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THE FUTURE OF AGRICULTURE IN A CHANGING CLIMATE

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EDITORIAL.....	02
FARMELLANEOUS.....	04
WORKING GROUP.....	10
BEST PRACTICES.....	12
FARMATORY.....	15
NEWS&EVENTS.....	21

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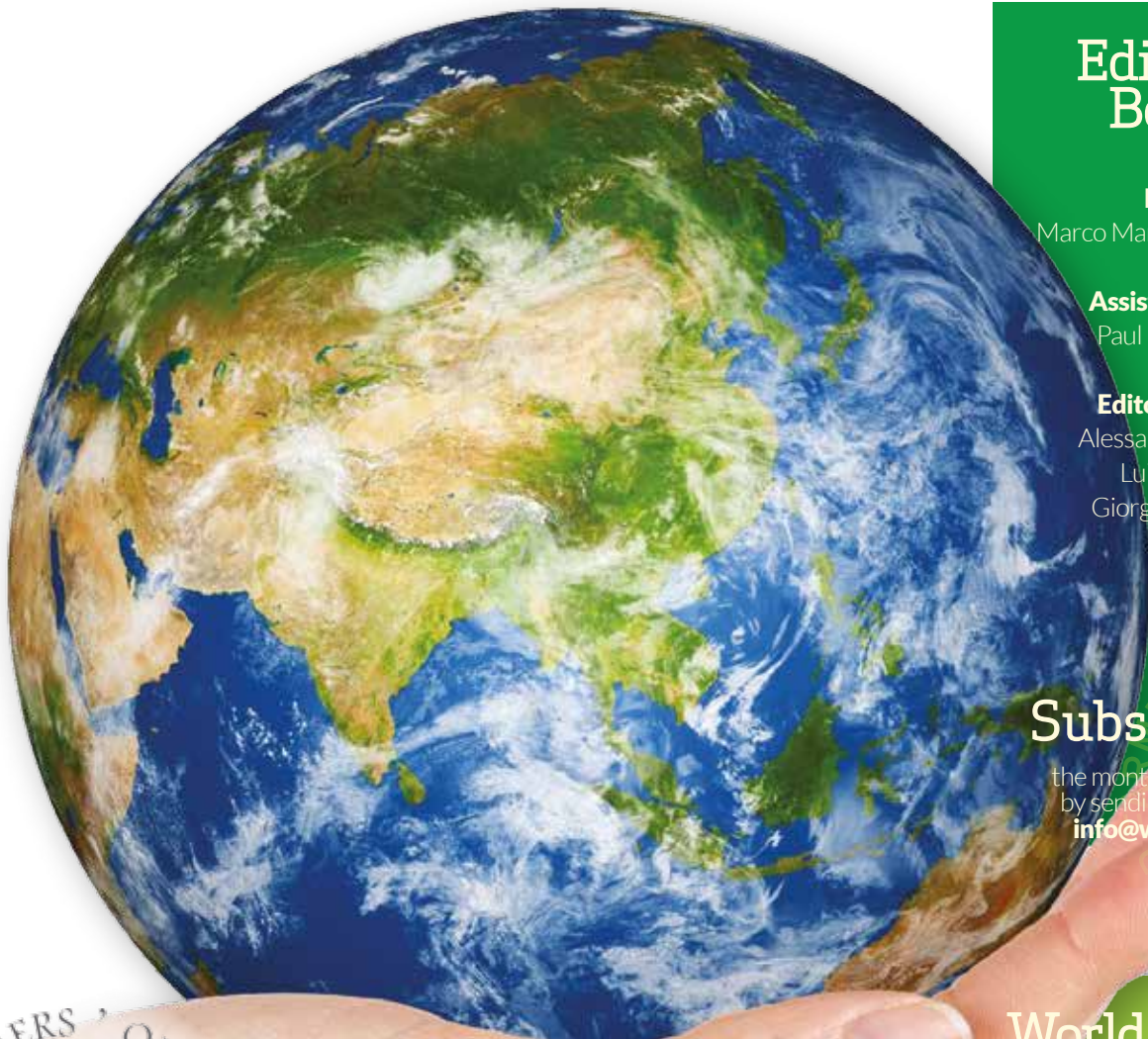
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THE OUTCOME OF COP21

Minister Timothy John Groser
NEW ZEALAND



As I put to pen paper on this editorial the ink on the Paris outcome is barely dry. I, along with other Ministers and Heads of State from the 196 Parties of the United Nations Framework Convention on Climate Change, have just now concluded two weeks of intense negotiations on a new climate agreement – The Paris Agreement. No doubt, it is already receiving a fair degree of scrutiny and comment.

Whatever else may be said about the Paris Agreement, our efforts have led to a better recognition of the role of agriculture, particularly in relation to food security and food production. There is also a post-Paris process on the technical issues relating to accounting for greenhouse gas which may also allow space for discussion on agricultural issues, or as I have preferred to describe them “biological emissions”. Parties now need to consider how they will take action on these emissions in a manner that supports food security.

This is a welcome change to the previous Kyoto Protocol. The Protocol was very much focused on CO₂ from energy and industrial processes, and treated agricultural emissions as just another set of emissions. For most Kyoto Protocol countries this did not matter because agricultural emissions were small relative to their emissions overall. These countries could absorb their emissions from agriculture (typically less than 10% of their total emissions) into an economy wide target, while in practice largely leaving the agricultural sector out of their domestic

policy response. The Kyoto framework has, however, been a challenge for New Zealand, where just on half of our emissions come from agriculture. This and the impact of the Kyoto Protocol framework shaped New Zealand’s thinking about what to do about agriculture in the new agreement.

One of the imperatives that underpinned the climate change negotiations that resulted in the Paris Agreement was that it need to have universal, or near to universal, participation. Without this it would simply not be durable or effective. By implication, it was obvious to me that that meant that negotiators had to find a realistic way of dealing with agricultural emission given that they are a big component of many (developing) country emissions profiles.

The other issue that shaped the negotiations was the politics of food production. In international politics, the preservation of peace and security trumps everything. After that, the most sensitive issue is food security, and the role of agriculture in that. It has always been clear to me that if we were to set up a choice between climate change and food security, there would never be any possibility of developing countries prioritising climate change, whatever the climate change models say.

The Paris Agreement now reflects this reality. It is framed by a recognition of the corresponding priority of safeguarding food security, and the vulnerabilities of food systems to the adverse impacts of climate change. The objective of low greenhouse gas development is to

be done in a way that does not threaten food security.

It would have been wrong to deal with biological emissions by excluding them from any agreement. It is too big a source of emissions to leave out of an effective agreement (some 10-12% of global emissions) and the science says that that it will be possible to meet an under 2 degree target by managing rather than capping biological emissions.

From my perspective the best recipe is to focus on improving the efficiency of production while at the same time investing in research and development for the solutions that we will need over the longer term.

There is a lot that can be done to improve the current productivity of global agriculture and, in the absence of viable technological solutions for mitigating agricultural emissions, this is the best way to manage emissions as well as providing for a growing global population and for continuing economic development. It is a win-win solution on all fronts. I am aware that there is a lot of work going on in this area through international organisations, NGOs, industry groups and farmers' organisations, including the WFO.

New Zealand is also contributing in this area. We have started running "farmer study tours" in association with the WFO, alternatively in New Zealand and offshore. The aim is to bring farmers from different countries together to exchange experiences, and for those farmers to interact with scientists and local government officials on ways to increase agricultural productivity and improve environmental outcomes. New Zealand has also been working to build agricultural capability in South-east Asia, Latin America and Africa.

While an emphasis on productivity will provide immediate wins, there is also a need for an increased emphasis on research and technology to reduce emissions without affecting productivity. In 2009, in the margins of the Copenhagen climate change conference, New Zealand initiated the Global Research Alliance on Agricultural Greenhouse Gases (GRA) to provide a framework for international scientific collaboration on developing ways to grow more food without growing greenhouse gas emissions. The GRA has been a huge success, promoting collective action on the part of, now, 46 member countries in a coherent and structured way through focused Research Groups. It has also provided a vehicle to increase investment into research to reduce greenhouse gases in livestock, paddy rice and cropping systems, and to increase the stock of soil carbon.

I am pleased to say that through the work of the GRA we have achieved significant outcomes on fundamental research as to how to reduce agricultural

greenhouse gases. There has also been a lot of work done on capacity building and increased scientific and technical capability – including through the publication of a guide for farming leaders on current best practice and emerging options for addressing greenhouse gases from livestock systems.

Given the progress that has been made, New Zealand has recently announced we will invest another \$NZ20 million in the GRA in order to build on the promising research results already identified. The sooner we have viable technologies, the sooner we can make progress where it matters – on the farm.

If farmers are essential to productivity improvements then they are also important for taking the technologies that are just on the other side of the horizon and utilising them on farm. There will always be the early adopters – the farmers who seize on opportunities to improve what they do and, more importantly, see the opportunity to increase their profits. But there are a vast number of farmers who may not be immediately attracted to new technology. To address this the GRA has started working with partner organisations who have experience and expertise in improving farm productivity through extension services to ensure that knowledge about best practice and emerging options are disseminated as widely and as quickly as possible.

The Paris Agreement has change the parameters in which the agriculture sector – farmers, industry, policy-makers – should respond to climate change. The emphasis on absolute reductions and sector neutrality that was prevalent in the Kyoto Protocol has gone. The new Agreement allows for the possibility that agricultural emissions are responsibly managed without jeopardising food security and social and cultural priorities.

If food production is to become as efficient as it can be then we need to incentivise behaviour change sooner rather than later. I am hopeful, that with the new Agreement in place, we now have the framework that will encourage countries to adopt efficiency targets for agriculture. Such targets would provide a way of measuring and demonstrating progress towards more sustainable and efficient agricultural production that feeds the world, adapts to the effects of climate change but does not contribute to climate change.

AGRICULTURE FACING CLIMATE CHANGE

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Agriculture is a part of everyone's day; providing nutrition and cultural expression 365 days per year, or at least it should - to every person in every corner of the World. It provides one of life's most essential basic needs: Food.

Agriculture is also a source of green bio-energy and fiber such as cotton, hemp, wool, leather, and fur. Best management practices enable a sustainable environment including clean air and water, carbon sequestration, and habitat for wildlife. Caring properly for the land builds healthy soil capacity to produce abundant crops year after year.

Agriculture also provides economic stability for millions of farm families, and for input suppliers such as seed, fertilizer, machinery, and transportation companies. It provides employment for farm laborers, for government departments, veterinarians, crop specialists and many more including processors, grocery stores, and restaurants. It also encompasses a growing, and hugely successful global greenhouse industry which produces a large variety of food, flowers, and many more plants vital to the agriculture sector.

There are many different farm sizes, from the very large to very small, and there are differing views on production methods such as conventional, utilizing genetic en-

gineering, organic, ecological, and those that include religious rites. Some farmers use a combination of several methods and some are strict adherents to a particular process for producing food and other products. They are all part of the agri-food global community.

All of this adds up to the indisputable fact that agriculture is a key economic driver in many countries, but more importantly, this sector is critical to maintaining life. It's our source of food and energy, environmental and economic sustainability, and it's completely dependent on an adequate amount of topsoil, water, warmth and photosynthesis from sunshine - all in the right amount, at the right time.

Agriculture's productivity is dependent on predictable climate conditions that enable timely planting, growth and harvest.

Predicting the future of agriculture in a changing climate is a difficult exercise that many organizations, scientists and other experts are attempting to achieve with a high degree of accuracy to help to identify what action will be needed to enhance and maintain food security in the coming years.

If countries can achieve the global goal of reducing the release of greenhouse gases through mitigation, we may be able to stabilize and reduce the growing impact of more severe weather events. The mitigation will be achieved by massive adaptation of best practices, of changing public policies, and figuring out how to work together with other sectors to achieve this goal.

A recent United Nations conference (COP21) on climate change brought countries and industries together from around the World in Paris, France, to reach an agreement to curb global warming.

The negotiated agreement should be announced by Dec 12, 2015 and is expected to take effect in 2020.

Agriculture was represented by a number of organizations, one of which was the North American Climate Smart Agriculture Alliance. They issued a statement from Paris (http://www.sfldialogue.net/files/NACSAA_cop21_statement.pdf) which elaborated on their focus of the integration of production, conservation, and sustainability. They are working to ensure the needs of the growing population are met; to ensure tools are provided to build production resiliency and to allow growers to adapt, and to reduce GHG by methane capture, soil carbon sequestration and biofuels that burn more cleanly than fossil fuels. They stressed the role that agriculture plays as a solution to climate change.

So what can agriculture do to help mitigate and adapt to this changing climate situation? We can work to ensure that research continues and expands to enable the discovery of new technologies and methods of adaptation to help deal with the increasing frequency and severity of droughts, floods, intense storms, invasive insects, new and increasing diseases, etc. We need to broadly adapt more sustainable methods of irrigation and practical ways to save water to use when needed and create infrastructure to channel flood waters into less damaging routes.

Farmers are resourceful and innovative and adapt to technologies that conserve and protect their farms. They have already begun to reduce their GHG emissions by adapting zero or conservation tillage, using cover crops, enhancing the health of the soil by returning biomass to maintain the ecology of the soil, and by monitoring soil health through testing for different components and adding back to the soil where and when needed. These are a few examples of applying best management practices. Conservation practices also include close monitoring of water use by livestock, as this not only can conserve and keep water clean, but it's

also used as an indication of herd health. In Canada, we have used a tool for over 20 years that we call the Environmental Farm Plan. This is undergoing a revision to become an even better tool to help farmers adapt to these new challenges. Farmers are correcting small drips and leaks, updating equipment, capturing water from rain runoff of roofs all in an effort to conserve. Ponds are dug to have a reserve if it's needed.

We are lobbying for updated building codes that will help withstand more extreme weather. Farm organizations work to convince governments that we need assistance for infrastructure projects and to build capacity in comprehensive programs to help aid and prepare the agriculture sector to reduce the effects of climate extremes.

We need research into these factors, including drought resistant crops. There are many areas that we can try to make a positive difference on our farms but mitigating GHG to avoid ever increasing tornados or massively stronger hurricanes will take an effort possibly never attempted before, but the alternative is not an option.

A balanced approach by all sectors of our economies is needed to combat this threat. Our governments must work with farmers to find so-

lutions. Education and technology transfer is critical to our success. Long term national strategies to work together to identify and fund priority issues such as better weather forecasting, warning systems, enhanced crop insurance, and recognition and support for the environmental goods and services that farmers provide would also be beneficial in their capacity to adapt to the climate challenges.

In many parts of the World it's women who till the soil, plant the seeds or tend the livestock to feed their families and sell what they can in local markets to provide food for their families and stability to their communities.

If they were empowered with education in agricultural business and production methods, food safety, best management practices, etc., their economies would grow, health would improve and their standard of living would rise. They too, need the same tools for mitigation and adaptation that the rest of the world farmers need to deal with climate change.

Agriculture has solutions. It could even provide offsets in a Cap and Trade system designed to effectively encourage GHG reductions, but we can't do it alone. Governments and society must be part of the team.



THE FUTURE OF AGRICULTURE IN A CHANGING CLIMATE

Aggrey Mahanjana
SECRETARY-GENERAL, AFASA

Mawethu Sonkosi

Data from the centre for Research on the Epidemiology of Disaster (2011) show that drought is a major disaster in the world in terms of the number of people affected and total economic loss, whilst floods top the chart in terms of number of mortalities.

People living in rural areas and resource-poor farmers are often cited as more vulnerable to the impact of drought (Akpalu 2005:58; Austin, 2008; Pelser et al. 2005:20; Benson & Clay 1994:35, 1998), and according to Austin (2008) their suffering and vulnerability are often exacerbated by lack of progress in effective drought management. Many scholars attribute this lack to the complexity and multitude of drought definitions (Wilhite & Knutson n.d.; World Meteorological Organisation n.d.; Goodrich & Ellis 2006).

About 60% of sub-Saharan Africa (SSA) is said to be vulnerable to drought, with 30% of it being estimated as highly

vulnerable (International Fund for Agricultural Development 1994, cited in Benson & Clay 1998). It is estimated that about 65% of the world receives less than 500mm of rain per year (Van Zyl, McKenzie & Kirsten 1996:250; Wilhite 1993a; Backeberg & Viljoen n.d.), implying that most of the farming in the world takes place under arid and semi-arid conditions (Wilhite 1993b). Despite this status quo, a greater concern for the farming community is the projected broad reduction of about 5% - 10% in the annual rainfall in the summer rainfall region (Department of Environmental Affairs and Tourism 2004:2).

Drought results in a complex web of impacts that affects many sectors of the economy and reaches well beyond the area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services. Impacts are commonly referred to as direct or indirect. Increased fire hazard; reduced water levels and increased livestock mortality rates are a few examples of direct impacts. The consequences of these impacts may result in indirect impact such as reduced income for farmers and agribusiness, increased prices for food, unemployment, reduced tax revenues because of reduced expenditures, increased crime, foreclosures on bank loans to farmers and businesses, migration, and disaster relief programmes (National Drought Mitigation Centre 2006).

The government policies have changed significantly over the past years. Drought is recognized as normal phenomenon in the agricultural sector and it will be accommodated as such in farming and agricultural financing systems. In the past drought aid schemes often focused on the disruptive effects of droughts and not on the causes of those effects. Farmers were assisted by governments without being required or at least encouraged to shift to less vulnerable production systems.

In African, a billion people experience either chronic or transitory hunger yearly. Under-nutrition contributes to the deaths of 2.6 million children an-



nually, and one in six children living in developing countries is chronically undernourished. These hard facts compel action to fight these unacceptable levels of food and nutrition insecurity. The opportunity exists to empower small-scale producers with the tools and resources necessary to adopt more productive, sustainable and resilient agricultural practices.

Responding to these challenges, the African Union's New Partnership for Africa's Development (NEPAD), is spearheading an agriculture and climate change programme, known as "25 by 25". Working with the Comprehensive Africa Agriculture Development Programme (CAADP), NEPAD has set a goal of supporting at least 25 million farm families to adopt and practice Climate Smart Agriculture (CSA) by the year 2025. The launch of the Africa CSA Alliance in Malabo at the AU Summit is one component of the programme. Central to the goals of the Africa CSA alliance is the explicit focus of all members on improving the lives and livelihoods of smallholder farmers, along with greater equity and sustainability of agricultural systems. It must also be noted that member countries will promote action towards the achievement of the CSA "triple win", which are:

- Sustainable and equitable increases in agricultural productivity and incomes
- Greater resilience of food systems and farming livelihoods
- Reduction, and/or removal of greenhouse gas emissions associated with agriculture, where possible.

The sharp focus on smallholder farmers in Africa will allow the Africa CSA Alliance to define CSA specifically for the African context, with emphasis on the first two goals of the triple win, which are:

- Sustainable and equitable increases in agricultural productivity and incomes
- Greater resilience of food systems and farming livelihoods
- Climate services for farmers
- Involve farmers in the co-design, co-production and co-evaluation of climate services

- Establish partnerships that bridge the gap between climate, agricultural research and farmers
- Exploit scalable communication channels to reach the smallholder farmers in the remotest parts of the country
- Continuously assess to improve quality of service
- Proactively engage, and target the needs of the most vulnerable and marginalised, particularly women, from the onset.

The climate change problem has now become a sad reality and is hitting the smallholder farmers harder. In South Africa, frequent droughts, floods and sometimes a combination of drought and floods in one season have become a huge problem. Farmers, especially smallholder farmers spend a lot of

money every season planting but with no guarantee that they will harvest something. This calls for joint efforts through public-private partnerships to capacitate smallholder farmers to adopt new ways of farming that minimise the impact of climate change on their agricultural production systems. Climate smart agriculture can be one way of dealing with climate change challenges, but the practices must be adapted at local levels.

In other words, not every climate smart agriculture practice will be adaptable to all areas. Farmers must also take initiative to use their experiences, locally available information and resources and support mechanisms from the state and NGOs to improve their capacity to produce food for themselves and for the markets.



THE DEVASTATION CAUSED BY DROUGHT IN SOUTH AFRICA DUE TO CLIMATE CHANGE.

CONCLUSION

DROUGHT PREPAREDNESS IS VERY IMPORTANT IN THE WORLD, FARMERS ARE ADVISED TO GROW DROUGHT RESISTANT OR EARLY MATURING CROPS, REDUCE AND CULL THEIR LIVESTOCK.

GOVERNMENTS HAVE BEEN PROVIDING A NEW SERVICE, ADVISING FARMERS ON CLIMATE CONDITIONS AND PRACTICES TO FOLLOW BASED ON THE CLIMATE OUTLOOK.

IT IS NO LONGER POSSIBLE TO LOOK AT THE CHALLENGES SMALLHOLDER FARMERS FACE SEPARATELY FROM CLIMATE CHANGE AND ITS CONSEQUENCES FOR THE PRODUCTIVITY, RESILIENCE AND ULTIMATE SUSTAINABILITY OF AGRICULTURAL SYSTEMS.

EFFECTS OF CLIMATE CHANGE: CASE STUDY "TUSCANY"

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In the last decade there has been a real change in climate in Italy concerning the data collected by the regional weather stations, such as the consortium LAMMA Tuscany, which highlights the demise of the transitional seasons.

In agriculture, this switch is constantly monitored by recording the temperature and millimeters of water fell on the ground, both in absolute terms and in terms of daily and monthly trend, and days -light, parameter which greatly influences photosynthesis.

And 'the agricultural sector is talking about NEW CLIMATE: The year is divided into two seasons equally distributed and generally more humid, characterized by waves of cold-hot inconstant and often of a month (the month of December alone in Tuscany sees an average increase of 3 degrees Celsius from 2010 to 2015, with a sharp reduction in rainfall), associated with heavy rainfall concentrated (commonly called "water bombs").

These changes forced the agricultural sector to commemorate the same philosophy on which agriculture is based: human adaptability to the cycles of the earth and the results that this can offer.

The quality of some crops, in fact, was positively affected by some climate parameters: the average higher temperatures have led to obtain a wine with alcohol content higher than in past decades, making acceleration of harvest and avoiding the use of sophistication such as 'Adding sugar to increase the rate of alcoholic fermentation. The displacement of the micro-climatic zones opens to the cultivation of new

crops, such as bananas in Sicily or quinoa. Other plants, such as beans, suffer from these rapid changes in climate and it is attempted cultivation today were not considered, such as Germany.

Once again the key, in physiology as in agriculture, is adaptability: the sector which is affected the most is that of conventional monoculture, with chemical fertilizers synthesis ways to enhance the growth of the plant. The plant, in fact, has to cope with stress related to the fertilization and growth enhanced (excessive availability of nitrogen), both the thermal effect: its resilience is very much reduced. To this it can be associated with the low genetic variability that can be found in some varieties of wheat and GMO monocultures, which reduce the adaptive capacity both climate and animal species parasitic cycles boosted by new microclimate. The risks are the actual total loss of the crop on the one hand (as it is the cultivation of cotton "BT cotton" Monsanto in India) and the need to increase the area of cultivated land on the other, to maintain a high rate of production.

A good adaptive response in an organism, requires the necessary substrates such as vitamins, minerals and hormonal messengers. Similarly, a good adaptive response of crops requires an agriculture based on the quality of the soil that focuses on the enhancement and recovery of the organic substance. Examples include organic farming and, in part, the integrated farming: the principles of Ecology Applied biodiversity present in the humus and the plot of land sustain life and the contribution of micro-nutrition crops and are the first line defense in all extreme situations. A richer land has a lower charge of pathogens; such as in the case of caries of wheat (*Tilletia* sp.). With this some Italian companies are using the specifications based on quality indicators developed in applied ecology, such as IBS-bf and QBS-ar (developed by prof. Parisi in 2001 at the Università di Parma), to assess the biological quality of the soil.

The following elements are then necessary: green manure crops, reduction of reinforcement of the surface layer



of the soil, crop rotation, use of seeds with good base of genetic biodiversity.

In the reality of Tuscany, for example, the cultivation of grains clothes size high (einkorn wheat, *Triticum dicocum*, etc.) allowed to cope with a highly rainy period (2012-2013) to an average of alternating warm without ice (2014-2015), maintaining the average productivity more constant than that of the grains in size modern dwarf.

In the last 10 years, in general, the productivity curve of modern wheat shows a downward trend compared to that of the biological, where there is a more consistent trend, with individual increases.

A second possible strategy, is imposed as a result of violent weather patterns and localized is a prohibition of a crop on a single surface: this has saved in 2014 part of the tomato crop in Tuscany, subject at that time to local and

violent hailstorms. Indirectly, this choice also promotes biodiversity.

In this context, we can understand the difficulties of conventional farms to make choices of monocultures that required in the years to invest in machines specially created for the collection processes, especially in the phase of mechanization.

Finally, two points which all types of agriculture are facing should be added:

- 1) Climate change willlead to preservation problems. While the highest rate of moisture leads to the development of pests and damages immediately legume and cereal. Here the problem comes later with the "flickering" and the development of aflatoxins: the normal process of storage products It will be revised, and will require increased attention in large consortia, generally without drying.

- 2) It is no longer possible to plan continuously sowing time and harvest: soil preparation, sowing, harvesting and post-harvest are facing changes unpredictable setting with shifts and use of machines suitable for plots of land divided .

In conclusion this change of microclimate, such as what occurred in Tuscany, returns focus to the seed, on the ground, on turns of preparation of the soil, sowing and harvesting. The basis of agriculture is the land as the creator of life, a biotype that does not provide selection pressure and impoverishment both genetic and epigenetic rules that protect against drought, from excessive runoff and damage from pests, like yesterday and today appears obvious.

With the contribution of Franco Bordoni, owner of the organic farm PoderePereto, Rapolano Terme (SI).



ORGANIC FARMING, GREAT PRODUCTIVITY

Beatrice Salvemini

O

rganic farming is much more productive than we think: crops without pesticides, on average, 19.2% lower than traditional crops, a minor difference of previous estimates.

This is estimated by a research of the University of California Berkeley, which has put together the results of 115 studies on the subject. And this gap may even be even lower; said the researchers, in fact, previous studies were often biased in favor of traditional agriculture. This difference between organic and conventional agriculture may also dwindle even more by using some techniques: for scholars, growing multiple (ie more crops simultaneously on the same land) is able to reduce the gap to 9%, while crop rotation 8%.

The researchers then showed that the gap between organic and conventional varies depending on the crop: there are significant differences, for example, in the cultivation of legumes, such as beans, peas and lentils.

“Our study - said Lauren Ponisio, one of the authors of the research - said that through appropriate investment “; “the difference in crops could be reduced or even eliminated in some crops and regions,” as stressed by Lauren Ponisio. The research, published in Proceedings of the Royal Society B, contrasts the widespread idea that organic farming, while offering a more environmentally sustainable than the traditional one, cannot produce enough food to feed the world. “Increase the proportion of agriculture using sustainable methods and organic is not a choice but a necessity”, said Claire Kremen, a professor at Berkeley and one of the authors of the research. “We cannot continue to produce food in the future without taking care of our soils, water and biodiversity.”

To this appeal of Professor Kremen consumers seem to respond in practice: the number of those who buy organic food is growing. And if in Europe in the last 10 years the demand for organic products has quadrupled in the Italian race to organic in 2014 reached a double digit increase in the first six months of the year the consumption of organic food increased by 17%, despite the crisis and the higher cost compared to traditional products.



DIVERSIFICATION PRACTICES REDUCE ORGANIC TO CONVENTIONAL YIELD GAP

**Lauren C. Ponisio,
Leithen K. M'Gonigle,
Kevi C. Mace,
Jenny Palomino,
Perry de Valpine,
Claire Kremen**

Agriculture today places great strains on biodiversity, soils, water and the atmosphere, and these strains will be exacerbated if current trends in population growth,

meat and energy consumption, and food waste continue. Thus, farming systems that are both highly productive and minimize environmental harms are critically needed.

How organic agriculture may contribute to world food production has been subject to vigorous debate over the past decade. Here, we revisit this topic comparing organic and conventional yields with a new meta-dataset three times larger than previously used (115 studies containing more than 1000 observations) and a new hierarchical

analytical framework that can better account for the heterogeneity and structure in the data. We find organic yields are only 19.2% ($\pm 3.7\%$) lower than conventional yields, a smaller yield gap than previous estimates.

More importantly, we find entirely different effects of crop types and management practices on the yield gap compared with previous studies.

For example, we found no significant differences in yields for leguminous versus non-leguminous crops, perennials versus annuals or developed versus developing countries. Instead, we found the novel result that two agricultural diversification practices, multi-cropping and crop rotations, substantially reduce the yield gap (to $9 \pm 4\%$ and $8 \pm 5\%$, respectively) when the methods were applied in only organic systems.

These promising results, based on robust analysis of a larger meta-dataset, suggest that appropriate investment in agroecological research to improve organic management systems could greatly reduce or eliminate the yield gap for some crops or regions.





WITH GRIEF STRICKEN FACES, THE WOMEN TAKE TO THE STAGE TO POTRAY THE SORROWS BROUGHT BY CLIMATE CHANGE

WOMEN FOOD CLIMATE CAMPAIGN AND LAUNCH OF RURAL WOMEN'S ASSEMBLY MALAWI CHAPTER: paving a future for agriculture in a changing climate

Tamara Chabvuta
NASFAM

It is Monday, October 12th and a group of 21 women farmers and youth begin their hike up Mulanje Mountain in the southern region of Malawi.

They are destined to reach the peak of the Mountain which is 3002m above sea level. What lays ahead, they are not sure. Knowing the rumours of the difficulties of going up Mount Mulanje, they are prepared to beat the odds and become conquerors on this journey that will take them 3 days.

In the northern part of Malawi, a caravan of women farmers from the northern region begins its descent towards the southern region of Malawi, to meet with the 21 who have been brave to go up the mountain. On their way, they will join with other women farmers from the central, east and southern regions of Malawi. These are a caucus of activities which were part of the Women Food and Climate Campaign launched in Malawi between 12th to 15th October this year through which the Rural Women's Assembly Malawi Chapter was launched on October 15th at Likhubula Forest Grounds.

The Women Food Climate campaign is an Africa-wide campaign engaging organisations from across the continent in demanding action for women farmers in the midst of climate change.

It targets the issue of climate change affecting women farmers' ability to get enough to eat in their households and it focuses on strengthening women food producers and achieving resilience to the effects of climate change in their communities.

"The overall aim of the campaign is that "African governments and the world must finance and invest in flexible and long-term funding mechanisms for climate resilience that promotes the rights of small scale women producers and vulnerable communities to address food security by 2020," reads a brief introduction of the campaign.

In Malawi, the campaign is being championed by Coalition of Women Farmers, NASFAM, Oxfam in Malawi, Cisonoc, Cisanet, Actionaid and Gender Coalition network.

Alice Kachere, a serving member of WFO Womens' committee, a former Nasfam National Board Chairperson and a woman farmer activist took a lead in the campaign as a brand ambassador. She was among the 21 who went up Mulanje Mountain demanding for climate financing for women farmers.

"The main reason we went up the mountain was to demonstrate the hardships that we are facing as women farmers because of climate change. We wanted to tell the nation and world leaders that the hardships we face as a result of climate change are as big as the hardships of going up Mulanje Mountain," explained Kachere upon arrival at Likhubula Forest grounds after the group's descent on the mountain.

By the time the group of the 21 came down from the mountain and arrived at Likhubula Forest grounds, 500 women farmers had completed their journey making their way to Mulanje through the caravan from the north, central, east and southern regions of Malawi.

The Minister of Gender, Children and Social Welfare, Honourable Patricia Kaliati graced the occasion as Guest of Honour and she reiterated on the brevity of all the women who took part in launching the campaign in Malawi.



A GROUP OF WOMEN WHO WERE PART OF THE CARAVAN CONDUCT AN AWARENESS WALK IN BLANTYRE BEFORE THE FINAL LAP TO MULANJE



THE GROUP OF 21 UPON REACHING THE PEAK OF MOUNT MULANJE

March, 2015, was the kick off for the campaign which will continue to run over a ten-month period.

Key moments took place on World Food Day in October and at the CoP Climate Negotiations in Paris in December, 2015 with the final key activities planned to take place by International Women's Day in March 2016.

In Malawi, citizens are asked to join in the campaign by signing the petition by sending a short message service (SMS) with the words "CLIMATE" to a specified number in Malawi or signing the petition online at:

www.womenfoodclimate.org

"I am touched by the commitment and zeal shown by all of you to demand for better financing to aid women farmers like you adapt to the effects of climate change. I have heard your cry, and I will do my part to make sure our government plays its part in financing for women farmers," explained Honorable Kaliati after receiving a petition demanding for climate finance from the women. During this time, some of the women had taken to the stage, mourning with grief stricken faces portraying the hardships they face as women in the midst of climate change.

The campaign also provided an opportunity for the Rural Women's Assembly Malawi Chapter to be launched, following the need for a forum where women farmers in Malawi can voice their concerns way beyond the campaign.

"With this campaign in the lead, it is important that all of us as farmers have a common forum where we can address the challenges we face and play a part in demanding for solutions to them. It is for this reason that today we are also launching the Rural Women's Assembly Malawi Chapter. This is an assembly where we all as women can get together collectively from the various affiliations we come from, unite and stand firm for our rights as women. On this note, let me ask all of you, to stand up and raise your Rural Women's Assembly flag," said Kachere the brand ambassador, setting the launch of the Assembly.

The Rural Women's Assembly is a coalition of rural women in southern Africa. Malawi is one of the countries where the assembly will be in operation specifically focusing on women farmers.

It is a self-organised network or alliance of national rural women's movements, assemblies, grassroots organisations and chapters of mixed peasant unions, federations and movements across eight countries in the SADC region.

In Malawi, it is believed that with the launch of the Assembly, a roadmap has been paved in completing rolling out the Women Food Climate campaign.



ALICE ADDRESSING THE AUDIENCE AFTER THE HIKE



HON KALIATI (LEFT) RECEIVES A PETITION FROM A REPRESENTATIVE OF THE WOMEN

THE FUTURE OF AGRICULTURE IN A CHANGING CLIMATE AND THE ROLE OF YOUTH

Virginia Cravero

ITALIAN YPARD REPRESENTATIVE

Agriculture is considered to be one of the most exposed sectors. The Declaration of the World Summit on Food from November 2009 stated:

“Climate change poses additional severe risks to food security and the agriculture sector. Its expected impact is particularly fraught with danger for smallholder farmers in developing countries, notably the Least Developed Countries (LDCs), and for already vulnerable populations.” (WFC, 2015)

According to the research of Zabel et al. (2014), a decline in the overall quality of farmland worldwide will occur. The author of the paper, Dr Florian Zabel also added that the result of the study suggests that “globally, there will be more area suitable for agriculture by the end of the century, while at the same time the average global suitability is worsening. This means that we will have fewer ‘highly suitable’ sites but more ‘marginally’ and ‘moderately suitable’ sites” (Zabel, et al., 2014)

Therefore, changing climatic conditions are projected to affect food security both at the local and global level. For example, the predictability in rainy season patterns will be reduced, while the frequency and intensity of severe weather events such as floods, cyclones and hurricanes will increase; other predicted effects will include prolonged drought in some regions; and water shortages; and changes in the location and incidence of pest and

disease outbreaks. Growing demand for biofuels from crops can place additional pressure on the natural resource base (Glantz, et al., 2009).

Indeed, climate change is already affecting all four dimensions of food security: food availability, food accessibility, food utilization and food systems stability. The impacts are both short-term, through more extreme weather events, and long-term through changing temperatures and precipitation patterns. Rural communities and livelihoods face immediate risk of increased crop failure, loss of livestock, and reduced availability of marine, aquaculture and forest products and new patterns of pests and diseases outbreak. People living in fragile ecosystems such as coasts, floodplains, mountain areas and semi-arid landscapes are most at risk (Glantz, et al., 2009).

For that, the existing “best practices” to cope with future characteristics of climate change should be viewed as providing a source of tactical short-term response to a changing environment as opposed to untested strategic long-term responses. Agriculture, forestry and land use can contribute to climate change mitigation through reducing greenhouse gas emissions and carbon sequestration. However, true progress will require comprehensive approaches, close cooperation, synergy and coordination among the policy planners, institutions and local communities (Glantz, et al., 2009).

Climate change adaptation strategies thus are now a matter of urgency. Many potential adaptation options in agriculture have mitigation synergies, and similarly, several mitigation options for climate change could generate significant benefits for both food security and adaptation: Research suggests that some crops will do well in a somewhat warmer atmosphere, while others will not. Some locations are expected to do better in term of crop yields in a warmer climate, while others will do worse. There are still many unknown factors when it comes to speculation about crop production and crop yields under a warmer climate regime (Glantz, et al., 2009).

There is a great deal of interest in – and perhaps reliance on – the concept of

“best practices,” which can provide a useful starting point for brainstorming to develop new climate change related-strategies. “It is essential to address the fundamental question of how to increase the resilience of present food production systems to challenges posed by climate change.” (Glantz , et al., 2009)

In order to put agriculture, forestry, fisheries and food security on the international climate change agenda, the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the Consultative Group on International Agricultural Research (CGIAR), the International Fund for Agricultural Development (IFAD) and the World Food Programme (WFP), organized a High-Level Conference on “World Food Security: The Challenges of Climate Change and Bioenergy” held at FAO Headquarters in Rome, Italy (June 2008) (Glantz , et al., 2009).

On climate change, the conference urged governments to assign appropriate priority to the agriculture, forestry and fisheries sectors, in order to create opportunities for the world’s smallholder farmers and fishers, including indigenous people, in particular vulnerable areas, to participate in, and benefit from financial mechanisms and investment flows to support climate change adaptation, mitigation and technology development, transfer and dissemination (Glantz , et al., 2009). New policy driven options are required to address the emerging challenges of attaining improved food security. How then can we get policy makers to take recommendations and lessons more seriously? How can we get them to realize that not following up on the lessons can have costly consequences? The vicious cycle is one of “disaster---lessons & recommendations--- disaster---same lessons, ad infinitum. The recommendations and lessons remain but the political leaders change. Many of the same lessons appear decade after decade (Glantz , et al., 2009).

Youth and future agriculture

The engagement of rural youth today determines how much food we will produce in the future. Their actions will also define how food production impacts the environment. Last month at the Global Landscapes Forum more than 200

young people and their supporters came together to deliver a strong message to the COP19 negotiators, urging them to address land uses in a coherent way – putting youth at the center. The Global Landscapes Forum (GLF) itself was designed to inform the global climate and development frameworks –specifically the UN Framework Convention on Climate Change (UNFCCC) and the UN General Assembly (UNGA) – about the opportunities of a “landscape approach” to development (CGIAR Consortium Youth, 2013).

GLF articulated 13 actionable policy recommendations and incentives – one of which was the recommendation to “Incorporate the voices of rural youth in decision making”. Sithembile Ndema (FANRPAN), moderator of the session Youth: The Future of Sustainable Landscape delivered two key recommendations, which fed into the final outcome statement:

“In developing sustainable solutions to tackle climate change issues, the UNFCCC must engage with and listen to the voice of youth in the landscape sector who contribute much needed innovative ideas and energy.

Capacity development of youth movements within these processes is critical for them to contribute to their future.

The landscapes approach requires a new breed of young professionals: those who are able to work across different sectors to achieve sustainable development goals and those who can take advantage of opportunities at different stages of the value chain, resulting in improved food security and better remuneration for young people in harmony with the environment.”

In the words of the participants, here are some of the key messages from the youth session:

“What happens in climate change meetings is just a talk shop; what matters is when this is brought back to rural people. Whatever happens at global events, what matters is what you bring back to the people.” – Tan Copsey, UK

“Youth must be empowered. There are no barriers to action, no excuses. Groups must be organized and supported through membership. YOUTH: Organize yourself, be inspired, persevere!”— Izzy Lawrence, UK (CGIAR Consortium Youth, 2013).

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YOUR
CHOICE

THE
STADIUM
GROUP

OUR

STOP

WORKING GROUPS

WFO established 5 working groups,
each one dealing with very important issues to WFO mandate:

CLIMATE CHANGE
FOOD SECURITY
LIVESTOCK
VALUE CHAIN
WOMEN

This section of the WFO F@rmletter is entirely dedicated to the working groups so that each facilitators can share all the activities carried out in order to fulfill the working group's missions.

This month, the activities carried out by the
LIVESTOCK
are presented.

LIVESTOCK IS A KEY TO HUMAN DEVELOPMENT

Koen Mintiens

FACILITATOR TO THE LIVESTOCK
WORKING GROUP OF WORLD FARMERS'
ORGANISATION

Livestock farming is almost as old as human civilization. It provides nutrients with a near-perfect biological value.

According to the World Organisation for Animal Health, the world demand for animal protein (milk, eggs, meat) is expected to rise by 50% by 2020. This growing demand will come from hundreds of millions of poor households in emerging countries joining the middle classes. Livestock farming is of vital importance for addressing the need for more animal proteins of increasing quality and has a central role in the subsistence and development of rural communities.

The World Farmers' Organisation has installed the Livestock Working Group at the beginning of 2015 to provide political recommendation and propose substantive materials in line with WFO policy on livestock farming. Working Group members participate in national

and international fora and organisations, such as the International Meat Secretariat and the World Organisation for Animal Health (OIE). The Working Group has a strong focus on animal health and welfare as central pillars of successful livestock farming. Technologically advanced and efficient health systems are needed to diagnose and prevent infectious diseases.

The Livestock Working Group will give special attention to the growing concern of resistance to antimicrobial drugs. The threat for resistance is considered as a global issue for humans, animals and the environment. Therefore the Livestock Working Group has include antimicrobial use and resistance in livestock as a case-study in its action plan for 2015-16. In November an informal meeting took place between WFO and representatives of the FAO Division for Animal Production and Health. Both parties have a mutual interest in prudent use of antibiotics and collaboration between both organisations is considered as an asset in addressing the issue. Clear collaborative actions on prudent use of antibiotics will be identified.

The final aim of the case-study on antimicrobial resistance is to add a chapter on antimicrobial use to the WFO policy document 'A fair and balanced functioning food chain' and to deliver international guidelines on prudent use of antibiotics that are supported by the farmers.

WFO LIVESTOCK WORKING GROUP REGIONAL REPRESENTATIVES

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Facilitator

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COP21: PARIS CLIMATE DEAL IS 'BEST CHANCE TO SAVE PLANET'

The climate deal reached in Paris is “the best chance we have to save the one planet we have”, US President Barack Obama has said. He said it could be a “turning point” towards a low-carbon future.

<http://bbc.in/1P06J5V>

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COP21 TALKS: CLIMATE DEAL AGREED BY 195 STATES

A “historic” deal to tackle climate change has been agreed by 195 countries at United Nations talks in Paris. The international agreement was adopted more than 24 hours after the official end of the fortnight-long conference in the French capital, following days and nights of shuttle diplomacy and wrangling between countries. The decision was greeted with huge cheers, tears and hugging and a standing ovation in the hall, as well as cheers, clapping and shouts in the media room and among campaigners in the other halls.

<http://bit.ly/1mhjcJ5>

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ADAPTATION FUTURES 2016 – 10-13 MAY

Adaptation Futures is the biennial conference of the Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA). In 2016 the European Commission and the Government of the Netherlands co-host the fourth edition. Adaptation Futures 2016 is where scholars, practitioners, policymakers and business people from all around the world go to connect, learn and inspire. It highlights adaptation practices and solutions for people, governments and businesses. The programme addresses all sectors and all parts of the world.

Subscribe to our [newsletter](#) and receive updates on the [programme](#).

<http://www.adaptationfutures2016.org/>

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TENTH WTO MINISTERIAL CONFERENCE, 15-18 DECEMBER, NAIROBI

The Ministerial Conference is the top-most decision-making body of the WTO. It usually meets every two years, and brings together all members of the WTO.

<http://bit.ly/1RPqiR4>

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OECD GREEN GROWTH AND SUSTAINABLE DEVELOPMENT FORUM

The 2015 Green Growth and Sustainable Development Forum (GGSD Forum) is organised by the Organisation for Economic Co-operation and Development (OECD) on the theme of ‘Enabling the Next Industrial Revolution: The role of systems thinking and innovation policy in promoting green growth’. The event will discuss how to foster the “next industrial revolution” through policies for systems innovation, drawing on the work of several OECD committees, including the Committee for Scientific and Technological Policy (CSTP), the Committee on Industry, Innovation and Entrepreneurship (CIIE), the Environment Policy Committee, the Economic Policy Committee and the Chemicals Committee.

<http://climate-l.iisd.org/events/>



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