in this situation appears when looking at population growth toward 2050. For example, to maintain a food self-sufficiency rate of 80 percent on the African continent, cereal production will need to be tripled. Without agricultural intensification, 80 million extra hectares would have to be cleared. Within one to two years of converting the land, 80-90 percent of the soil organic matter critical to fertility maintenance would be lost as carbon into the atmosphere.

But by allowing for the production of more food from less land, fertilizers have averted the conversion of about 1 billion hectares of virgin land into agricultural land since 1960.

And they will continue to do so in the future as more efficient fertilizers are produced and applied with good management practices. Several organizations are now testing and mapping soil nutrient content in Africa and providing agribusinesses and fertilizer manufacturers with solid data on which to base fertilizer recommendations. Along with improving policy environments and better fertilizer blends (that include secondary and **micronutrients**), agricultural productivity in Africa is growing and primed for greater success.

Success Story: Urea Deep Placement

Mitigating the effects of climate change while sustaining and increasing agricultural productivity will also require creative approaches to new products. While the inherent nutritional needs of crops will not change, new application technologies to increase nutrient uptake can drastically reduce agricultural emissions. And we are seeing some success from this already.

For example, in Bangladesh, one of the most vulnerable nations to climate change, rice is intensively cultivated on 80 percent of all farms, most of which are half a hectare or less. Much of this rice is cultivated using a continuously standing water system in which the rice field is flooded. When farmers apply fertilizer, most broadcast urea (46 percent nitrogen), and because nitrogen is the most affordable product, overuse and low nutrient use efficiency are common. This results in major nitrogen losses due to leaching, surface water runoff, and volatilization of nitrous oxide.

As a solution, IFDC introduced urea deep placement (UDP) into Bangladesh, the implementation of which reduces urea use by 20-30 percent and increases yields by 15 percent across all growing seasons. Nearly 2 million farmers implement UDP with an annual incremental rice production of 340 kilotons (kt).

For dry season rice in Bangladesh, nitrous oxide emissions decrease by 60-80 percent, equivalent to about 200 kg CO2 per hectare from reduced fertilizer use and 70 kg CO¬2 per hectare from increased N uptake. The application of UDP on 0.4 million hectares of dry season rice has mitigated more than 100 kt CO2 equivalent, which, when scaled to the 3.8 million hectares of dry season rice suitable for UDP, can potentially reach 1,000 kt CO¬2 equivalent.

Looking Ahead

There is no doubt that the challenge ahead of agriculture is great. We are already witnessing the agricultural hurdles created by climate change while preparing to nourish a population of 9-10 billion by 2050. In addition, agricultural expansion is limited by available land and water resources. In some regions, land and water are already scarce. Finally, new weather patterns will change large and small producers' cropping mix, practices and strategies. For the smallholders in developing countries, this may represent the most significant change they have experienced in hundreds of years.

Despite these obstacles, IFDC looks positively toward the future. We have the tools and capacity to overcome these hurdles, but we can no longer put off action. As agricultural scientists, it is our vocation and moral obligation to identify science solutions and best management strategies that ensure farmers worldwide live healthy, prosperous and productive lives and that they have the tools and ability to combat and mitigate the effects of future climate change.

SUSTAINABLE PRODUCTION FOR ADDRESSING CLIMATE CHANGE IN COTE D'IVOIRE

Dr Aboua Gustave
SECRETARY GENERAL
WCPO - OMCC

Since the late 90's, Côte d'Ivoire is experiencing a worsening climate variability. Weather can be highly variable on a daily, weekly, or even yearly basis, which can influence precipitation patterns and vary the average temperature, registering a year-to-year decrease. The fall of precipitation in Côte d'Ivoire as well as in other countries of the Gulf of Guinea, started at the end of the 60s and continued during the 80s and 2000s.
Since the 70s, we have witnessed a radical change in the rainfall regimes in Côte d'Ivoire, as a consequence of climate change. One of the reasons certainly lies in the global warming and the greenhouse gas effects. Moreover, man's action on rural livelihoods and ecosystems contributed significantly to the changing dynamics of the agricultural sector in the country through deforestation, bushfires and air pollution.
Agricultural production is suffering from a significant drop in yields.
hazards and, ultimately, economic loss for the farmer.

Impact of climate changes on the agricultural production

The agricultural sector in Côte d'Ivoire unfortunately is not immune to the negative effects of climate change.

Rainfall volumes, annual distribution and the length of the year-to-year rainy seasons have evolved significantly over the past 40 years and require a consideration from a socio-economic perspective. Thus, the production of cocoa which originally took place in the Center-East region of the country, was then moved to the South-West region due to the deterioration of the conditions of the agricultural production.
The progressive deterioration of the environment at the country level is witnessed through phenomena such as drought and desertification which, in the short, medium and long-term, can reduce the agricultural productivity despite the hard work of the farmers.
"It is becoming increasingly dry and hotter than the past decades" Ivorian farmers reported. "The rain season starts late, stops early and dry beaches might appear during the rainy season". Farmers reported a shift in the beginning and the length of the rainy season.

Adaptation and mitigation initiatives at the local level

The Government of the Côte d'Ivoire, aware of the importance of agriculture as an essential component of its economy, launched the National Agricultural Investment Programme (NAIP), which soon became the framework for any intervention in the agricultural sector since 2010.
In its 2012-2015 programme, the NAIP is focused primarily on addressing climate change and promoting adaptation and mitigation initiatives. Indeed, climate change adaptation initiatives are included in Program 1 "Improving Agricultural Productivity and Competitiveness" combining agricultural intensification, promotion of water control, sustainable management and governance of land.

These actions include:

- The introduction of new plantations more resistant to the drought: this is the case of the Bixa Orellana and the cashew tree which replace the coffee

and the cacao in the North-East. This is also the case of the rubber and oil palm cultivations replacing coffee and cocoa in the Eastern region.

- The use of new varieties more resistant to drought and diseases in the rehabilitation of plantations: this is the case of the UNDP / ANADER project of Production-Marketing-Training of the Farmers for rice cultivation. This is also the case of the 2QC (Quality-Quantity-Growth) Programme for the promotion of the quality of cocoa financed by the FIRCA.
- Change of strategies: in favor of more resistant ones. Postponing the seeding and plantation processes while considering the delay at the beginning of the rainy season.
- The differentiation of activities: this is the case of the farmer who combines several food crops on the same plot or farming livestock. The different associated crops vary in the different regions of the Country.
- The use of new cropping techniques adapted to the new climatic conditions: this is the case for the use of plastic bags for coffee nurseries, cocoa trees, oil palms and rubber trees to ensure the successful harvest after planting. This is also the case for the development of vegetable crops at the edge of rivers or water flows.
- Transhumant farming.
- The use of fast-growing trees in agroforestry.

Need for capacity-building of the agricultural community

Traditional constraints still affect negatively the agricultural profitability (i.e. land tenure, soil fertility via extended fallows). It is important to recognize that the situation has evolved according to the farming community, which is more inclined to adopt innovative techniques with high productivity.
Successful alternative techniques are now being tested in agriculture. These include:

- Agroforestry (Fast-growing trees to regenerate the forest to favor under-forest crops);
- water management using water reserves and sustainable irrigation systems: construction of agro-pastoral dams;
- sustainable livestock and fisheries;

It is important to develop and strengthen an evidence-based data collection and analysis system to contribute significantly to change the mindset in the agricultural sector in Côte d'Ivoire.

Conclusions

Sustainable productivity to fight climate change has a great potential in Côte d'Ivoire, if continued efforts to address climate threats are shared by all stakeholders, particularly by the farmers' community.
To this end, the transfer of new technologies and their ownership within the agricultural sector should be encouraged.
It is important to preserve forest ecosystems by:
-rationalizing the exploitation of forests;
-sustainable agricultural production;
-reducing bushfires.

Similarly, it is necessary to fight droughts through:

- biodiversity preservation;
- good cultivation techniques;
- sustainable irrigation techniques.

Finally, involving research into everyday farming practices becomes essential for promoting good practices and building farmers' capacity. This requires adequate funding for the transition towards a model of sustainable agriculture.

CLIMATE CHANGE MITIGATION ACTIONS IN NEW ZEALAND

James Steward
PRESIDENT
MANAWATU/RANGITIKEI
FEDERATED FARMERS
OF NEW ZEALAND

She'll be right mate. Or will she? Being a fifth generation farmer my family have seen the primary industries go through several evolutional changes over the last hundred years of farming in New Zealand. We understand that in today's world, farmers need to keep up with the game in terms of understanding how we are impacting on the environment, and making sure where possible our management practices support sustainable production. We've seen first hand how on farm changes can create both immediate benefits, and the potential for some serious long terms gains to sustainability, and we are keen to do more.

In a general sense, the biggest changes we have seen the agricultural sector make as a whole, have been industrial changes, largely related to tools and mechanical developments to assist with the manual labour of farming, and transport changes to ensure our goods are traded internationally. But these changes are nothing compared to what we need to do as an industry to ensure that not only is our backyard in good shape, but the effects that we are having to the wider environment are managed.

In the drive to build New Zealand's economy and to shape the future for New Zealanders standard of living, farmers were encouraged to clear and fertilise farm land, in particular hill country to make way for more sheep and push production in both sheep, dairy and other primary industries. This however has come at an environmental cost. What we now understand is that the way forward is about getting the balance of production and natural resources to line up. Natural capital and ecosystem services are not to be taken lightly and there is more global awareness and with that, higher demand to get things right. Environmental and economic efficiencies are the way forward.

With my role as Federated Farmers Provincial President of the Manawatu/Rangitikei Province I have been exposed to the challenges of getting community at a balance around environmental issues.

On my own property, which farms just over 800 dairy cows, I have taken the management practice of lowering stocking rates with a strict breeding regime of having efficient converters of grass to milk. Monitoring pasture is very important as we need to get maximum tonnage of dry matter per hectare and also have best pasture quality without waste. Nitrogen is used strategically and if conditions demand is coated to prevent losses into the atmosphere. These on-farm management practices have not only increased production efficiency but with the additional benefit of helping to further reduce greenhouse gas emissions.

At a regional level we have some initiatives including the Sustainable Land Use Initiative (SLUI) led by Horizons Regional Council, with the goal of reducing sediment but also act to provide for carbon sinks with riparian and woodlot plantings. The Regional Council One Plan has also been a great learning curve for famers both within the region and broader as other Council's look to implement similar schemes. Tools such as Overseer, and whole farm plans have in particular helped me look at my property's footprint on the environment and continue to look at more efficient and sustainable systems.

But it has been the networks that I have made in my role which excites me that there is a way forward to both raise profitability and help production and reduce impact on the environment. With my links to Massey University, I am about to be involved with drone technology of measuring pasture and mapping nutrient hot spots. I am also heavily involved in the Regional Growth Study, looking to better understand that role of agribusiness within the region and how this can better deliver on the Government Business Growth Agenda.

On a regional scale I am also involved in educational initiatives to promote agricultural as a career, and have been involved with the Massey University P21 project looking at efficiencies and nutrient management and FoodHQ to look at precision agriculture.

From an education perspective, our farm is also looking to take a lead in terms of working with others in the industry and broader community to learn and share information about what is happening on farm. We have recently built a new dairy shed which has facilities for the specific purpose of hosting groups on farm. We believe this will be a great asset to the District and broader, in that it will have a separate training/viewing room as well as tailored use of the actual working areas to enable visitors access. We believe there is no better way to learn than to be hands on seeing how things work in practice.

In my role in Federated Farmers, I am also able to work with the organisation on delivering its high level strategic agenda, including on Greenhouse Gas Emissions. The Federation's recent strategic refresh reconfirmed this area as a major area of focus. As an active member of the World Farming Organisation, the Federation will be actively working to ensure that our members have the information they need in the space.

I agree. Information is key. We, as farmers, need to have up to date and regular information on greenhouse emissions to go forward. This information is crucial if we are to meet our targets of doubling export dollars in the primary industries in the next ten years in a sustainable way. I believe the only way we can do this is if farmers and science work together. Then maybe she will be right.

RURAL WOMEN, CLIMATE CHANGE AND MITIGATION ACTIONS IN THE CARIBBEAN

Mildred Crawford
VICE PRESIDENT CARIBBEAN NETWORK
OF RURAL WOMEN PRODUCERS

Research shows that climate actions have triggered varied act of natural disasters which transforms weather patterns in the Caribbean. This creates challenges, uncertainty in weather, environmental issues and low or poor quality of products frustration and severe poverty.

Michelle Black, female Champion farmer, who resides and work in Jamaica, is the owner of Golden Dutchie Farm in St Ann. She has been battered by the long period of drought on a 36 acre farm, but she remains undaunted by the challenges and demonstrates how women operate in the process of resilience.

In 2014-2015, she had the most demanding time of her life. On her farm she has implemented a water harvesting mechanism but her demand for this commodity exhausted the supply that was stored. She has a contract which requires her meeting a quota on a particular deadline and in tears she reported to me that she lost 1600 hills of yams because of the drought. She told me she heard of benefits that

As I walked the farm with Michelle, I realize Michelle's passion for farming vegetables, tubers and livestock (goats and pigs), and the ambition to have a model farm.

The earth was very dry and cracked in some areas, showing the demand for water. Trees withered while the sun drained us as we moved along. While we discuss Climatic conditions, I realize these challenges:

- Michelle leased the land. It is owned by the government but the bureaucratic process prevented her from getting legal document which could enable her to access benefits like credit and put in other infrastructure which enables her to increase productivity.
- The property was far from the public water supply and although she had introduced water harvesting mechanism, the period of drought lasted very long so she exhausted her supply. She had to purchase truck loads of water daily.
- She was congratulated when she had water and the farm was kept, but there was little support or encouragement from agencies when she had challenges.
- She had a staff of 15 persons working on farm which is to be paid fortnightly.
- The time when she would do her planting had to be suspended because of lack of rainfall.
- She had to feed the animals, changing from pasture rearing to straight commercial feed. All this was an increased and unplanned cost

Mitigation Strategies

Her courage and determination was evidenced in the strategies that Michelle employed. She invested more in short term vegetable crops, and utilizes the profit to purchase more expensive techniques, but using less water and producing more moisture in the soil. Gradually she attracted assistance from a nearby underground water supply or well. She has now piped water from almost a mile away to her farm where she will be able to constantly supply her main crops, two large greenhouses and her animals with water.

SUSTAINING AGRICULTURE WITHIN BAKA PYGMIES COMMUNITIES IN EAST CAMEROON

Nestor Ngouambe
YPARD CAMEROON REPRESENTATIVE

The bakas pygmy communities are people living and attached to forest values. Their subsistence is based on all they can harvest in tropical forest. This last decade, actions have been put in place to let those communities get involved in agriculture. These actions lead to massive deforestation with consequences on climate as we all know. Nowadays, farmers are facing the effects of this change of climatic condition and are sometimes unable to plan their agricultural campaign since rainfall is uncertain. With respect to this problem, a local NGO called ADEAC (Association pour le Developpement des Exploitations Agricole du Cameroun), has put in place a permanent agricultural project aiming at letting farmers adapt to climate condition within their agro ecological areas.

Permaculture: a "permanent" agriculture

Permaculture is a system of agricultural and social design principles centered on simulating or directly utilizing the patterns and features observed in natural ecosystems (**OECD**). In eastern Cameroon, due to subsistence needs, local communities tend to destroy forests for agricultural practices. After two years they just abandon the land to prospect new ones. As a consequence, local communities start to complain about the scarcity of food they find in forest. The aim of permaculture is to exploit those land abandoned by farmers for sustainable agricultural practices. It consists of intensive agricultural practices without any chemical inputs, with the only use of high yield varieties.

Capacity building of baka's on sustainable agriculture

To avoid the scarcity of food needs, it was very urgent to sensitize and build capacity of farmers on how to produce and domesticate what they need in the forest. The French economist Jean Baptiste once said: "If you want something, you have to produce it by yourself. Otherwise you have to produce something that can you can ultimately exchange with what you want".
After several trainings both practical and technical, a small grant was given to farmers to buy material and build propagator for seed multiplication. Also, they learnt how agroforestry can be a solution for climate change.

A mitigated results

It is true that most farmers face problems due to climatic conditions that change significantly but farmers who are trained are now well aware of:

- seed multiplication both for food plant and tree plants,
- mulching to avoid evapotranspiration the adoption of high yield varieties
- reluctance of some farmers on the adoption of this practice because they remain attached to their ancestral practices.

Adapted climate change adaptation tools for farmers

Dealing with climate change in the context of professionalization of small scale farming is the great challenge. Several approaches like MICCA have been developed and adopted in various countries. But Baka pygmies due to their low educational level have limited understanding of the pertinence of such approaches.
Increasing agricultural productivity within the context of climate change needs a lot of time for farmers' appropriation of specific strategy. In this sense more attention should be paid on training and capacity building with young people as main target.
One of the main weaknesses of this initiative is the fact that facilitators spent more time on theoretical training than with practical examples which are easier to understand for farmers. That is why it is important to develop new climate change materials adapted to farmer environment.
Farmers are really facing climate change effects which significantly limit their productivity. Permaculture comes as alternative solution to sustain agricultural system within a changing context. The promotion of climate change adaptation tools will help those farmers to avoid the negative effects of climate change, since they are the main victims of climate change.

NEWS

GRA WFO Study Tour – Exploring digital agriculture and best practices in GHG reduction

New Zealand, 30 November 2016 - The third annual Global Research Alliance (GRA) – World Farmers Organisation (WFO) Farmer Study Tour is underway in New Zealand this week (28 November – 4 December 2016).

This joint activity supports the Partnership between the two organizations and was initiated to better connect the policy, science and farming sectors, and allow for the exchange of ideas and experiences to increase the skills needed to reduce agricultural greenhouse gas emissions on farm.

http://wfo-oma.com/news/gra-wfo-study-tour-exploring-digital-agriculture-and-best-practices-in-ghg-reduction.html

COP22: Adaptation in agriculture - building resilient farmers and farming systems

In collaboration with the World Organization of the Animal Health, OIE, WFO organized this side event to promote solutions on how different stakeholders can support farmers to increase their resilience to adapt to a changing climate.

As climate is changing and all over the world we are experiencing more unpredictable and uncertain weather conditions than in the past. Farmers, including livestock breeders, are the most affected by the effects of climate change since they depend on the weather for their daily returns and incomes. Given the inextricable link between climate change, food security and poverty reduction, the agricultural sector is crucial in the fight against climate change and so are the farmers who have the burden of meeting the world's growing food demands, while reducing carbon and greenhouse gas emissions. The agricultural system is very complex given its multifunctional role. That is why a holistic approach is needed to identify policies and programmes that support the sector in the three main components: social, economic and environmental, to efficiently support the Paris Agreement and to empower farmers.

http://wfo-oma.com/news/cop22-adaptation-in-agriculture-building-resilient-farmers-and-farming-systems.html

Agriculture initiatives and COP22: Ministerial Roundtable at the Nordic Countries Pavillion

On 17 November, WFO addressed an event organized by the Nordic countries to discuss how agriculture initiatives, within the framework of the Paris Agreement and the national climate plans, can help tackle climate change through reduction of emissions, adaptation of production systems, and increased resilience of people and their livelihoods. The Moroccan presidency has put agriculture at the central stage for this COP, among other things launching the Adaptation of African Agriculture Initiative, and seeking to further the work on a sector, which is important to millions of people across this continent.

http://wfo-oma.com/news/agriculture-initiatives-and-cop22-ministerial-roundtable-at-the-nordic-countries-pavillion.html

MARRAKECH
COP22|2016|CMP12
UN CLIMATE CHANGE CONFERENCE

COP22: Agriculture and Food Security Action Event

This high-level event was organized following the launch of the Adaptation of African Agriculture (AAA) by the Kingdom of Morocco, the Global Framework on Water Scarcity, the Food and Agriculture Organization of the United Nations, and the Milan Urban Food Policy Pact by mayors from over 100 cities. An initiative that aims to make the sector more productive, sustainable and climate resilient and to set up climate action in agriculture, enhancing progress towards the Paris Agreement. As part of the Global Climate Action Agenda, the Agriculture and Food Security Action Event will discuss the central role of agriculture in solving the triple threat of hunger, poverty and climate change.

http://wfo-oma.com/news/cop22-agriculture-and-food-security-action-event.html

COP22- Climate Smart Farmers: Scaling up rural women's innovative practices for impact

As women farmers represent, on average, 43 percent of the global agricultural labour force, and considerably more in many developing countries (FAO, 2011), it is critical to engage them in the global policy dialogue on climate change, as well as, in any of the decision-making processes relating to agriculture and climate.
WFO, represented by Mr Richard Bower, from the National Farmers' Union of United Kingdom, explained the activities that WFO is carrying forward to promote women farmers' issues. Mr Bower described the mechanism of WFO women committee, based on the policy on gender and how the organization makes sure that the gender balance approach is applied to the global advocacy work implemented by the organization.
http://wfo-oma.com/news/cop22-climate-smart-farmers-scaling-up-rural-women-s-innovative-practices-for-impact.html

COP22: Youth Engagement in CSA in Africa to boost their enthusiasm to remain in the agricultural sector

On 15 November, WFO addressed the side event organized by the Climate-Smart Agriculture Youth Network on Youth Engagement in Climate Smart Agriculture in Africa. The event analyzed the growing concern that young people have become disenchanted with agriculture. About 85% of the young people live in developing countries, where agriculture is likely to provide the main source of income. It is, therefore, vital that young people are connected with agriculture as a source of income. To mark World Youth Skills Day (WYSD) on July 15 2016, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Climate and Agriculture Network for Africa (CANA), Climate Smart Agriculture Youth Network (CSAYN) and CLIMDEV-Africa Youth Platform (ACLYP) held an online discussion forum on Youth Engagement in Climate Smart Agriculture (CSA) and the 2030 Agenda for Sustainable Development.
http://wfo-oma.com/news/cop22-youth-engagement-in-csa-in-africa-to-boost-their-enthusiasm-to-remain-in-the-agricultural-sector.html

"Every programme and policy should involve farmers" said Charles Ogang, WFO Board Member, Uganda

November 16, 2016 - Farmers' Constituency today has been represented by Charles Ogang, President of the Uganda National Farmers Federation, UNFFE, at the event "Agriculture and Food Security Action Event @COP22", jointly organised by the Food and Agricultural Organisation (FAO), the AAA Initiative, the Kingdom of Morocco and Coping with Water Scarcity in Agriculture- a global framework for action in a changing climate. Farmers are key actors in achieving the goal. "Every programme and policy should involve farmers" said Ogang. Indeed, many of them failed because farmers are not involved while inclusion in the decision-making and policy-making process is essential to make them owners of their process of development.
http://wfo-oma.com/news/every-programme-and-policy-should-involve-farmers-said-charles-ogang-wfo-board-member-uganda.html

COP22: Dyborn C. Chibonga, NASFAM called for technology and financing frameworks at SBSTA

Recognizing the common understanding reached on the strategic role of the technology framework in bringing transformational change, farmers, represented at SBI Closing by Dyborn C. Chibonga, Chief Executive Officer of National Smallholders Farmers Association of Malawi (NASFAM), Malawi, called for technology transfer and an ambitious financing framework, particularly for farmers in developing countries.
http://wfo-oma.com/news/cop22-dyborn-c-chibonga-nasfam-called-for-technology-transfer-and-an-ambitious-financing-frameworks-at-sbi.html

COP22: How do farmers move forward in the SBI negotiations?

On Monday, 14 November, the UN Climate Change Conference (UNFCCC) continued in Marrakech, Morocco. Throughout the day, contact groups and …
http://wfo-oma.com/news/cop22-how-do-farmers-move-forward-in-the-sbi-negotiations.html

What role for farmers in climate-smart agriculture post-Paris?

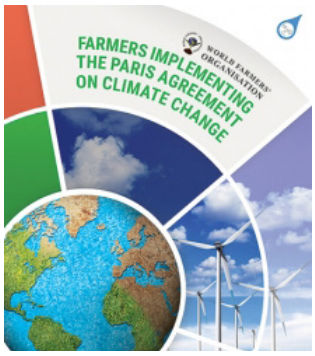
GACSA side-event "Investment opportunities for scaling-up Climate-Smart Agriculture (CSA) illustrated the current global finance landscape showing that agriculture is generally under-funded. Furthermore, only a small portion of all agricultural financial resources trickles into CSA funding. If CSA has to produce the expected climate solution to food security it must be implemented at a large-scale and this requires substantial investments. The event called for innovative approaches to resource mobilization for scaling-up CSA.

http://wfo-oma.com/news/what-role-for-farmers-in-climate-smart-agriculture-post-paris.html

Quo Vadis? Agriculture and Food Security under the Paris Climate Agreement

The agricultural sector is among the foremost priority for the post-Paris climate action in developing countries. The challenge is to increase the efficiency of agricultural production while ensuring the preservation and sustainable use of natural resources.

http://wfo-oma.com/news/quo-vadis-agriculture-and-food-security-under-the-paris-climate-agreement.html



New WFO Publications

Under the series "H2O", WFO has launched two new publications. The Nutrient Management Handbook is a guide that provides farmers and farmers' organizations with useful and straightforward information on the combination of fertilizers and their effects on plant growth, and offers the soils, including guidelines on efficient nutrient management techniques on how to manage nutrients. This is a joint effort by WFO, the International Fertilizer Association, IFA, and the Global Alliance on Climate Smart Agriculture, GACSA. The booklet on Farmers implementing the Paris Agreement on Climate Change contains a collection of case studies showing the contribution that WFO farmers are already making in tackling climate change by generating and using renewable energy in agriculture. Both publications are available at:

http://www.wfo-oma.com/climate-change/publications.html.

WFO event on the responsible use of FAO VGGT, 21-22 November 2016, Kampala, Uganda

WFO, in joint partnership with FAO and the Uganda National Farmers Federation, UNFFE, organized a two-day training workshop for the farmers, focusing on land tenure and the critical role of farmers and their organisations in the implementation of the FAO Voluntary Guidelines on Responsible Governance of Tenure of land, fisheries and forests in the context of national food security.

The VGGT were developed in the framework of the CFS and approved in 2012. The guidelines represent the most important policy product reached by consensus on land tenure. The workshop represented a successful partnership among FAO, WFO and UNFFE to empower farmers to advocate for their rights and needs. The major outcome of the training was the decision to organize a meeting between UNFFE members and the Uganda Minister of Land, with the support of FAO in Uganda, to further discuss solutions to the land tenure challenge.

FAO International Symposium on Nutrition searches ways to improve nutrition and food systems

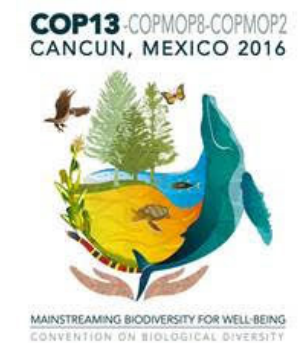
Rome, 2 December 2016

Responding to the mounting impacts of malnutrition on public health and economic development — estimated to cost $3.5 trillion per year — via a shift to healthier diets and food systems was the subject of a two-day high-level symposium held at FAO premises.

The International Symposium on Sustainable Food Systems for Healthy Diets and Improved Nutrition (1-2 December) analyzed at country-level challenges and successes to shed light on effective approaches to reshaping food production, processing, marketing and retail systems to better tackle the problem of malnutrition, which blights the lives of billions of individuals and can trap generations in a vicious cycle of poverty and malnutrition.

http://wfo-oma.com/news/fao-international-symposium-on-nutrition-searches-ways-to-improve-nutrition-and-food-systems.html

EVENTS



COP 13 - Thirteenth meeting of the Conference of the Parties to the Convention on Biological Diversity

4 - 17 December 2016, Cancun, Mexico

At the UN Biodiversity Conference in Cancun, Mexico, the world will meet to take the steps needed to build a future of life in harmony with nature. The conference provides a critical opportunity for countries to address strategic actions to enhance implementation of the Strategic Plan for Biodiversity 2011-2020 and promote the achievement of the Aichi Biodiversity targets. The Conference will focus on mainstreaming biodiversity across relevant sectors, especially agriculture, fisheries, forestry, and tourism, to contribute to the sustainable development goals, climate action, food security and other human development goals.

https://www.cbd.int/conferences/2016

Global Forum for Food and Agriculture (GFFA)

January, 19-21 2017, Berlin, Germany

The Global Forum for Food and Agriculture (GFFA) is an international conference that focuses on central questions concerning the future of the global agri-food industry. It gives representatives from the worlds of politics, business, science and civil society an opportunity to share ideas and enhance understanding on a selected topic of current agricultural policy.

http://www.gffa-berlin.de/en/

Step It Up Together with Rural Women to End Hunger and Poverty

16 December 2016, FAO headquarters, Rome, Italy

The Event focuses on the critical role and contribution of rural women in increasing food security and eradicating rural poverty through agricultural and rural development. Gender equality and the empowerment of rural women is inextricably linked to the strengthening of food systems to fight hunger and malnutrition, and to real gains for rural lives and livelihoods at large.

Rural women are a significant, vital and sizeable proportion of humankind. As farmers and farm workers, horticulturists and market sellers, businesswomen, entrepreneurs and community leaders, they make up over a quarter of the world's population. In developing countries especially, they represent approximately 43 percent of the agricultural labour force. Because they produce, process and prepare much of the food available, they are not only critical to agricultural value chains, they are primarily responsible for the food security of their families and their communities.

http://www.fao.org/about/meetings/rural-women-end-hunger/about-the-event/en/

Agricultural Resilience - World Bank, Washington DC

January 31- February 1st

The Agriculture sector and the global food system are highly vulnerable to a growing set of diverse risks. For centuries, rainfall variability, drought, floods, pest and disease outbreaks, have led to production shortfalls, and threatened global food security. Having come into focus during the recent food price spikes, risks from market volatility and uncertainty in the broader enabling environment continue to pose major risks. Now, with the advent of climate change and the intensifying globalization of agricultural commodity markets, the challenge of adequately and proactively managing agricultural risks and to strengthening the resilience of the food system are going to be more important than ever in ensuring food security and reaching multiple of the SGDs.

The objective is to share knowledge and lessons learned on various topical themes of agricultural resilience. This event will offer an overview of the latest thinking on resilience at a conceptual and applied level paired with accounts of on the ground country experience to inform a discussion on the future direction and priority actions of the food system resilience community.

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