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**Climate Change, Food Security and Nutrition**

Collection of contributions received

**Discussion No. 113 from 24 March to 17 April 2015**

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# Introduction to the topic

Climate change directly affects food and nutrition security of millions of people, undermining current efforts to address undernutrition and hitting the poorest the hardest, especially women and children. It impacts people’s livelihoods and lifestyles through different pathways. Farmers, pastoralists, forest dwellers and fisherfolk are already facing more challenges in producing and gathering food due to changing weather patterns, such as erratic rains. In the short term the impacts can be linked to extreme weather events which contribute to casualties, household food insecurity, disease and handicap, increased population dislocation and insecurity. In the longer term, climate change affects natural resources and therefore food availability and access, but also environmental health and access to health care. In the most affected areas these long-term impacts eventually can lead to transitory or permanent migration, which often leaves female-headed households behind.

Climate change is therefore seen as a significant “hunger-risk multiplier”. In fact, some forecasts anticipate 24 million additional malnourished children by 2050 – almost half of them in sub-Saharan Africa. Poor health and undernutrition in turn further undermine people’s resilience to climatic shocks and their ability to adapt.

Climate change will exacerbate the crisis of undernutrition through three main causal pathways:

* impacts on household access to sufficient, safe and adequate food;
* impacts on care and feeding practices; and
* impacts on environmental health and access to health services.

Unless severe measures are taken, and countries reduce the greenhouse gas emissions and increase the removal of these gases from the atmosphere, it will be increasingly difficult and expensive to adapt to climate change.

Climate-smart agriculture is one of the solutions that have been proposed to fight climate change. It is an approach that aims at combining food security and development, adaptation to climate change as well as reducing and removing emissions, whenever possible. It will not be an easy task to transform agriculture and food systems so that they would be truly climate-smart, also taking into account nutrition considerations. So far limited attention has been given to the interface between climate change and nutrition and relevant policies, programmes and projects remain by and large disconnected. The Rome Declaration on Nutrition and Framework of Action adopted by the 2nd International Conference on Nutrition in November 2014 recognized “*the need to address the impacts of climate change and other environmental factors on food security and nutrition, in particular on the quantity, quality and diversity of food produced, taking appropriate action to tackle negative effects*” and recommended to “*establish and strengthen institutions, policies, programmes and services to enhance the resilience of the food supply in crisis-prone areas, including areas affected by climate change*”.

The object of this consultation is to gain a better understanding of the impact of climate change on food security and nutrition as well as the impact of current dietary preferences and the related food systems. In addition, we invite you to identify possible measures to protect and/or improve nutrition and to adapt to climate change, while reducing and removing greenhouse gas emissions thus ensuring long-term food security.

We are well aware of the richness of relevant knowledge existing around the world and are looking forward to learn from your experience. We would therefore like to invite you to share your views on this thematic area. You may want to consider the following questions:

**1)** **What are the *main issues* for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing policies and programmes?**

**2) What are the *key* institutional and governance *challenges* to the delivery of cross-sectoral and comprehensive policies that protect and promote nutrition of the most vulnerable, and contribute to sustainable and resilient food systems?**

**3) In your experience, what are key *best-practices* and lessons-learned in fostering cross-sectoral linkages to protect and improve nutrition while preventing, adapting to climate change and reducing and removing greenhouse gas emissions in projects?**

This consultation is part of the online learning event Climate Change, Food Security and Nutrition, organized jointly by the [Mitigation of Climate Change in Agriculture Programme (MICCA)](http://www.fao.org/climatechange/micca/en/) of FAO and the FSN Forum.

We look forward to a lively and interesting exchange!

Florence Egal

# Contributions received

## Christian Häberli, World Trade Institute, Switzerland

Ad Q 1) What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other?

Even/because this is a fiendishly complex issue, focus is essential. I suggest a focus on the weakest link in the food value chain i.e. smallholders in net-food importing developing countries (NFIDC). This requires a self-critical look into the reasons for the failure (i) of smallholders to even feed themselves (ii) of national and international institutions including FAO, IBRD and WTO to lift the inherent smallholder biases in their own policies and practices. The fact that many scholars and even the research arm of the World Bank itself had already identified such biases back in the 1990ies, but never acted on them, speaks long for what is basically a governance failure in many organisations and countries. Regardless of whether we consider climate change as fundamentally different challenge or as an additional factor of uncertainty impacting on global and national food security, it seems to me that without an answer and remedial action in this issue there is little chance for successful climate change mitigation especially in those countries and population groups likely to be affected most violently. Failing now would leave those smallholders with few mitigation options other than massive national and international migration.

## Marc J. Cohen, Oxfam America, United States of America

The Impact of Climate Change and Bioenergy on Nutrition, edited by Brian Thompson and myself, was published by Springer for FAO in 2012. It includes contributions by the editors, M. Cristina Tirado, Noora-Lisa Aberman, and Janice Meerman. The book is accessible at <http://www.fao.org/3/a-as502e.pdf>.

## Salomeyesudas, Nalla Kerai ( Good Greens) Executive Director , India

Dear Florence Egal,

* first issue:
	+ location specific policy is needed
	+ hype of one particular crop or food should be discouraged
	+ diversity is the key for any security therefore enhance diversity
* second issue:
	+ policies to protect common lands and forest bodies including water bodies
	+ the policy should safe gourd land ,actually for each village or dwelling place a recommended amount of common land should be earmarked and use be handed over to local community to manage it for agro eco securities

I am not sure of my contribution to third issue you raised

Thank you.

Sincerely

B. Salomeyesudas

## Emmanuel Torquebiau, CIRAD, France

Climate-smart agriculture (CSA) aims at reaching simultaneously sustainable food security, adaptation to climate change and mitigation of climate change. To acheive these objectives, an innovative policy environment is required. The conclusions of the recently organized Climate-smart Agriculture Conference (Montpellier, France, 16-18 March 2015) highlight that policy makers and other stakeholders, especially researchers, must work together to increase local effectiveness and contribute to bridging the gap between agricultural policies and climate finance.

Excerpts from the "Montpellier Statement":

- The support of CSA innovation platforms, which gather policy makers, development agencies, civil society and the private sector with researchers and research institutions, will increase local effectiveness.

- The gap between climate change and agricultural policies needs to be bridged, in particular in UNFCCC negotiations, as well as linking agriculture and climate change financing instruments.

More info here: <http://csa2015.cirad.fr>

## Jonica Otarra, Center for Integrated Development and Social Marketing,Inc., Philippines

Issues to Consider:

**\*Low agricultural production outputs despite the continued usage of chemicals in agricultural farms and plantations that also gives rise to the growth of pest-resistant diseases in agricultural crops.**

\*As the planet has now exceeded 4 out of the 9 planetary boundaries as seen in the Planetary Boundaries Framework of Johan Rockstrom et.al , I believe that policy makers should also re- examine policies towards regulation of the impacts on the usage of chemicals in agricultural farms and plantations. The usage of these chemicals has contributed to the rise of carbon dioxide emissions which is one of the key drivers of climate change. It would be best if there would be promotion of more environment-friendly methods and innovations in agricultural farming.

Despite the usage of these chemicals, it still did not eliminate plant pests and diseases in agricultural farms, Not only that, but it has contributed to numerous health problems as a result of the usage of these chemicals. Often, the most affected of these are the marginalized sectors of society- the farmers and the Indigenous People.

A big question is that how can ordinary independent farmers have the proper clothing equipment when they use or apply these chemicals in their agricultural farms? When the costs of these chemicals are sometimes taking more than half their salary? This is true for most of the rural communities because of low production outputs in agricultural farms.

**\* Agricultural food waste that may further aggravate the inequality of food distribution especially coming from agricultural rejects of both export and import industry.**

- Poverty and Hunger is a major problem yet there are numerous food rejects coming from the agricultural exports and import industry. The big question is how can the policy- makers address such big issue? Maybe they can create and re-examine policies with regards to this issue.

**\* The Healthier food choices-inorganic vs. Organic**

If we are to combat climate change and reduce carbon dioxide emissions, then it is essential that we also look into healthier ways of consuming food that has more benefits for our own health.

- One of the main issues is the affordability of organic foods in the market. How can it become affordable especially for the developing countries?. In the Philippines, buying organic food is expensive and since it is expensive, there is lesser demand of it.

**\* Higher costs of organic certification.**

 Another issue is that how can the policy-makers help make the certification of products as organic become more affordable?

 Numerous studies show that farmers who are into organic farming find it difficult to pursue organic since the certification for organic products is expensive. In particular, how can the independent organic farmers afford to have their products certify as organic?

## Manoj Kumar Behera, NRMC India, India

Focusing wastelands for food production through the adoption of agroforestry models suited to the local condition. A very good policy with feasible monitoring indicators is required.

The kitchen garden and home garden shall be popularized through Government programmes.

Creating a space for women groups in the implementation framework at the grassroots level.

At the National Level monitoring shall be done by a group of experts from agricultural sectors, policy makers, representative from NGOs and women groups.

## Hans Schaltenbrand, Agricultural/Forestry/Food Science Mg. University, Switzerland

A comment to Mr. Häberli’s interesting input to Q 1) What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other?

Mr. Häberli touches an important point: THE FOCUS. If we look about 20 years back, important gvt. and private agencies supporting smallholders stopped providing their services to such complex and difficult landholdings, in particular in remote/upland areas. Instead during the last ten years focus was put on those being able to produce high value products (hvp). It is nothing but logic that precisely such remote and upland smallholders now urgently need financial smart support to be in a position to adapt to more complex climatic conditions. Therefore, a re-investment in smart joint rural advisory services is key to much complex land and production issues. The private sector will not focus on such difficulties in far remote areas. Therefore leading investments must first come from the public sector

Best regards, Hans Schaltenbrand

Berner Fachhochschule / Bern University of Applied Sciences

Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften HAFL /School of Agricultural, Forest and Food Sciences HAFL

Hans Schaltenbrand

Professor for Rural Development and Natural Resources Management

HAFL International Consulting Services

## Dosse Sossouga, Amis des Etrangers au Togo (ADET), Togo

[*Original contribution in French*]

Si on parle de changement climatique, de sécurité alimentaire et de nutrition, il faut prendre le problème au sérieux. Les 7 milliards de personnes sur la planète terre vivent au dépend de l'agriculture. Ma question est de savoir si les agriculteurs mondiaux grèvent, comme sera le monde? Alors il est important de mettre un accent particulier sur l'agriculture qui, à son tour, a besoin d'un climat favorable, d'une terre arable propice et d'une technologie appropriée pour une production plus grande possible pour mettre fin à la faim dans le monde d'ici 2030. L'homme, ayant droit à l'alimentation, à la bonne santé, à la vie et autres, nous oblige à améliorer la production agricole pour assurer la sécurité alimentaire et une bonne nutrition des bébés jusqu'aux personnes âgées en tous lieux sur la terre. Et pour y arriver, il faut une volonté politique, une politique inclusive impliquant tout le monde dans le processus du développement agricole. Il faut un programme agricole soutenu et de bonne nutrition autrement dit une alimentation équilibrée. Il faut libéraliser le secteur agricole avec des coopératives très engagées, il faut déployer ou recruter des ingénieurs agronomes pour des apports techniques et octroyer des crédits agricoles très flexibles accessibles même aux agriculteurs particuliers. Il faut également privilégier les cultures agricoles qui diminuent le dégagement de gaz à effet de serre. Il faut éviter les feux de brousse et protéger les forêts.

Le gouvernement, la société civile, les coopératives, le secteur privé, les paysans sont indiqués dans ce processus.

Pour la protection de la forêt, il faut des activités de sensibilisation des communautés sur le changement climatique et ses conséquences en se basant sur des lois relative à la protection de l'environnement du pays. Il faut recruter des planteurs d'arbres dans la localité pour le reboisement, l'entretien et la protection des arbres, donc des forêts. Il faut changer les moyens de cuisson des membres de la communauté qui dépendaient de l'environnement. Ex: utilization de cuisière solaires.

[*English translation*]

When talking about climate change, food security and nutrition it is important to take it seriously as 7 billion people on earth are dependent on agriculture. My question is, what will happen to the world if, globally, the farmers were to strike? So, it is important to put a particular accent on farming that, in turn, needs a favorable climate, suitable arable land and appropriate technology in order to produce the best possible harvest and, by 2030, end world hunger. Given the rights of mankind to food, health, life and other rights, we are obliged to improve agricultural production in order to ensure food security and good nutrition for children and the elderly everywhere on earth. To achieve this task, there must be a political determination, an inclusive policy involving everyone in the agricultural development process. There has to be a sustainable program for agriculture and good nutrition, that is to say, a balanced diet. The farming sector has to be freed up with wholly committed cooperatives, agronomists should be deployed or recruited to provide the technology and very flexible agricultural credit should be made available even to individual farmers. At the same time, it is important that priority is given to crops that reduce the emission of greenhouse gases. Bushfires must be avoided and woodlands must be protected.

The government, civil society, cooperatives, private sector and peasants all have a part to play in this process.

For the protection of woodlands, there should be community-based actions which raise awareness of climate change and its consequences, depending on the environmental protection laws of the country. Local tree planters must be recruited to regenerate the woodlands, to maintain and protect the trees, and so eventually the forests. The cooking methods of those who depend on the environment need to be changed. For example: by using solar cookers.

## Barry Cohen, United States of America

ALGAE FOR FOOD, FEED and the SEQUESTRATION OF CO2

Algae is one solution today to help third-world counties become self-sustainable. Algae can be made into nutraceuticals Omega 3 EPA/DHA, cosmetics, feed, food, bioplastics and potential fuels. One to two grams per day of high protein Spirulina can totally end malnutrition in children.

The National Algae Association is the first non-profit education and algae production trade association in the world. We are made up of commercially-minded algae researchers, algae farmers and equipment companies.

We are scaling-up algae farms for food and feed throughout the US and the world. We also have members currently co-located at coal-fired power plants and cement plants sequestering CO2. Algae farms can be built on non-arable acreage and recycle over 80% of all water used using less water than traditional farming. Algae is also used to clean wastewater.

Algae farms can be built today with no additional research or technology. We provide job training, research/testing and equipment providers to scale-up algae farms and indoor algae biomanufacturing.

For information, feel free to contact us at info@nationalalgaeassociation.com

## Florence Egal, Food Security and Nutrition expert and facilitator of this discussion

Dear all,

Thanks for your contributions which really set the scene. Thanks for those who provided documents and weblinks, they will be included in the report of the consultation.

Let me try and summarize where we are:

* many of you referred to governance issues. Climate change constitutes an additional factor of uncertainty impacting on food security and nutrition. Insufficient attention has been given to smallholders by national and international institutions so far. Strategies must be local-specific. The public sector has a key role to play since the private sector cannot be expected to assist smallholders in remote areas.
* a set of comments refer to agricultural production systems: priority should be given to crops which can limit GHG emissions; it is important to shift away from a commodity approach to promote diversity and agroforestry; organic agriculture (for both health and environment) should be encouraged and made more affordable. Waste associated with international food trade should be addressed.
* it is essential to protect natural resources (common lands, forests and water bodies), replant trees, and promote solar cooking
* it is urgent to bridge the gap between agriculture and climate change policies and funding

I realize that I cannot do justice to the wealth in your comments in a few paragraphs and I have deliberately chosen issues to stimulate exchanges. Did I get it right and did I forget anything major?

It would really be nice to hear more about nutrition :-)

I hope many of you will join the webinar next Tuesday (31/3).

So much for now.

Florence

## Selina Juul, Stop Wasting Food movement Denmark (Stop Spild Af Mad), Denmark

There needs to be a better link and understanding between food losses and waste, resource scarcity, population growth and climate change - because these factors are interconnected and will affect the future of our food. There must be an understanding on political level as well as the public level.

## James T.J Peermade Development Society, India

Dear all

I am T.J James , working as Advisor , to Peermade Development Society , NGO based in Kerala, India

This is regarding the first query , I would like to share a successful attempt to revive and propagate local cow pea variety cultivated by the indigenous tribal groups

The basic objective of the project was to revive and propagate farmer developed/ indigenous varieties for food security and climate change mitigation and the project was supported by ITPGRFA (treaty nurtured by FAO) under its benefit sharing fund.

We have documented four different varieties of cowpea ( Vigna sp -local name Njanda, Peenius , Karimpayaru, Thatathi ). Though these varieties are known for its drought resistance, disease resistance, zero management and also for its nutritional qualities, majority of the farmers have abandon and shifted to other hybrid varieties. We started searching farmers who cultivating these varieties. We found just only 4 women farmers are cultivating these varieties in entire tribal colony. There are more than 500 families are residing in the colony.

The other farmers opined that, the availability of common pea (red colour ) in the market , which they get in subsidized and cheap rate is one of the major reason for abandon these varieties, For cultivation also they usually go for this variety , since they will get the seeds from market without difficulty.

We checked with other women farmers , their interest in cultivating these varieties. Most of them are very much interested, but enough seeds and planting materials are not available.

So we developed strategy for promoting these varieties. Initially we supported these four women farmers to expand cultivation for raising more seeds and we purchase these seeds from them and supplied to other farmers. In a span of two year, now more than 40 to 50 women farmers are actively cultivating these varieties and also demand for these varieties are increasing, especially among other non-tribal farmers and we observed slowly increasing market value and demand for these crops. We also linked our micro finance programme for support the farmers for cultivating these varieties and response is very encouraging.

Here I would like to highlight two major issues

The importance of reviving indigenous varieties for climate change mitigation and nutritional security and developing methodologies and strategies for promoting them

Developing market and market value for these indigenous crops.

Regards

James

## Belayneh Zeleke, Addis Ababa University, Ethiopia

Climate change affects agricultural production and productivity which results food insecurity.

Food insecurity is one of the underline causes of malnutrition. On the other hand nutrition insecurity/malnutrition also affects agricultural production and productivity which leads to food insecurity, then people/ community utilize natural resources unwisely and aggressively that exacerbate climate change.

Therefore, to overcome food and nutrition insecurity, create resilient environment and to realize social and economic progress/development through the community, we have to work simultaneously on climate change, food security and nutrition effectively.

## Ayşen Sema Tekin, Freelance advisor, Turkey

Dear all,

Populist policy makers don't care risks of climate change in developing countries like mine. Also they don't announce risks of climate change to people.

So their daily politics, investments and sub construction are planning for get more vote. Governments promote urbanization. This is cheaper and easy than to promote farming. Nature is being destroyed for HES, highways, huge bridges and airports. Besides land grabbing and water grabbing by big companies is getting more day by day. Local people have to spend more times in demonstrations than their farm to keep their land. Shortly; there are more threats for nature friend food production.

Key institutional and governance challenge for policy makers is to change their understanding on "development" to provide sustainable and resilient food system. Review the development approach will be the most significant gains as lessons learned.

Best regards

Ayşen Sema TEKİN

## Hector Maletta, Universidad del Pacifico, Peru

Just to add some elements that go somewhat counter conventional wisdom in this matter, though not against scientific evidence, let me remark on some often disregarded points:

1. Food security is defined by access to food, and nutrition by access to food, safe water, sanitation and health care; they do not require that everyone produce food on their own plot. Access is chiefly determined by income level and distribution, not by self sufficiency: even subsistence smallholders can only produce a fraction of their food needs, mainly staple food, and most need extra income to purchase more food and other goods and services in the market. They usually procure that extra income through off farm activities, chiefly wage labour. In fact, subsistence producers are, and have been for decades, among the people more affected by food insecurity and malnutrition, especially when they lack complementary sources of income, Urban folk (even poor urban folk) customarily get more food and better nutrition indicators than peasants, in spite of (or due to?) not producing any food themselves. Other than producing food in everybody's plot, economic development brings more income, and also more trade (domestic and international) to bring more food from whatever point of production to whatever point of consumption. Livelihoods diversify, social labour is divided and specialized, and trade plays an ever greater role. This is already happening: Since 1961 to 2012 food production worldwide more than trebled (increasing 50% per capita), but international food trade increased by a factor of nearly nine times, confirming what the World Food Summit found: that "trade is a key element for achieving food security". Increased world output, increased income in developing countries, and increased world trade, will save more people from hunger than scrapping a few more grains or tubers from tiny subsistence plots. More peace and better governance will also help, by eliminating major causes of today's famines and food emergencies (war, refugee camps, internecine strife, corruption).

2. There is no shortage of land at the world level. The world has about 3 billion Ha of prime and good land (according to FAO agro-ecological zones and soils classification) and only about 1.5 bn Ha are actually used for crops. Ample reserves of good arable land exist especially in Africa, Latin America, North America and Eurasia. Moreover, existing projections of future requirements of extra land do not foresee a significant increase in arable land use (which is, moreover, rather stagnant since the mid 1980s). See for instance the FAO report by N. Alexandratos and J. Bruinsma,  2012. World agriculture towards 2030/2050: The 2012 Re­vi­sion. Rome: FAO. <http://www.fao.org/docrep/016/ap106e/ap106e.pdf>. (This FAO land classification already accounts for land degradation occurred in the past).

3. Climate change has both beneficial and deleterious implications for agriculture. A warmer climate in temperate regions opens up new lands for cultivation, extends the growing period, and improves land productivity; warming also increases water evaporation and thus rainfall at global level, though changes in convection currents may cause more drought in some areas like Southern Africa and Northern Mexico. On the whole, world arable land is projected to increase. Increases in usable land area and land productivity, due to increased rainfall and milder winters, are already observable in several areas of the world (cf expansion of cultivation into formerly dry non-cultivable areas in the North and West of Argentina). Also, higher concentrations of carbon dioxide in the atmosphere increase crop yields (especially for the C3 type crops like wheat, and also for the C4 type like maize when grown in dry conditions). More availability of atmospheric CO2 also reduces the water needs of C4 crops. Both effects countervail other negative impacts that climate change may have (for instance, maize in Mexico may suffer due to expected drier conditions there, but at the same time maize, a C4 plant, would require significantly less water under increased CO2, partly contributing to offset the former effect).

4. Agricultural productivity is on the rise almost everywhere. Yields, and output value per hectare, are growing faster than ever, including Africa, and also Asia and Latin America (it grows more slowly in Europe and North America). Even if no further technical development or discovery occurs in agriculture (hardly a likely prospect), simply by catching up with existing technology, growth of productivity can continue for decades, especially in developing countries where the technology gap is wider and productivity increase is faster.

5. All indicators of food security and nutrition are improving. The MDG of halving the prevalence of undernourishment is practically on the verge of being achieved globally (see FAO's SOFI reports). Anthropometric indicators of nutritional failure are also decreasing, as reported by the Nutrition division of WHO. Moreover, the rate of improving in both aspects seems to be accelerating. There is an increasing worldwide problem of obesity and overweight, affecting already more people than acute or chronic undernutrition, and this marks a significant nutritional transition never seen before in the history of mankind.

6. It is often mentioned that from 2000 to 2050 food production has to increase by 50-70%, and this is seen as an alarming prospect, but in fact it just requires a growth rate of 0.8-1.0% per year, whilst in the previous past century food output has been increasing at about 2.5% per year on average, and this rate has been accelerating in recent decades compared to previous ones. Note that this includes the period of most rapid climate change and intense emissions of greenhouse gases, especially noticeable since 1970.

7. Studies on the impact of climate change on future levels of food production and prevalence of undernourishment, even under quite pessimistic assumptions, indicate that progress would continue, covering future demand for food and other uses of agricultural products (including biofuels) and reducing undernourishment to non-significant proportions in all major regions by 2050 or thereabouts. See for instance the report of Dr Günther Fischer commissioned by FAO:  *World Food and Agriculture to 2030/50: How do climate change and bioenergy alter the long-term outlook for food, agriculture and resource availability?* Included in FAO 2011, **Looking ahead in World Food and Agriculture: Perspectives to 2050**.Ed by Piero Conforti. <http://www.fao.org/docrep/014/i2280e/i2280e00.htm>.

I do not make these rather heretical comments to mean that there is no problem and nothing needs to be done. On the contrary, a lot remains to be done. For the 850 million hungry people existing today, it is little comfort to learn that things will be better by 2050: they need assistance today, every day, both in the form of agricultural development for family agriculture, help to transform their present livelihoods, and social protection to support them in their current predicament and bridge the difficult transition into a better way of life.

Food prices are decreasing since 2010, and the spikes of 2007 and 2010 fortunately did not trigger the dire effects once feared (no famine and very few food riots occurred worldwide in the wake of the price surge), but many people suffered from high food prices, and generating higher incomes to afford food and other necessities are of the very highest priority.

More energetic efforts should also be deployed internationally to stop the many local conflicts, State failures and collapse, and widespread corruption that affect the lives, food security and nutrition of millions in poor countries and cause the most dramatic food crises we see today.

In view of the ongoing migration and urbanization process in the developing world, helping people to enter in a better way into urban and international employment (through education, training, and better domestic and international migration and housing policies) is also a crucial ingredient to help people earn better incomes and improve the food security of themselves and their relatives, including those left in the old country and expecting to receive remittances.

Facts reflected in the above comments suggest some shifts in emphasis are needed: people are moving from subsistence production to into new livelihoods. Livelihood transformation and diversification may perhaps be more important than incremental (and often ineffectual) efforts to improve traditional livelihoods. To accelerate the current rate of progress in access to food and better nutrition a strong emphasis is needed on economic development; agricultural productivity; better supply of water, sanitation and health care; labour training and productivity; and food trade (including cheaper and steadier food supplies for regions in need, and better access of poor countries to world markets for agricultural products). Climate change may make things more difficult in some aspects and places, and may help in others. Humankind will undoubtedly deal with all these challenges (we have dealt with far worse ones in the past), but knowing them in advance surely helps.

I hope this may provide food for thought and make for a more spicy debate.

## Paul von Hartmann, California Cannabis Ministry, United States of America

Dear Florence and FSN Associates,

Climate change has several dimensions, all of which threaten global food security and health in fundamentally interconnected ways. Temperature increase, ocean acidity & circulation, ozone depletion, sub-arctic methane release all pose potentially catastrophic influences.

Most people are aware of "global warming." Fewer people seem to be as concerned with the increasing solar UV-B radiation reaching the planet's surface, what I refer to as "global broiling."

Climate change mitigation and crop selection in the 21st Century must take into account both of these aspects of systemic climate imbalance. If we are to avoid irreversible systemic collapse, then must successfully adapt in the most time-efficient ways to navigate these changes.

First we must acknowledge the changes are happening at an accelerating and unpredictable, non-linear rate; then we must objectively reconsider our priorities. Specifically, society's views about what is "illegal" and what is essential must change.

Cannabis agriculture, manufacture and trade offer fundamental solutions to many of the problems imposed by climate imbalance. Every growing season that passes without comprehensive, objective analysis of this unique and essential natural resource, is gone forever.

Consider that "hemp" is the only crop that produces complete nutrition and sustainable biofuels from the same harvest. In addition, the atmospheric benefits of Cannabis sequestration and monotwrpene production make hemp an essential crop.

Please feel invited to consider the rationale for resolving climate imbalance, presented in my recently published book,

"Cannabis vs. Climate Change: How hot does Earth have to get before all solutions are considered?" <http://www.amazon.com/dp/B00PCSRUF8>

Thank you for the opportunity to present an achieveable biogenic solution in an atmosphere of timely objectivity.

Best wishes to all,

Paul

## Santosh Kumar Mishra, S. N. D. T. Women's University, India

1. **What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing policies and programmes?**
	1. **Main issues for policy-makers while considering climate change:** Environmental policies have sweeping implications for business, citizens and the environment. Building policy is a complex process and there are numerous opportunities for things to go well – or poorly. Societies have a long record of managing the impacts of weather- and climate-related events. Nevertheless, additional adaptation measures will be required to reduce the adverse impacts of projected climate change and variability, regardless of the scale of mitigation undertaken over the next two to three decades. Moreover, vulnerability to climate change can be exacerbated by other stresses. These arise from, for example, current climate hazards, poverty and unequal access to resources, food insecurity, trends in economic globalization, conflict and incidence of diseases such as HIV/AIDS. Further, some planned adaptation to climate change is already occurring on a limited basis. Adaptation can reduce vulnerability, especially when it is embedded within broader sectoral initiatives. There is high confidence that there are viable adaptation options that can be implemented in some sectors at low cost, and/or with high benefit-cost ratios. However, comprehensive estimates of global costs and benefits of adaptation are limited.
	2. **Main issues for policy-makers while considering food security and nutrition:** Underlying the food and nutrition situation are multiple challenges in achieving sustainable food production. A rapidly growing population is increasing the demand for food. Climate change is adding to the challenge of achieving sustainable food production and meeting the demands of a growing population. Events related to climate change are likely to intensify in the coming years. There is no magic bullet that can eliminate hunger and under-nutrition, given the complex nature of these problems. There are many inter-related issues, some of which are related to poverty and lack of empowerment. These include gender issues, discrimination against ethnic groups, land use, rights and ownership, war, the HIV pandemic, and environmental issues. Food solutions need to be integrated and multifaceted. Efforts to realize the *“right to adequate food”* must go beyond improving the production and distribution of nutritious food. “Safety nets” should systematically include or be accompanied by measures to promote sustainable livelihoods for households with malnourished children. Adequate feeding and care should be an integral part of national strategies and programs to reduce hunger and under-nutrition. This includes promoting exclusive breastfeeding for the first 6 months and appropriate complementary feeding, basic requirements for nutritional well being.
2. **What are the key institutional and governance challenges to the delivery of cross-sectoral and comprehensive policies that protect and promote nutrition of the most vulnerable, and contribute to sustainable and resilient food systems?** Production systems and the policies and institutions that underpin global food security are increasingly inadequate. Sustainable agriculture must nurture healthy ecosystems and support the sustainable management of land, water and natural resources, while ensuring world food security. In order to be sustainable, agriculture must meet the needs of present and future generations for its products and services, while ensuring profitability, environmental health and social and economic equity. The global transition to sustainable food and agriculture will require major improvements in the efficiency of resource use, in environmental protection and in systems resilience. Sustainable agriculture requires a system of global governance that promotes food security concerns in trade regimes and trade policies, and revisits agricultural policies to promote local and regional agricultural markets.

The current trajectory of growth in agricultural production is unsustainable because of its negative impacts on natural resources and the environment. The overarching challenges being faced are the growing scarcity and fast degradation of natural resources, at a time when the demand for food, feed, fibre and goods and services from agriculture (including crops, livestock, forestry, fisheries and aquaculture) is increasing rapidly. Some of the highest population growth is predicted in areas which are dependent on agriculture and already have high rates of food insecurity. Additional factors - many interrelated - complicate the situation:

* Competition over natural resources will continue to intensify. This may come from urban expansion, competition among various agricultural sectors, expansion of agriculture at the expense of forests, industrial use of water, or recreational use of land. In many places this is leading to exclusion of traditional users from access to resources and markets;
* While agriculture is a major contributor to climate change, it is also a victim of its effects. Climate change reduces the resilience of production systems and contributes to natural resource degradation. Temperature increases, modified precipitation regimes and extreme weather events are expected to become significantly more severe in the future;
* Increasing movement of people and goods, environmental changes, and changes in production practices give rise to new threats from diseases (such as highly pathogenic avian influenza) or invasive species (such as tephritid fruit flies), which can affect food safety, human health and the effectiveness and sustainability of production systems. Threats are compounded by inadequate policies and technical capacities, which can put whole food chains at risk; and
* The policy agenda and mechanisms for production and resource conservation are mostly disjointed. There is no clear integrated management of ecosystems and/or landscapes.

The challenges outlined above give rise to five key principles for guiding the strategic development of new approaches and the transition to sustainability:

* **Principle 1**: Improving efficiency in the use of resources is crucial to sustainable agriculture;
* **Principle 2**: Sustainability requires direct action to conserve, protect and enhance natural resources;
* **Principle 3**: Agriculture that fails to protect and improve rural livelihoods and social well-being is unsustainable;
* **Principle 4**: Sustainable agriculture must enhance the resilience of people, communities and ecosystems, especially to climate change and market volatility; and
* **Principle 5**: Good governance is essential for the sustainability of both the natural and human systems.

In order to cope with the rapid pace of change and increased uncertainty, sustainability must be seen as a process, rather than a singularly defined end point to be achieved. This, in turn, requires the development of technical, policy, governance and financing frameworks that support agricultural producers and resource managers engaged in a dynamic process of innovation. In particular:

* Policies and institutions are needed that provide incentives for the adoption of sustainable practices, to impose regulations and costs for actions that deplete or degrade natural resources, and to facilitate access to the knowledge and resources required;
* Sustainable agricultural practices must make full use of technology, research and development, though with much greater integration of local knowledge than in the past. This will require new and more robust partnerships between technical and investment-oriented organizations;
* Evidence-based planning and management of the agricultural sectors requires suitable statistics, geospatial information and maps, qualitative information and knowledge. Analysis should focus on both production systems and the underlying natural and socio-economic resources; and
* The challenges relating to stocks and utilization rates of natural resources often transcend national boundaries. International governance mechanisms and processes must support sustainable growth (and the equitable sharing of benefits) in all agriculture sectors, protecting natural resources and discouraging collateral damage.
1. **In your experience, what are key best-practices and lessons-learned in fostering cross-sectoral linkages to protect and improve nutrition while preventing, adapting to climate change and reducing and removing greenhouse gas emissions in projects?**
	1. **Key Best-Practices in Improving Nutrition and Climate Change Adaptation:** The agricultural sector both affects and is affected by climate change. While it contributes to mitigating it, agriculture affects climate change through the emission of greenhouse gases (GHGs) from croplands and animals. It is affected by loss of agricultural land, salt water intrusion, changes in temperature and rainfall regimes and increasingly severe weather hazards. The International Fund for Agricultural Development (IFAD), in partnership with Procasur Africa, CARE  (relief agency) in Kenya and the Cgiar Research Program on Climate Change & Food Security (CCAFS), organized a learning route titled “*Natural Resource Management and Climate Change Adaptation best practices: The Experience in Kenya,”*that took place between the 7th and the 13th of July 2014. Seventeen participants from various IFAD-supported projects, implementing partners and civil society organizations in Ethiopia, Rwanda, Lesotho and Kenya all met together on an 8-day journey across the districts and rural communities of Kenya.

A Learning Route is an experience that transforms its participants, leading them to become agents of change in their own organizations. It is a capacity-building procedure with a proven track record of successfully combining local knowledge and experiences. The Learning Route is based on the idea that successful solutions to existing problems are already present within rural areas, and that those solutions might be adapted and spread to other contexts. This journey gets participants to understand these changes through peer learning, discussing directly with rural communities who are the promoters of the identified best practices and successful innovations (<http://ifad-un.blogspot.in/2014/08/local-solutions-and-best-practices-on_21.html>, accessed on March 31, 2015).

* 1. **Lessons-Learned in Improving Nutrition and Climate Change Adaptation:** Only by implementing real changes across the global food system will we be able to achieve food security and a stable climate for the long term. This will require a break from business as usual and a significant shared commitment by policy makers, investors, agricultural producers, consumers, food companies and researchers. Followings are lessons learned inimproving nutrition and climate change adaptation initiatives:
* *Integrate food security and sustainable agriculture into global and national policies*:
* Establish a work program on mitigation and adaptation in agriculture in accordance with the principles and provisions of the United Nations Framework Convention on Climate Change (UNFCCC), based on Article 2, as a first step to inclusion of agriculture in the mainstream of international climate change policy.
* Make sustainable, climate-friendly agriculture central to Green Growth44 and the Rio+20 Earth Summit.
* Develop common platforms at global, regional and national levels for coherent dialogue and policy action related to climate change, agriculture, crisis response and food security, at global, regional and national levels. These include fostering country-level coalitions for food security and building resilience, particularly in countries most vulnerable to climate shocks.
* *Significantly raise the level of global investment in sustainable agriculture and food systems in the next decade*:
* Implement and strengthen the existing G8 L'Aquila programs and commitments to sustainable agriculture and food security, including long-term commitments for financial and technical assistance in food production and to empower smallholder farmers.
* Adjust national research and development budgets, and build integrated scientific capacity, to reflect the significance of sustainable agriculture in economic growth, poverty reduction and long-term environmental sustainability, and focus on key food security issues (for example, developing nutritious non-grain crops and reducing post-harvest losses).
* Increase knowledge of best practices and access to innovation by supporting revitalized extension services, technology transfer and communities of practice (for example, North-South, South-South, cross-commodity and farmer-to-farmer exchanges), with emphasis on low-to high-income countries and on women farmers.
* *Sustainably intensify agricultural production while reducing greenhouse gas emissions and other negative environmental impacts of agriculture*:
* Develop, facilitate and reward multi-benefit farming systems that enable more productive and resilient livelihoods and ecosystems, with emphasis on closing yield gaps and improving nutrition.
* Introduce strategies for minimizing ecosystem degradation and rehabilitating degraded environments, with emphasis on community-designed programs.
* Empower marginalized food producers (particularly women) to increase productivity of a range of appropriate crops by strengthening land and water rights, increasing access to markets, finance and insurance, and enhancing local capacity (for example through farmer and community-based organizations).
* Identify and modify subsidies (such as for water and electricity) that provide incentives for farmers to continue agricultural practices that deplete water supplies or destroy native ecosystems. Introduce compensation schemes that target the poor.
* Couple economic incentives for sustainable intensification of agriculture with strengthening governance of land tenure and land zoning to prevent further loss of forests, wetlands and grasslands.
* *Develop specific programs and policies to assist populations and sectors that are most vulnerable to climate changes and food insecurity*:
* Develop funds that respond to climate shocks, such as 'index-linked funds ' that provide rapid relief when extreme weather events affect communities, through public-private partnerships based on agreed principles.
* Moderate excessive food price fluctuations by sharing country information on production forecasts and stocks, strengthening market databases, promoting open and responsive trade systems, establishing early warning systems and allowing tax-free export and import for humanitarian assistance. This includes embedding safeguards related to import surges and trade distortions in trade agreements.
* Create and support safety nets and other programs to help vulnerable populations in all countries become food secure (for example, cash and in-kind transfers, employment guarantee schemes, programs to build resilience, health and nutrition, delivery of education and seeds of quick growing foods in times of famine).
* Establish robust emergency food reserves and financing capacity that can deliver rapid humanitarian responses to vulnerable populations threatened by food crises.
* Create and support platforms for harmonizing and coordinating global donor programs, policies and activities, paying particular attention to systematically integrating climate change risk management, adaptation and mitigation co-benefits, and improved local nutritional outcomes.
* *Reshape food access and consumption patterns to ensure basic nutritional needs are met and to foster healthy and sustainable eating patterns worldwide*:
* Address chronic under-nutrition and hunger by harmonizing development policy and coordinating regional programs to improve livelihoods and access to services among food-insecure rural and urban communities.
* Promote positive changes in the variety and quantity of diets through innovative education campaigns, which target young consumers especially, and through economic incentives that align the marketing practices of retailers and processors with public health and environmental goals.
* Promote and support a coherent set of evidence-based sustainability metrics and standards to monitor and evaluate food security, nutrition and health, practices and technologies across supply chains, agricultural productivity and efficiency, resource use and environmental impacts, and food system costs and benefits. This should include providing consumers with clear labelling.
* *Reduce loss and waste in food systems, targeting infrastructure, farming practices, processing, distribution and household habits*:
* In all sustainable agriculture development programs, include research and investment components focusing on reducing waste, from production to consumption, by improving harvest and postharvest management and food storage and transport.
* Develop integrated policies and programs that reduce waste in food supply chains, such as economic innovation to enable low-income producers to store food during periods of excess supply and obligations for distributors to separate and reduce food waste.
* Promote dialogue and convene working partnerships across food supply chains to ensure that interventions to reduce waste are effective and efficient (for example, redirecting food waste to other purposes), and do not create perverse incentives.
* *Create comprehensive, shared, integrated information systems that encompass human and ecological dimensions*:
* Sustain and increase investment in regular monitoring, on the ground and by public domain remote sensing networks, to track changes in land use, food production, climate, the environment, human health and well-being worldwide.
* Support improved transparency and access to information in global food markets and invest in interlinked information systems with common protocols that build on existing institutions.
* Develop, validate and implement spatially explicit data and decision-support systems that integrate biophysical and socioeconomic information and that enable policy makers to navigate trade-offs among agricultural intensification, nutritional security and environmental consequences.

## Hector Maletta, Universidad del Pacifico, Peru

Dear Florence, you are of the opinion that "priority should be given to crops which can limit GHG emissions". I agree in general but have also some comments:

1. Emissions from crops in developing countries are not very important, except insofar as they involve net deforestation. Emissions in modern mechanized agriculture are far more important, by way of the fuel used by agricultural machinery. Growing crops, in fact, sequesters carbon from the armosphere through photosynthesis. And on the whole, emissions from agriculture are a tiny fraction of all emissions, mostly originated in manufacturing, big cities, and some mining related activities such as the production of cement. In the poorest countries, reducing emissions is probably among lower priorities, after getting food, not being killed by violence, and other immediate threats to everyday life. Most of them live without electricity, and producing electricity for one or two billion people means burning a lot of fossil fuels and thus producing more emissions: not increasing emissions may condemn those billions of people to darkness for a very long time. Middle-income countries, chiefly in Asia like China, have also other priorities (getting developed) and will postpone serious reduction of their emissions till they are done.

2. Some modern forms of tillage and farming are far less deleterious, or directly beneficial, in terms of emissions, but not always palatable for people preocuppied by the environment or endeavouring to promote subsistence farming.

For instance, no-tillage or limited-tillage systems (like those widely practiced by modern extensive farmers in Brazil, Argentina and the US) greatly reduce the use of machinery and fuel, and also reduce soil erosion (because of less compactation of soils by heavy equipment). They reduce fossil fuel burning, and by planting the new crop on the bed created by the previous one, they keep the land under green cover most of the time, which reduces water and wind erosion.

For another and more controversial example: growing genetically modified crops reduces the use of fuel for herbicide application (one single pass is often enough, because the GM crop does not absorb the herbicide which in turn kills most of the weeds at once); besides, the most important GM crop, soybeans, is a legume, thus capturing and storing nitrogen (and not only carbon) in the soil, when the crop residues are remixed with topsoil in the no-tillage system. Now, those conservationist systems are all practiced by modern farming systems in places like the US or the Argentine plains, not in traditional peasant production systems in South Asia or Sub Saharan Africa (nor in Europe, where GM crops are a no-no). In fact, more emissions are customarily caused by small peasants clearing woodland by slash and burn than by modern farmers practicing no-tillage crops.

Warning: Food for thought may often be unpalatable, but it is always good for one's mind.

## Hector Maletta, Universidad del Pacifico, Per

Dear Florence,

Some additional comments on your most recent comment that "priority should be given to crops which can limit GHG emissions". I agree but think this should be qualified in various ways.

1. Emissions from agriculture come mostly from use of fuel-burning machinery, and secondarily from deforestation (in slash and burn agriculture). Now, concerning machinery, there is a worldwide increase in the use of no-tillage or limited-tillage systems by commercial farmers (e.g. in the US, Brasil or Argentina), which greatly reduce the use of machinery and thus of fuel, and besides keep the land under green cover most of the time, and sequester more carbon when crop residues are mixed with topsoil before planting again on the bed created by the previous crop. Now this is mostly practiced by modern and relatively big farmers in high and middle income countries, hardly by subsistence peasants (at least not on in massive numbers). Such systems require know how, machinery and other inputs not within the reach of the poorest farmers.

2. Plants and trees absorb carbon from the atmosphere while they are growing (and emit it while they are rotting on the ground). A stable forest neither absorbs nor emits carbon in net terms.

3. There is evidence that the planet is getting greener, in the sense that green cover and vegetagtion Net Primary Production is increasing worldwide in spite of deforestation. This is partly due to the very presence of higher concentrations of CO2 in the atmosphere. In this respect there is a new paper by Liu and others (2015, see ref below) verifying that the planet is getting greener. This agrees with other recent studies such as those by Donohue et al (2013) and Hemming et al (2013) also referenced below. A review of Liu's paper can be found in an article published by Reuters: <http://www.trust.org/item/20150330150036-h00zp/>

Recent satellite-based studies of global green cover focused on semi-arid regions confirms Liu's conclusion by showing a general increase in green cover linked to in­creased CO2 concentrations in the atmosphere (Donohue et al 2013). A simu­la­tion with the Hadley Centre climate model for equilibrium doubling of preindustrial concentration of CO2 found an expected net global increase of 57% in Net Primary Production of plants at the world scale (Hemming et al 2013). This expected increase results from a gross increase of 75% in photosynthetic ca­pacity and a 21% decrease due to plant responses to changes in the climate. It tends to support the idea that CO2 effects may be larger than climate effects (e.g. temperature and rainfall) to determine the impact of anthropogenic climate change on vegetation of all kinds (natural or cultivated). Dr Josep Carbonell, head of the World Carbon Project, sums it all up by stating: "CO2 is bad for the climate, but good for plants".

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## Bibhu Santosh Behera, Ouat Bhubaneswar, Odisha, India

INNOVATION(Agrowaste-Food Compost)

Being invented by Bibhu Santosh Behera,Ph.D Research Fellow,OUAT,Bhubaneswar

As the Tribal people’s were traditional they were making a Low cost bamboo dustbin in their villages and put all food left out as well agro wastes and finally they use it as a substitute of Compost.

Dosages:-2 Bullock carts per Acre

You can use it in day to day life

## Bibhu Santosh Behera, Ouat Bhubaneswar, Odisha, India

Dear Friends of UNEP/FAO and all

Please follow my models and concepts from my Ph.D Research for achieving SCP as well SDG.

My Developed Model

* Research-Extension-Farmer-Climate-Market-End User (REFCME)
* This model is being developed by me( Bibhu Santosh Behera) from this study of research. This is the best model for achieving success in day to day life.
* Climate Smart Extension Education must be fruitful when it is preached and applied in Climate smart Agriculture .It should be introduced in Course curriculum in University as well schools for betterment of our future comings. So lets put our hand to translate this concept into action. So Follow this caption.
* GO GREEN
* ADOPT ORGANIC
* MARCH AHEAD
* FOLLOW CLIMATE SMART EXTENSION
* SUSTAIN THE FUTURE
* *Bibhu Santosh Behera,Father of Climate Smart Extension, Indian PhD Researcher*
* *Dream of a Climate smart village*



* Innovation for Climate smart economics



* We should make Technology Advancement and Refinement (TAR) of Research or any technology which must be blended with Modern technology with conventional by conglomeration with Indigenous technical knowledge (ITK).The technology must be socially acceptable, economically viable, and technically feasible, culturally compatible and climatically suitable.

Bibhu Santosh Behera, Innovator and Researcher of Climate Smart Extension Education for whole cosmos

## Jo-Anne Relf-Eckstein, Canada

Q1 comments:

1) What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing policies and programmes?

Public policy is defined by Thomas Dye as "anything a government chooses to do or not to do". While this is but one way of understanding public policy, it has helped me think about answering this question. Question1 implies linking policy-makers who most likely have different agendas, resources and political priorities. Additionally, in many countries policy design/formulation/implementation for the issues of climate change; nutrition; and food cuts across several policy systems (climate change involves environment departments; nutrition is health and wellbeing and food can be agriculture (production), trade and economy and access to food or assistance in redistribution to those who are in need may fall under social welfare.

Nearly all policy problems display characteristics of reconciling cooperation and conflict. If you accept this, then the first main issue to consider is cooperation and finding common ground for the policy-makers that justifies government intervention in the economy - a problem common to all policy domains. Without agreement on the definition of the problem; the goal(s); the means to achieve the goals, and how to measure (ie evaluation), policy design/implementation/evaluation, the problem remains "unstructured"(see Hisschemöller and Hoppe 1995). I am coming to the conclusion policy-makers (the ones who actually make the decisions) either do not believe there will be a shortage of "commodities" (food), or if they do accept the information and evidence, it is riddled with too much uncertainty to sustain their attention, let alone come to agreement across the different policy arenas and policy systems (e..g different countries/regimes/ideologies). Perhaps there wont be policy action until there is a crisis - a big crisis and we make a new definition of the problem - such as social conflict? If we cannot agree on the ways to measure it, how can we manage it? And if there is lack of agreement on the values and beliefs (ie different policy domains), how can we expect "food security/insecurity" to be a main policy issue? As Dye says, the govt chooses "not to do something". Its much easier to let the market work out a solution through innovation (e.g incentivize to increase food production) then take a policy systems-thinking approach to solving the complex global problem.

Time horizon is also a factor. Policy implementation may be viewed as beyond the scope of election cycle., so why take action now and especially when there remains high levels of uncertainty on the issues of climate change, food security and nutrition is an issue. (for example see Mark Gibson, The Feeding of Nations the many ways to measure food insecurity/security - if we can’t measure, how can we manage?). Policy-makers have limited resources - there is only one pie (of available resources) but many ways to cut it. The evidence on climate change may be far too distant to give policy-makers certainty that they are making the right decision.

If we look back in our history and if the literature reporting on the early days of policy-making on food insecurity (ie formation of the FAO) is accurate, then we can postulate that the current state was one of social conflict. The governments and policy-makers of the day needed to address the problem of scarcity of food. The literature suggests 1) there was at least one policy broker with influence to advocate on behalf of those suffering and thus helping to define the problem and put it on the policy agenda; 2) a common goal held by the elected leadership to resolve the social conflict that food insecurity was causing and 3) political will to implement the means to reach the goal and resolve the issue of scarity and distribution of food. 4) in addition to respecting the human right to food principle, there were economic reasons to act. There was action. There was leadership. Common ground was "brokered".

So what could policy-makers consider? Maybe are trying to solve the wrong problem. The "problem", or difference between current state and future state is not just about food and the climate etc. but what happens when people don’t have enough food - it is social conflict, diseases, loss of life, economic losses etc. Social conflict may be easier to quantify - as a society, we've been there, done that. A problem of social conflict might better engage our rational decision-making of costs and benefits and loss of quality of life speaks to our emotional component of decision-making. Designing policy solutions that incentive changes in individual behaviour from the bottom-up, focus on local knowledge and leadership and small but many changes in individual and community might help. Each local community knows its area, its strengths and weaknesses. For example, to solve the problem of coordination, instead of top-down government policies that are difficult to implement, monitor, evaluate and ensure compliance, nudging individual behaviour seems more achievable. Perhaps we need polices and financial resources to build leadership, cooperation and coordination at community levels and collaborative governance systems that are prepared to face the crisis we anticipate. Moreover, this needs to be done in both developed and developing countries; small landholders and large landholders. The problem is everyone's responsibility - NIMBY (not in my backyard) doesn’t cut it. Small things like consumer food waste is embarrassingly high and yet we continue our behaviours. Sadly, will it take another crisis to focus a common problem and change policy? if you believe this, then is the next best policy option is for government intervention policies that build preparedness for the crisis but even that takes leadership, advocacy and finding common needs and wants.

## B Cole, National Algae Association, United States of America

ALGAE for FOOD and FEED in third-world countries.

http://www.pbs.org/newshour/updates/algae-growing-nuns-in-central-africa...

To UNEP and FAO: The article above is about Nuns at St. Josephs growing algae for food. Algae farms can be built today on non-arable land. recycling 85% of all water using the sun. All is needed is non-arable land, a source of water and a source of CO2. All technology hurdles have been met. Algae is one solution to eliminate malnutrition in children from third-world countries and algae farms can be built today using existing technology and off-the-shelf equipment.

For information: info@nationalalgaeassociation.com

## Paul von Hartmann, United States of America

"What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing policies and programmes?"

Increasing solar UV-B radiation is a dimension of climate change that has many adverse consequences, including immune suppression, genetic mutation and abnormal cell division. Crop failures, forest death, increasedt solubility of toxic metals and soil microbe damage are also associated with increasing UV-B radiation.

In addition to implementing biogenic strategies for mitigating increases in UV-B, it is relevant to consider a proactive, nutritional approach to prevention and treatment of the diseases that are linked to increasing UV-B. [1]

Since "DNA Day" is celebrated each year in April, it is especially timely to consider the role of Cannabis seed nutrition in repairing damaged DNA, before the Spring planting season for 2015 passes. [2,3, 4, 5]

Cannabis "hemp" seed is the best available source of vegetable protein for the greatest number of people in the world, comprised of 65% edestin protein and 35% albumin protein. Protein production determines carrying capacity.

Political interference has impeded open discussion of the many reasons to recognize hemp as a critically important crop. Our species does not have time for suppressed response to the global threat of climate change. All solutions to the compounding problems must be considered, without regard to outdated policies that continue to limit open discussion of an overlooked and under-utilized, "strategic" natural asset. [6]

References

1. Climatology of Ultraviolet Radiation at High Latitudes Derived from Measurements of the National Science Foundation’s Ultraviolet Spectral Irradiance Monitoring Network

 <http://link.springer.com/chapter/10.1007/978-3-642-03313-1_3>

"Measurements of solar UV irradiance performed during the last 18 years at six high-latitude locations and San Diego have revealed large differences of the sites’ UV climates. The ozone hole has a large effect on the UV Index at the three Antarctic sites, and to a lesser extent at Ushuaia. UV Indices measured at South Pole during the ozone hole period are on average 20%-80% larger than measurements at comparable solar elevations during summer months. When the ozone hole passed over Palmer Station late in the year, the UV Index was as high as 14.8 and exceeded the maximum UV Index of 12.0 observed at San Diego."

2. DNA Day 2015

<http://ghr.nlm.nih.gov/spotlight/dna-day-2015>

3.Hemp can repair DNA

<http://beforeitsnews.com/alternative/2012/09/hemp-can-repair-dna-2-2471364.html>

4. Molecular characterization of edestin gene family in Cannabis sativa L

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5. National Library of Medicine - Medical Subject Headings.

Name of Substance edestin protein, Cannabis sativa

<http://www.nlm.nih.gov/cgi/mesh/2011/MB_cgi?mode=&index=161552>

6. Executive Order 13603

PART VIII - GENERAL PROVISIONSSec. 801. Definitions. (e) "Food resources" means all commodities and products, (simple, mixed, or compound), or complements to such commodities or products, that are capable of being ingested by either human beings or animals, irrespective of other uses to which such commodities or products may be put, at all stages of processing from the raw commodity to the products thereof in vendible form for human or animal consumption. "Food resources" also means potable water packaged in commercially marketable containers, all starches, sugars, vegetable and animal or marine fats and oils, seed, cotton, hemp, and flax fiber, but does not mean any such material after it loses its identity as an agricultural commodity or agricultural product.

<https://www.whitehouse.gov/the-press-office/2012/03/16/executive-order-national-defense-resources-preparedness>

## Manoj Kumar Behera, NRMC India, India

Hi everyone

I think it is high time for FAO to critically analyse the agricultural and environmental policies of different countries...The results of the analysis can better guide us where to intervene and how to do it effectively to realize the goal of environmental sustainability without affecting the economic growth of countries

Furthermore, this will help us in identifying the best practices around food and nutritional security both at Government and community level....Then FAO shall take steps to share these best practices among the countries for necessary changes in their policy and institutional frameworks......Now focus shall be more on community resilient traditional systems and practices which seem to have tremendous potential in addressing the concerns of climate change, food and nutritional security

Hope this issue will find a place in the action plan of FAO

## Emile Houngbo, Université d'Agriculture de Kétou (UAK, Bénin), Benin

[ENGLISH VERSION PROVIDED BY THE PARTICIPANT BELOW]

Quel modèle de production agricole pour la sécurité alimentaire et nutritionnelle face au changement climatique actuel ?

La question des impacts du changement climatique sur la sécurité alimentaire et nutritionnelle est celle du choix du modèle de production agricole capable de maintenir la production requise pour continuer à satisfaire les besoins alimentaires de l'humanité. Car, c'est un fait que le changement climatique a des conséquences énormes sur l'environnement et les conditions de production agricole. Les conditions climatiques (température atmosphérique, pluviométrie, insolation, ...) ne sont plus comme elles étaient il y a quelques dizaines d'années. On se demande si l'environnement continuera à assurer efficacement ses fonctions de production, de régulation et de protection pour l'homme. En réalité, des espèces et variétés végétales et des races animales utiles à la production de la nourriture sont affectées négativement. Il y en a qui vont disparaître carrément, pendant que d'autres vont perdre de leur performance productrice passée. Mais, dans le même temps, il y aura aussi des espèces, variétés végétales et races animales qui vont s'adapter à ce changement climatique. Il y en a en qui continueront ou qui deviendront utiles à l'alimentation humaine suite à ce changement climatique. Il reste seulement à savoir quelle attitude adopter dans ce contexte de changement climatique. A notre avis, il suffira d'appliquer le principe que "l'on ne commande à la nature qu'en lui obéissant". Nous devons plus jamais faire attention aux pratiques agricoles dégradantes qui nuisent à l'environnement et donc réduisent son efficacité à accompagner la productivité agricole. C'est dire que l'agriculture conventionnelle, qui est d'ailleurs l'une des causes de ce changement climatique, ne doit plus continuer. Nous devons renoncer entre autres à l'utilisation abusive des pesticides, engrais minéraux et espèces exotiques. Il s'agira de s'orienter beaucoup plus vers l'agroécologie comme modèle de production; un modèle qui mettra au centre des pratiques, la conciliation de la production agricole avec le respect des principes écologiques. Ceci amène à accorder une importance considérable aux espèces, variétés végétales et races animales traditionnelles; c'est-à-dire qui ont fait leur preuve d'adaptation écologique à travers le temps. Il doit en être de même pour l'approvisionnement en semences. Celles-ci doivent provenir moins des variétés exotiques qui sont souvent exigeantes en intrants et en sols, et qui sont aussi plus sensibles aux maladies. L'agroécologie est donc la solution, mais il demeure qu'il faudra prendre les dispositions nécessaires pour son adoption massive. Car, il faut le signaler, les pratiques agroécologiques (agroforesterie, agriculture de conservation, utilisation de plantes de couverture, etc.), tout en réduisant le recours aux intrants externes, exigent le plus souvent une quantité de travail plus importante et une technicité plus améliorée de la part du producteur.

[ENGLISH VERSION]

Which Model of Agricultural Production for Food Security and Nutrition in the Present Climate Change Context ?

The issue of climate change impacts on food security and nutrition is the choice of the model of agricultural production capable of maintaining the production required to continue to meet the food needs of humanity. For, it is a fact that climate change has a huge impact on the environment and agricultural production conditions. Weather conditions (air temperature, rainfall, sunshine, ...) are not like they were a few decades ago. One wonders if the environment will continue effectively performing its functions of production, regulation and protection for humans. In fact, species and plant varieties and animal breeds useful for food production are negatively affected. There are some of them which are going to disappear, while others will lose their former production performance. But at the same time, there will be also species, plant varieties and animal breeds that will adapt to climate change. These plants and animals will continue to be or will become useful for human consumption due to the climate change. It only remains to find how to behave in the context of climate change. In our opinion, it is sufficient to apply the principle that "one can command nature only by obeying it." We must now pay great attention to the degrading agricultural practices that harm the environment and thus reduce its effectiveness to support agricultural productivity. This means that conventional agriculture, which is also one of the causes of this climate change, must continue. We must reduce significantly the use of pesticides, fertilizers and exotic species. We must then move much more towards agroecology as a model of farming; a model that will develop agriculture and will be also respectful to the ecological principles. This model impose to attach considerable importance to the species, crop varieties and traditional animal breeds, which have proven ecological adaptation through time. It must be the same for the supply of seeds. These later must come less from exotic species that are often demanding inputs and soils, and are also more susceptible to disease. Agroecology is the solution, but it needs to make arrangements for its widespread adoption. For, it must be reported, agro-ecological practices (such as agroforestry, conservation agriculture, use of cover crops), while reducing the use of external inputs, often required a significant amount of labor and an improved technical level of the farmer.

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## Gill Shepherd, IUCN, United Kingdom

I have been working on climate change and food security in several countries over the last year or two, but will write here about Mexico and Ghana. In these cases - and all the others - farmers are having to adapt to climate change on top of other changes going on anyway.

(1) The most important of these is rising population densities, leading to shortened fallows and an enforced move along the land-use intensification continuum in response to the resulting declining soil fertility. Higher proportions of income than before are having to be spent on fertiliser and weed/pest control.

(2) Secondly, in rural Mexico (Yucatan) and rural northern Ghana (Mole), the schooling of children in primary and secondary school and the frequently resulting exodus of young people to look for urban employment rather than returning to their parents' farms has resulted in a permanent loss of labour on the farm. This may be no bad thing in the long run, but in the short run it makes risk-spreading (for instance raising cattle and other animals as well as growing crops) almost out of the question in labour terms.

These two changes are forcing profound changes in farming systems in their own right, even before taking climate change into account as well.

Farmers in Ghana told us that, from the mid 1990s, they began to notice the increased unpredictability that is their main experience of climate change. Indicators for the imminent onset of the rains which used to be relied on as a trigger to planting - the appearance of certain birds and flowers, for instance - no longer meant what they had meant before. It was impossible to be sure that rains would start, or that if they started they would continue.

Their needs include quick-maturing crop varieties, which are relatively hardy. Because they are having to abandon many previous crops and crop varieties they need a lot of advice about how to innovate. But agricultural extension services no longer exist.

In Yucatan, farmers are narrowing the range of crops they grow and often investing more in livestock as adaptations both to points (1) and (2) above, and to the much more violent intensity of heat, drought and hurricanes that is their experience of climate change.

In both these places - and others worked in - the complementarity of wild foods from the forest is very important, and these foods may at times mitigate the climate change experience.

In Ghana, more commitment to rural extension is needed all round from the government agencies responsbile for agriculture, livestock and forests.

In richer Mexico, these agencies do work in rural areas, but they do not sufficiently work with one another. Villagers complained that they were offered completely contradictory advice by Agriculture and by Forests, and wished that higher level policy makers would sort out their differences, and make themselves more fully aware of local people's needs and constraints.

## Md.Moshfaqur Rahman, Bangladesh

My answer:

1) To understand the nature is a first thing; then the attitude to control it. If we abate this type of approaches then the nature is friendly.

2) I don’t have faith on government & its bureaucrats. A body of international & national with expat for policy & implementation with a definite fund from budget then it can be worked.

3) When its cross-sectoral then everything is mixup & we all thing that we are the best & our policy is the solution. So maintaining this is tough.

Like flood is a blessing for flood plain but we misunderstand this also we made structure after structure to resist flood; so when it comes it destroy everything. But if we let it flow to land then land will be fertile with fish spawning & many.

This is we make blessing a curse-so lots of on structural function.

## Claudia Martínez, Consultora INDER, Costa Rica

[*Original contribution in Spanish*]

Buenas tardes

En primer creo que la agricultura debe cumplir con los objetivos y principios de la agricultura sustentable, por ello debe ser: 1. adaptable a las condiciones cambiantes de cada agricultor, 2. debe garantizarse al agricultor que lo que estamos ofreciéndole funciona y da resultados y 3. Debe garantizar su mejora en la economía familiar y calidad de vida, entiéndase bien calidad de vida NO subsistencia.

Los objetivos de toda actividad, igual para la agricultura es que sea: económicamente viable, socialmente justa, localmente autosuficiente y amigable con el ambiente(cambio climático), por tanto no podemos meter a todos los agricultores en un saco, desde que FAO, ONU impulsan en 1992, el desarrollo sostenible, las practicas y propuesta van y vienen y no se definen y confunden cada día más a los agricultores.

Cambio Climático: Relación entre cambio climático vs Desertización y Desertificación, hay diferencia, es lo mismo, en 1995 en un curso superior de especialización en agricultura ecológica, agricultura sostenible, impartido por la Junta de Andalucía y el Gobierno español, veiamos con gran profundidad el impacto generado por la acción del homre y la naturaleza, para mi el famoso cambio climático de hoy

En relación a sus preguntas:

Cuáles son las principales cuestiones: Pregunto respetuosamente que significa para ustedes cuestiones?

Con 32 años trabajando en campo al lado de los agricultores día a día en el diseño y establecimiento de sistemas agropecuarios sostenibles como agronegocios y últimamente ajustando el área mínima necesaria para que una familia campesina viva, coma sana y nutritivamente y tenga calidad de vida, puedo decirles esas"cuestiones", por las que uetdes preguntan lo que necesitan es acción, no de políticas, ni de programas, hay que actuar yá, y actuar con profesionales con experiencia práctica, en campo, no en escribir y dictar políticas. Teconologías hay, de bajo costo, de fácil acceso, y viables económicamente. Lo que no tenemos es capacidad técnica, los profesionales hoy día se bajan de un avión y se suben a otro y se mal informan de lo que sucede en la realidad poruqe es más importante viajar que atender directamente las ncesidades de los productores/as.

2. Desafíos: enfrentar la situación y atacar el problema de la seguridad alimentaria y nutricional trabajando al lado del agricultor, no dirigir desde oficinas centrales laas acciones, desarrollar encadenamientos y cadenas de valor local, enfatizar en la importancia de la producción primero para el autoconsumo, diversificar la unidad de producción familiar, dejar de andar inventando nombres raros a lo que hacen y ponerse a trabajr de verdad en la parte productiva, el vincular al agricultor en una venta directa productor-consumidor es lo ideal y adecuado en este momento, desde todo punto de vista, económico, social, ambiental y reduce la huella de carbono además,

3. Lecciones aprendidas: Personalemente no las veo, a nivel intersectorial, no existen, tal vez existan en un papel, pero de ahí a la realidad en campo dista Km de Km de distancia, en el papelito encuantran la solución a todo pero la realiddad es otra, un grave problema es el beneficio directo alas mismas familais en los últimos 20 años, todo se lleva a un mismo lugar, lugar que no da resultados, el aporte económico brindado es para que vendadn comida a las personas que llegan a capacitarse a sus espciso, estos espacios llamadas vitrina tecnológicas no ESTAN FUNCIONANDO,

Esta es mi oipinión, basada en mi experiencia entre México y centroamérica como consultora y en mi país Costa Rica, de lo dicho a lo hecho, solo en el papel.

Un cordial saludos

[*English translation*]

Good afternoon,

First of all, I believe agriculture must comply with the objectives and principles of sustainable agriculture. Therefore, agriculture should: 1. Adapt itself to the changing conditions of each farmer; 2. Guarantee the farmers that it works and yields results; and 3. Ensure an improved household economy and quality of life (NOT subsistence) to the farmers.

Any activity, agricultural or of any other nature, should be economically feasible, socially fair, locally self-sufficient and environmentally friendly (climate change). Therefore we cannot lump all the farmers together. Since FAO and the UN started promoting sustainable development in 1992, diverse practices and proposals have followed, lacking consistency and increasingly confusing the farmers.

Climate Change: Relationship between Climate Change and Desertification. Differences exist. In 1995, in an advanced specialized course in organic farming and sustainable agriculture conducted by the Regional Government of Andalucía and the Spanish Government, we studied the impact caused by the action of man and nature in depth. In my opinion this is what nowadays is called climate change.

Regarding your questions:

What are the main issues? I would respectfully like to ask what does the term “issues” mean to you.

After 32 years working daily in the field, side by side with farmers, on the design and development of sustainable agricultural systems such as agribusiness and, more recently, on the optimization of the minimum surface area required for the everyday life, healthy and nutritious diet and quality of life of a farming household, all I can say is that these “issues” need action. They do not require policies or programs, but immediate action led by professionals with practical experience in the field, not by policy-makers. Low-cost technologies -easily accessible, and economically feasible- do exist. What we do not have is technical capacity. Nowadays, the professionals step off an airplane and hop on another one. They are not properly informed about the reality, because travelling becomes more important for them than meeting the producers’ needs.

2. Challenges: To address the situation and tackling the problem of food and nutrition security in cooperation with the farmers, avoid remote operational management from the headquarters, develop linkages and local value chains, emphasize the importance of production primarily for own consumption, diversify the household production unit, stop creating weird terms for whatever is being done, and work productively. Right now, engaging the farmer in a direct sale to the consumer seems to be ideal and appropriate from an economic, social, environmental –carbon footprint reduction as a bonus– point of view.

3. Lessons learned: Personally, I think no lessons have been learned at the intersectoral level. Maybe they have been reflected in a document, but they are very distant from the reality in the field. Solutions to every problem can be found in a document, but the reality is different. A serious problem is that the same families have been benefited over the past 20 years. All the resources are allocated to the same places yielding no results. Economic support is provided to sell food to people who receive training in these areas. These places, called technological showcases, are NOT WORKING.

This is my opinion, based on my experience as a consultant in Mexico, Central America and Costa Rica, my country.

Kind regards.

## Antonio III Añano, Philippine Association of Agriculture Visayas Chapter, Philippines

Combination of land management and land administration would be very best significant to combat climate change. In the Philippines political will with technical capabilities must be combined in order the land use policy should properly be implemented on the use of our natural resources. Land use or natural resource must be conceptually and carefully study on the use of the natural resources according to the needs, desire, aspirations of the men’s need for sustainable development...

## Jean Philippe Pancrate, Perfect Union, France

The climate change is in the centre of the news. It concerns all of us. It affects our lives and has devastated our economies. The price to pay is becoming too high .Today do we need small scale change or a revolution against this scourge with affects more and more starving people every day? We must fight against poverty and the conditions that create it. One of which is climate change. Today more than ever, we must act faster.

## Jonica Otarra, Center for Integrated Development and Social Marketing,Inc., Philippines

I want to share with everyone some insights with regards to the climate change and food production issues written by Dr. Hector Malleta. I do agree with him on the fact that a lot needs to be done today. However, we might have very different perspectives and data on the following points:

 A. It is predicted that there will be a massive rise of the economic growth till the end of century. Moreover, according to the ICCG Webinar “Water Challenges in the Agricultural Sector”( <http://www.iccgov.org/EventDetails.aspx?IDEvento=360&IDSM=59&IDM=75>) last March 6, 2015,there has been a decline in global agricultural production of Maize, Wheat and Rice. Figures for Maize are from 1961-1990, there is a total growth rate of 2.33 and from 1991 -2010, the growth rate was 1.82. For wheat, from 1961-1990, the world growth rate was 2.73 and from 1991-2010, it was at 1.03. For Rice, from 1961-1990, the total global growth rate was at 2.14, while from 1991-2010, it was at 1.09. These data coincide with FAO’s Webinar last March 31, 2015 (<http://www.fao.org/climatechange/micca/88950/en/>),that there is a continuous decline in agricultural production if the problem of climate change continues.

B. If we are aiming for a world and sustainable future for all then I believe that we must look at the issues holistically- that is both at a micro and macro level of analysis. We have to take into the account the surrounding issues of the consequences of using lands especially those that are used for commercial purposes. we already have exceeded the planetary boundary for biodiversity loss (<http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries.html>). Biodiversity loss is a result also of the fact that when lands are being converted into mono-cropping plantations or for commercial purposes, such as factories, etc. we basically cut down trees, alter soil composition, etc., which leads to the displacement of a lot of species in the forest. When they are displaced, when these species are deprived of their natural habitat, sooner or later, they die especially when they do not have food to eat. We do also have to take care of them because they also provide us a lot of ecosystem services. Added to this is the fact that the indigenous peoples are being displaced away from their lands. This is a major issue that still remains true especially for those large commercial mono cropping plantations and large commercial mining companies. Often times, politics play a role on this issue. If countries are to adopt the SDGs this year, then policy makers should also address this issue.

C. I really do not see why climate change has beneficial implications for agriculture when we have also exceeded this planetary boundary. Exceeding planetary boundaries have negative impact and that means an alteration on earth’s system processes that leads to a high possibility of loosing the earth’s resilience. It is sad to think but really true that scientists predict that the temperature of the planet is getting warmer that can reach 4 degrees Celsius, the temperature of the civilization before the last ice age, Humans could become 6th mass extinction of the species and it is predicted that we will be 10 billion by 2050. Moreover, the scientific data of the great acceleration (<http://www.igbp.net/globalchange/greatacceleration.4.1b8ae20512db692f2a680001630.html> ) shows that everything is rising today. There are no signs to show that there is a decoupling or a decrease among the data. Aside from that, basic science would tell us that in order for plants to survive, they do need a good amount of sunlight and water.

I hope this helps: -)

## Subhash Mehta, Devarao Shivaram Trust, India

Prof Amar Nayak’s paper
(<http://www.fao.org/fsnforum/sites/default/files/resources/FAO%20Sm%20Amar%20CFS%20contribution.docx>) , with some inputs from me, as trailed below, focuses on ‘Achieving sustainable development for food, nutrition and livelihood security through low cost low risk agriculture and using the producer company/ org (PC) intervention but staffed with professionals’. The paper highlights sustainable approaches to agriculture in the long term, ensuring access to food, nutrition and cash for all producers through agriculture and also meeting the increasing nutritious food needs of the growing populations, value addition for increase shelf life of farm produce to reduce postharvest losses and waste, also trade in the vicinity and opportunities, without compromising the economic, environmental and social bases of the rural poor producer communities. The paper identifies barriers to change, including in institutions, organizations, policies and governance, and potential options to overcome them and covers the enabling environment necessary for transition to systems sustainable in the long term.

## Habiba Hassan-Wassef, Health and Nutrition Policy in Development, Egypt

To FSN Forum Team,

As a complement to the online event Climate Change, Food Security and Nutrition I wish to publicize this crowdsourcing campaign. I am conducting this initiative in the framework of a research project funded under the EU-Egypt Innovation Fund, aiming at promoting knowledge transfer networks that bring together the various actors of the agro-food value chain.

Our objective is to build a community of interest on climate change, food and nutrition security and, especially, to promote active sharing of resources among its members.

The free software we are using is called "Magicrowd". It is allowing us to curate thematic boards displaying all sorts of contributions and not only comments (written insights, links, images, files).

Habiba Hassan-Wassef, MD
Health and Nutrition Policy in Development
Research Consultant, National Research Center, Cairo
Head, National School Feeding Program Preparatory Committee
HORIZON-2020 NCP (Food)
Independent EU Expert in Food and Health
Trustee, African Nutrition Society
Trustee, Knowledge for All Foundation
Adviser, UN High Level Panel of Experts on Food and Nutrition Security
Member of the EU Knowledge For Innovation Group

## Florence Egal, Food Security and Nutrition expert and facilitator of this discussion

Dear all,

I hope some of you had a well-deserved break, but many have been working hard. Let me try and summarize some of the key issues that have emerged in the last days:

* *Climate change must be seen in the context of* – and as an addition to – major *changes in farming systems and lifestyles*. “Modern” agriculture techniques have focussed on use of fertiliser and weed/pest control which have increased production costs. Schooling of children and migration in search of urban employment has led to increased labour constraints in family farms, which does not allow any longer risk-spreading (e.g. combining animal and plant production) and delivery of environmental services (for both sustainable management and mitigation of natural disasters).
* The narrow approach often taken to prevent “natural disasters” such as floods, has had a negative impact on the food and agriculture system. It is important to adapt to nature and not fight it. *Societies have a long record of managing the impacts of weather- and climate-related events* and there may be a lot to learn from “community resilient traditional systems and practices”. It is important to revive indigenous varieties for climate change mitigation and nutritional security.
* *Sustainable agriculture* must nurture healthy ecosystems and support the sustainable management of land, water and natural resources. It *must meet the needs of present and future generations for its products and services, while ensuring profitability, environmental health and social and economic equity*. It must be adapted to local conditions and ensure decent livelihoods. The focus must be on local food chains, diversification of household production and direct sale to the consumer, with a view to ensure family consumption first and local food availability, while reducing carbon footprints. The complementarity of wild foods for food security and nutrition can be very important, and help to mitigate the impact of climate change.
* *Agro-ecology* can contribute to preventing and adapting to climate change, and can benefit all farmers from large scale commercial agriculture to subsistence farmers. It is urgent to upscale communication, extension, education (from primary school to university). Peer-learning starting from local experience should be given priority. A wealth of material has already been developed.
* *More on governance* Policy makers must be more aware of local people's needs and constraints and ensure coherence of messages. The policy agenda and mechanisms for production and resource conservation are mostly disjointed. There is no clear integrated management of ecosystems and/or landscapes. The current architecture of public service delivers various government schemes with people as mere recipients and inadvertently weakens rural communities which are essential to sustainability. Policies and financial resources in both developed and developing countries should focus on building leadership, cooperation and coordination and developing collaborative governance systems at all levels which can help navigate trade-offs. Support to sustainable agriculture should go hand in hand with appropriate nutrition interventions and social protection.

Looking forward to the next round of contributions. Have a nice week.

Florence

## Forests for Food Security and Nutrition, FAO Forestry Department, Italy

Dear FSN Forum members,

1. What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing policies and programmes?

Sustainably managed forests can play a key role in climate change mitigation and adaptation. Therefore, Sustainable Forest Management (SFM) practices are important and relevant to this particular discussion.

Despite the seemingly obvious causal link between climate change and FSN, there is still a lack of comprehensive understanding on the nexus. Negative impacts of climate change on natural resources bring an immediate effect on food availability and access, thus urgent attention is required. However, we should also not forget other remaining aspects of FSN, which are directly dependent on healthy forest resources. Some of the examples include the potential deterioration on: i) safe cooking practices due to a lack of fuelwood, ii) human health led by disappearing local non-wood forest products and a lack of access to clean water and air, iii) long-term environmental health and resilience to shocks based on overall forest ecosystem services, as well as many other elements which are essential to ensure sustainable FSN.

In dealing with Climate Change and Food Security and Nutrition, there is generally a lack of cross-sectoral policies. For example, while SFM policies and policy-makers take certain aspects of livelihoods into consideration when addressing climate change adaptation practices, the Food Security and Nutrition (FSN) objectives are usually not properly reflected nor adequately incorporated in the SFM practices. SFM policy-makers do not necessarily confer about climate change and FSN in a cross-sectoral manner involving actors from FSN-related sectors. In turn, opportunities to enhance FSN through SFM, in the context of climate change, are not fully captured at policy level.

1. What are the key institutional and governance challenges to the delivery of cross-sectoral and comprehensive policies that protect and promote nutrition of the most vulnerable, and contribute to sustainable and resilient food systems?

As discussed above, the lack of understanding on the extensive nexus between SFM and FSN yields limited efforts to plan and implement cross-sectoral and comprehensive policies. Consequently, there is relatively little knowledge including best practices on effective design and implementation of such policies by different sectors.

Cross-sectoral collaboration can be particularly difficult among the “competing” sectors in some cases. As an example, sectoral dynamics among the forestry, the agriculture and the environment sectors can vary depending on the national institutional context, and in some challenging contexts, such dynamics can act as a bottleneck in spite of the sound understanding on the link between SFM and FSN.

1. In your experience, what are key best-practices and lessons-learned in fostering cross-sectoral linkages to protect and improve nutrition while preventing, adapting to climate change and reducing and removing greenhouse gas emissions in projects?

It has been evident that Sustainable Forest Management (SFM) policies and programmes which are better integrated into other sectors, such as rural community development, not only ensure generation of greater socio-economic benefits including food security and nutrition but also enlarge the number of beneficiaries.

A good example of best practices is the one of the the Republic of Korea (RoK). RoK is one of the few countries who succeeded in forest rehabilitation at national level with the aim, amongst others, to improve FSN. The national forest cover of today has reached 63% of the total land cover while in the 50s it was less than 35% in a severely degraded condition. As such, it demonstrated that restoration of forests and prevention of consequential climate change impact were possible and led to substantial FSN improvement.

The Republic of Korea’s National Forest Rehabilitation Plans have been implemented since 1973 in ten-year cycles. Especially in the 70s and 80s, RoK’s National Forest Rehabilitation Plans were implemented under a bigger framework of “Saemaeul Undong” (New Community Movement in Korean). “Saemaeul Undong” began with an objective to “improve the living and agricultural environments, solve food problems, increase profits for farmhouses, reduce the income gap between urban and rural communities, and improve morale of the populace” (Ministry of Strategy and Finance, 2013). RoK’s experience is, therefore, a very good example of the integration of forestry policy with community development policies including some key elements of FSN.

The National Plans were implemented in conjunction with a broader “Saemaeul Undong” programme, covering activities related to income generation, fuelwood plantation and fruit tree plantation. Successful implementation of the plans not only made forest and landscape restoration possible at national level but also, contributed to the country’s food security and rapid economic development through the rehabilitation of ecosystem services.

Among many of the success-factors, the presidential leadership at the time ensured a sound cross-sectoral collaboration among the concerned ministries (e.g. Ministry of Agriculture, Ministry of Internal Affairs, Ministry of Transportation, Ministry of Defense etc.). Last but not least, it should also be highlighted that the policies were able to reinforce the role of communities as illustrated by their strong participation and the sense of ownership.

## Hector Maletta, Universidad del Pacifico, Peru

@Jonica Otarra's comment of 6 April:

Jonica writes that "there has been a decline in global agricultural  production of Maize, Wheat and Rice".

But she is actually referring to a decrease in the GROWTH RATE of output. Cereal output of itself (all three plus several other species like oats or barley) has been growing steadily since 1961, and in fact cereal production in 2014 is an all-time record, overcoming the previous all-time record of 2013, which in turn overcame the previous all-time record of 2011, and so on. Data up to 2013 are all in FAOSTAT, for 2014 preliminary estimates see FAO's Cereal Supply and Demand Brief, <http://www.fao.org/worldfoodsituation/csdb/en/>.

Now, the growth rate is not equivalent to the potential production growth allowed by technology and natural resources, but to the amount dictated by demand. As incomes grow, demand for staple food (like cereals) tends to stagnate while demand increases for other foods (fruit, vegetables, vegetable oils, meat, dairy products and so on). Per capita output of cereals is in fact stagnant since the 1980s, and food consumption of cereals is actually declining, while overall food consumption improves steadily in terms of calories, protein and micronutrients. Per capita output of those other foods correspondingly increases too. As population growth further decelerates as expected in coming decades, and per capita incomes continue to grow, this process is expected to continue. Even if the proportion of cereals going to other uses, such as animal feed or feedstock for biofuels, have been (slightly) increasing, per capita output of cereals is stalling, due to (slightly) declining per capita human consumption of cereals as food. One may promptly find this out by going to FAOSTAT production section to get the series of cereals (total), and to the population section to get population, copy both to a spreadsheet and do the division. For human food consumption of cereals one has to go to FAOSTAT's Food Balances section, choose Commodity Balances - Crop primary equivalent, and then select "Cereals (excluding beer)" in the Items box (while selecting "World" and the years desired). Per capita cereal output has been oscillating between 320 and 350 kg/year since about 1980 (the higher figure was only achieved in 2013 and 2014, but slightly lower figures were common in the 1980s). Per capita food consumption of cereals has gone from 127 kg/yr in 1961 to 148 in 1986 and 144 in 2011 (latest year available). Calories per capita at world level have grown from 2194 in 1961, to 2568 in 1986 and 2868 in 2011, but calories from cereals are much more sta­ble: 929, 1124, 1115 in the same years. The substitution of other foods for cereals is going on in all regions, including the more poorly fed like Sub Saharan Africa or South Asia. At world level, all the very significant increase in calories since 1990 came from non-cereal foods, and this is also the tendency for all major regions of the globe. So basing the analysis on cereals alone is bound to be misleading.

Jonica also writes: "I really do not see why climate change has beneficial implications for agriculture."

In fact, it does not have to be beneficial, on the whole. Most projections show a global (small) negativeeffect. But that small negative effect on total agricultural production (which in turn results from rather pessimistic and precautionary assumptions about the future) applies to the output that would be achieved in the future in the absence of climate change, not to the output achieved today. In the absence of climate change, that future output would be much larger than today's, so the small negative effect of climate change would not matter much. Anyway, just to respond to Jonica's implied question: climate change beneficial effects on agriculture arise from several sources; one is the improved agricultural conditions in temperate zones: new lands become cultivable in North America and Eurasia due to a warmer climate, and many lands in temperate regions improve their productivity due to lengthening of growing period, and the like. Secondly, more CO2 in the atmosphere increases photosynthesis (especially for C3 crops like wheat) and reduces water needs for C4 crops (like maize). Thirdly, global warming means also more global rainfall, albeit some regions would get drier (e.g. Northern Mexico or Southern Africa); increased rainfall is in general beneficial for agriculture by increasing the flow of irrigation water and improving conditions for rain-fed cultivation, especially in semiarid zones. The increase in CO2 in recent decades is already having that effect on crops and natural vegetation, as shown by several studies such as the Donohue article I cited in a previous post to this forum.

With the expected growth in population and income, demand for food and hence the required food output by 2050 is estimated to be 50-70% larger than in 2000. These figures imply an annual growth rate between 0.81% and 1.06% per year from 2000 to 2050; food output grew already by 39% in 2000-2013 at an annual 2.56%, so the required growth in the remaining years to 2050 should be just 22.6%, at annual 0.55%.

This expected growth is not all that scary: production is increasing already much faster than required to reach that goal, as it has been doing for more than half a century. The rate of growth of food output has been almost permanently around 2.5% per year in every decade since the sixties. By all accounts it is extremely unlikely that the average growth rate for 2013-50 falls so precipitously as to fall be just 0.55% per year. But even in that unlikely case, and with such minuscule annual growth, the output in 2050 would indeed be 70% greater than in 2000, thus responding to the expected demand from an expected population of about 9.5 billion as per the latest UN projections (on which more below). Notice, furthermore, that projected demand by 2050 includes the excess demand of obese and overweight people, which are expect­ed to increase in numbers and fatness in the intervening years, in both rich and developing countries, under the pessimistic assumption that nothing stops or slows down the wave of over-eating that pervades the world today and is reaching emerging countries very fast.

Even if no further technological innovation occurs in agriculture from here to 2050 (another implausible assumption in the century of biology), the mere process of diffusion of existing technology throughout developing and emerging countries, which is already taking place, would cause an annual increase in production far greater than 0.55% per year.

Jonica also writes that "it is predicted that we will be 10 billion by 2050".

Not quite. The latest UN figure (medium variant) for 2050 is 9.55 billion, a bit above previous projections of 9.2-9.3 bn. This slight increase is in turn only due to an apparently innocuous change in assumptions introduced in recent UN updates: up to 2010 it was assumed that fer­tility rates would converge to a common value of 1.85 children per woman; since 2010 it was suddenly assumed that they would converge to replacement level (2.1 children), thus increasing the projection for 2050 (and even more for 2100). There is no sign of such convergence of all countries (at different pace) to a common value; changes in fertility are a function of income and education, but the UN demographers did not take those factors into account, nor the fact that incomes and education are rising fast throughout the developing growth, and are expected to keep rising, thus putting the brakes on fertility. A regression model over all countries, with those variables set at the values observed in recent decades, and then projected to the future with the expected growth in per capita incomes adopted for the IPCC climate change projections, would predict continuing low (and decreasing) fertility at world level. I won't bet the farm on mothers in China or Brazil starting to bear more children any soon.

Improving the lot of the poor, so they can afford their daily bread (and also their daily cheese, chicken, peaches, and all other foods they may care about, plus all other necessaries of life) is the main priority and challenge, not the production of food which is already more than enough for everybody, and is expected to keep being so in the foreseeable future.

## Subhash Mehta, Devarao Shivaram Trust, India

ecology by and for the small-scale producers who grow 70% of the world’s food.

The conference, organised by the International Planning Committee for Food Sovereignty (IPC) and hosted by the Confédération Nationale des Organisations Paysannes (CNOP), was a powerful opportunity to show how agroecology can help realise the six pillars of food sovereignty outlined by the IPC in the same village of Nyeleni, back in 2007.

A representative of ROPPA (Network of Farmers’ and Agricultural Producers’ Organisations of West Africa) set the tone for the conference in his opening speech: “People are struggling every day, all over the world, but we must not struggle alone, we must work together.” One farmer’s voice is inconsequential in the face of the interests of financial profit, but together we can be heard.

The declaration drafted One delegate spoke about how our feelings are as important as the techniques we use in agroecology: “Without feeling,” he said, “I cannot be a farmer.” We feel connected to the natural environment in a spiritual way – not one quantifiable by financial returns. Agroecology is not just a technique or a system, it’s a way of living that gives people a strong cultural connection to the land.

The FAO was a key supporter of the February conference, and this new declaration defining agroecology more clearly has the power to influence FAO recommendations for the future of food production. With the UN following suit, we hope that nation states will, in turn, begin to look to agroecology to achieve genuine food security.

However, co-optation is a continuing threat, diluting the power of agro ecology’s ethos. The French government, for instance, has created a central role for agroecology through the 2014Loi d’Avenir (law for the future of agriculture, food and the forest). This is ostensibly driven by agroecological rinciples, but in its essence, it does not uphold the expanded definition of agro ecology. Reducing the use of pesticides and antibiotics, and encouraging organic farming and the use of agro forestry, are steps in the right direction but they do not, on their own, represent the holistic approach mapped out in the new declaration.

Peter Crosskey has commented in the Sustainable Food Trust’s coverage of the Loi d’Avenir, that:

“The members of the small-scale farmer’s union, Confédération paysanne (Conf’), constantly accused Stéphane Le Foll of using new catchphrases to embellish an old system – for example, exhorting farmers to ‘Produisons autrement’ (produce differently) but allowing the same industrial production alongside.”

The declaration was borne out of sentiments such as these, showing the will of people across the planet to work in ways that are healthy for us and the ecosystems on which we depend. The document weaves together many strands. It emphasises the importance of women as primary food producers, and the rights of indigenous peoples to access their traditional territories. The declaration also recognises our dependence on the health of ecosystems so that species extinction can be slowed and climate change halted.

In order to maintain and develop agroecological production, practical face-to-face exchanges and training between producers is essential. Engagement between producers and consumers, also, needs to be prioritised and traditional markets have a key role in this. The market is, again, the ‘agora’ – a place to come and buy staples from the producers we know and trust, but also the place we come for community exchange and cultural sustenance.

Out of these strong local networks, grassroots producers and consumers can make sure they are also represented in local policy-making decisions. Once these local networks work together they can link into national and international networks to ensure they are represented at higher levels of policy making too. This is well demonstrated through the West African networks of CNOP, which are members of ROPPA, which in turn works with Via Campesina, which is represented on the IPC.

Perhaps most significantly, the declaration, “recognise[s] that as humans we are but a part of nature and the cosmos. We share a spiritual connection with our lands and with the web of life. We love our lands and our peoples, and without that, we cannot defend our agroecology, fight for our rights, or feed the world. We reject the commodification of all forms of life.”

This declaration can lead us into a happier, more harmonious future, and towards viable food sovereignty. People deserve to be able to live with dignity, pursuing time-honoured practices that nurture the planet as well as their own lives.

## Subhash Mehta, Devarao Shivaram Trust, India

Dear Florence,

I am responding to your request for inputs on nutrition.

Shanthu Shantaram’s article at: [http://www.livemint.com/Opinion/LeNI9i16mbNcd5L8J8sU1L/Is-the-organic-mantra-for-real.html?utm\_source=copy](http://www.livemint.com/Opinion/LeNI9i16mbNcd5L8J8sU1L/Is-the-organic-mantra-for-real.html?utm_source=ref_article)

and the scientist community (almost all specialists) have got away with their push for high cost high risk laboratory developments of conventional mono crop agriculture systems  during the last around 100 years. In the long term, this has for many decades and continues to be the cause of the agrarian crisis, hunger, malnutrition, poverty and effects of climate change worldwide, especially among the rural poor smallholder producer communities (about 60% of the world's population) have lost the knowledge and know how to produce nutritious food through agriculture.

In contrast, those following the low cost low risk climate friendly Agro ecological organic  systems of their area, setting up producer org/ company (PC) but managed by professionals, to take over all risks and responsibilities, other than on farm activities, now have have access to own requirements of nutritious food and cash with increased net income/ purchasing power improved livelihoods, mitigation of climate change and reversing migration back from urban areas, contributing to economic development and growth, case study at [www.navajyoti.org](http://www.navajyoti.org/),  also attached is a 20 March, 2015, Food Systems Report from Africa.

##  Nkwelle Nkede Flabert, Centre for Communication and Sustainable Development for all, CECOSDA - Cameroon

*Dynamic interactions between and within the bio-geophysical and human environments lead to the production, processing, distribution, preparation and consumption of food, resulting in food systems that underpin food security. Food systems encompass food availability (production, distribution and exchange), food access (affordability, allocation and preference) and food utilization (nutritional and societal values and safety), so that food security is, therefore, diminished when food systems are stressed. Such stresses may be induced by a range of factors in addition to climate change and may be particularly severe when these factors act in combination.*

**Kowack Alphonse** is a large scale farmer in Johanesbul, an outskirt of the Yaounde city of Cameroon and tells a story of the changes he has experience in his profession during a working visit by the CECOSDA. For the past 18 years of his profession, he has been practicing the mixed farming system and he produces crops like maize, beans, groundnuts, cocoyam, cassava, plantains, and vegetables like spiny pigweed, a specie called *Amaranth spinosus* (locally known as “Fullong”). As a result of climatic variations, Kowack explains that he has experience a remarkable reduction in yield with an estimated decrease from about 25 bags/harvest (in the early 2000s) to less than 10 bags/harvest (from the last harvest of March 2015) bags of maize, and other products suffer the same problem; his farms have experienced a drastic increase in infections from food and waterborne bacteria, viruses, parasites and bio toxins. Also, direct effect of climatic changes on crops like changes in rainfall patterns leading to drought, warmer temperatures has led to changes in the length of growing season and the loss of certain plant species that can no longer yield well with the present climatic conditions in the Centre region of Cameroon like cucumber.

Despite the decrease in productivity, the demand for food increases constantly. The consequence of this is an increase in the prices of food which influences the availability and affordability of food; a great threat to food security. Food prices are a key indicator of the effects of climate change on agriculture and, even more importantly, on food affordability and security. Food prices increase for all staple crops because climate change acts as an additional stressor on the already tightening price outlook. Under climate change, maize, rice, and wheat prices in 2050 are projected to be 4, 7, and 15 percent higher than under the historic climate scenario (a geometric progression).

Climate change thus will increase the number of malnourished children in both 2030 and 2050. Without climate change, child malnutrition levels in Cameroon and the Central Africa in general are projected to decline from 28 percent in 2000 to 24 percent in 2030 and 19 percent in 2050. Under climate change, child malnutrition which increased by an additional 0.5 million children in 2010, would be higher by 1 million children in 2030, and would still be higher by 0.6 million children by 2050. Changes in agricultural trade flows as a result of climate change are driven by changes in the local biophysical and socio-economic environment, as well as a wide-ranging set of local, regional, national, and international trade policies.

## Nkwelle Nkede Flabert, Centre for Communication and Sustainable Development for all, CECOSDA - Cameroon

There is one thing I will like this forum to look into properly because I greatly believe that it is the most impacting aspect of food insecurity.

**Smallholder, policies, climate change, food security and nutrition.**

* Smallholders and small family scale farmers play an important role in the availability and affordability of food.
* They are the most affected in food crisis problems arising from climate change and other influences not related to climate change.
* In the case of malnutrition, 80% of their children suffer more.
* The efforts put in place by the state and other international organizations hardly have a direct positive impact on their livelihood and activities.

**Live example of food security threat due to climate change:** In the Bangem, Kupe-Muanenguba Division of the South West Region of Cameroon, and in about 9 of 10 regions of Cameroon, Cocoyams belonging to the genus *Colocasia (locally known as “Ibo coacoa”)* suffered a serious blight in 2008. This disease emergence was favoured by rainy overcast weather with low night temperatures; disease spread primarily by splashing rain water.

This specie of cocoyam which was main source of most of Cameroonian delicacies got extinct and has recently been discovered in a village at the foot of the Muanenguba twin lakes (Poala) in a very small quantity. All efforts to make it grow in other areas again have been abortive as a result of **climate change**.

The local population are facing serious food crisis, change in the consumption pattern and most individuals who depended on this product are now left with the option of buying food and trying to cope with other means.

Thus there is still more to be done in this aspect, probably by involving local based organizations that can identify and work with these communities. The approach this time should begin from the grassroots and I believe it will yield more fruits.

## Renata Mirulla, Max Blanck and Maria Nuutinen, FAO, Italy

Dear FSN Forum members,

Please find attached a summary of our latest webinar ‘**Climate change impacts on food security and nutrition now and in the future’.**

The webinar covered a wide range of topics and revealed how climate change, food insecurity and malnutrition are interlinked. It emphasized that action to alleviate the problems must face all three factors together.

Thanks to all for your participation and for sharing this summary and the links to the webinar on our web page: [www.fao.org/fsnforum/news/climate-change-FSN](http://www.fao.org/fsnforum/news/climate-change-FSN)

On behalf of the organizers,

Renata, Maria & Max

FAO

## Jonica Otarra, Center for Integrated Development and Social Marketing,Inc., Philippines

Replies to the April 8 post of Dr. Hector Malleta

A.“Now the growth rate is not equivalent to the potential production growth   allowed by technology and natural resources, but to the amount dictated by demand. As incomes grow, consumption of staple food (like cereals) tends to stagnate while demand increases for other foods  (fruit, vegetables,  vegetable  oils, meat, dairy products and so on)”

**My Reply** : The data that I posted is not potential growth rate, because they are  growth rates that are already determined. Also, If growth rate is equivalent to  the amount dictated by demand, isn't it that demand also dictates production? I  believe that there needs to be an improvement and flexibility especially with  regards to the use of agricultural indicators . These indicators are lacking  somehow especially when it does not reflect  other conditions happening in  the agricultural sector.

B.food consumption of cereals is actually declining-whist overall food  consumption improves in terms of calories, protein and micronutrients-”

**My Reply:**If there is an improvement in the overall food consumption,  then the first beneficiaries of this improvement in the over all food consumption  supposedly would be the farmers, indigenous farmers all over the world since they are the agricultural producers of food. However, sadly, this is not the case for all. They are still one of the most marginalized today. Also,  if there is an improvement in the over all food consumption, it may not be true for all countries worldwide.   Though there is a continual reduction of hunger ,there are still 805 Million people  in the  world who live in hunger according to WFP’s Website.(<https://www.wfp.org/hunger/stats>) “Asia is the continent with the most hungry  people - two thirds of the total. The percentage in southern Asia has fallen in  recent years but in western Asia it has increased slightly.”-WFP Website.

We have also to take into account the fact that while we consume the healthy  nutrients  from agricultural foods, we also  have to take note of the chemicals  that were used to produce these foods because we also take in these chemicals  into our body. We have to reminded of its health impact on us.

 C.“So basing the analysis on cereals alone is bound to be misleading.”

**My Reply:** I also cited in the paragraph that the data also coincides  with FAO’s   webinar last March 31, 2015. The data on cereals is an additional one.

 D. “In fact, it does not have to be beneficial, on the whole. Most projections show a global (small)negative effect. But that small effect on total agricultural production (which in turn results from rather pessimistic and precautionary assumptions  about the future) applies to the output that would be achieved in the future in the absence of climate change, not to the output achieved today. However, beneficial  effects arise from several sources; one is the improved agricultural conditions in  temperate zones: new lands become cultivable in North America and Eurasia due, and some lands in those regions improve their productivity due to lengthening of growing period; secondly, more CO2 in the atmosphere increases photosynthesis  (especially for C3 crops like wheat) and reduces water needs for C4 crops  (like maize). Global warming means also more global rainfall, albeit some regions would get drier (e.g. Northern Mexico or Southern Africa), and increased rainfall  is in general beneficial for agriculture by increasing the flow of irrigation water and improving conditions for rainfed cultivation especially in semi arid zones.”

**My reply:** quite confusing statements when at first that “  Climate change has  both beneficial and deleterious implications for agriculture.”and the new  statement above that climate change does not have to be beneficial.We also have  to c0nsider the fact that one of the key drivers of Climate change is C02 emissions. More warming of the planet contributes to the already irreversible decline of west antartic glaciers( <http://science.nasa.gov/> science-news/ science -at-nasa/ 2014/12may\_noturningback). In addition, when glaciers melt, these  would mean a sea level rise . According to the IPCC Climate Change 2014  synthesis report  Summary for Policy Makers ([https://www.ipcc.ch/pdf/ assessment- report/ar5/syr/AR5\_SYR\_FINAL\_SPM.pdf](https://www.ipcc.ch/pdf/%C2%A0assessment-%C2%A0report/ar5/syr/AR5_SYR_FINAL_SPM.pdf)), it is projected that there will be a sea level rise as the warming of the planet continues.

In particular, The glaciers have a role to play in reflecting the sun’s heat back into space . Whenever I see the attached picture , it reminds me of the impact of climate change . The photo below is he sunken cemetery in Camiguin, Philippines. The cross is a land mark wherein below the sea,there is an original spanish cemetery wherein after the eruption of a volcano in 1871, there was a sea level rise.



I doubt it when humans can survive in a very hot planet.

E.  “Jonica also writes that "it is predicted that we will be 10 billion by 2050".

“Not quite. The latest UN figure (medium variant) for 2050 is 9.55 billion, a bit above previous projections of 9.2-9.3 bn.”

**My Reply:**  My basis for this is the  presentation of Johan Rockstrom ,  an internationally recognized scientist on global sustainability and Executive Director of  Stockholm Resilience Centre. Here is a link to his presentation at CIGI :https://www.cigionline.org/blogs/front- row/time-stop-pushing-boundaries

## Georges Bazongo, Self Help Africa, Burkina Faso

The climate change is the main challenge for the Government and Population to mitigate in the coming year. Self Help Africa as an International NGO recognize that the most affected by the climate change are the women and children in the rural area in Africa. Also, the Government's data show that the women are more impacted by the poverty in the rural Africa. So considerating the question as an organisation:

1) The means issues for the policy makers are to undertstand what technologies and actions could address clearly the climate change issues. So they need to promote proven practices rathers than moving on theoricals actions which will not meet the beneficiaries demand. So they need to consider research and demonstrate before to scale up. It's a approach of Self Help Africa, to learn and understand better before to expand in a specific area and population.

2) The key institutionnal and governance challenge for the policy makers is to consider the women and the children as the key and strategiques beneficiraires of the programmes and actions to address climate extremes (drought and flood). Investing in women will help the families to keep the harvest at home, to control the sales of the grains and others products and diversify the food consumption within the household. Investing in women means involving men to have their support in the project and to take the household as of the beneficiary. In this case, women will easily aaccess to land and inputs for crop production. For example, Self Help Africa have implemented a soya value chain project in Savanah Region in Togo since 2011, the women are around 80% of the benficiaries and the activities include gender mainstraining with women and men in the same cooperatives and after 3 years, women increased their access to land from 0.125 ha to 0.25 ha (100% of increase) with the support of their husband and their soya production contributed to increase to 28.41% of the household income and the consumption of the soya dishes in the households and through the Local Heath Center agaisnt the under five children undernutrition increase by 85%. The soya have been produced with drought tolerant seeds.

3) As best practice sfrom our experiance are to promote affordable drip irrigation for crop production. A action research conducted from 2012 to 2015 showed than drip irrigation could reduce the water consumption by at least 30%, reduce the labour by 74% comparing with using water can and increase the yield of tomato by 48%, cabbage by 253% and maize by 118%. The drip irrigation have been promoted with compost use and a plantation of 1100 utilitarian local trees around the gardens.

## Paul von Hartmann, United States of America

2. "What are the key institutional and governance challenges to the delivery of cross-sectoral and comprehensive policies that protect and promote nutrition of the most vulnerable, and contribute to sustainable and resilient food systems?"

The "key institutional and governance challenge to the delivery of cross-sectoral and comprehensive policies" is transcending all government's intransigent, irrational social prejudice against the most nutritious, essential agricultural resource on Earth. Restrictions, regulation, taxation and otherwise burdening the global renaissance of Cannabis agriculture (especially in the United States), works against the time-sensitive opportunity we may still have, closing faster than climate scientists are anticipating.

A realistic, responsible time-assessment of climate changes, that are threatening the systemic balance of the entire world, demand an immediate, proportionate, effective global response. Mankind must evolve with timely intention, or we will likely achieve extinction before the end of the 21st century.

Increasing UV-B radiation, increasing atmospheric CO2 and the temperature increase in Earth's oceans, melting sub-Arctic methane hydrates, are components of global eco-systemic interrelation that are beyond mankind's ken or control. We are approaching irreversible tipping-points, without sufficient understanding to comprehend the degree of urgency.

Since the problems we face result from humankind working against Nature, it seems beyond obvious to recognize the importance of working with natural systems to heal the imbalances imposed by man's industrial assault against Nature.

Organic agriculture is mankind's functional interface with the natural Order. For our species to be symbiotic with the planet upon which we depend, rather than continuing to be parasitic, the values and priorities of governance must prioritize the Laws of Nature over the laws of man. If there is an activity or policy that wounds the planet, it must be discontinued immediately. Not "phased out" not diluted or reduced, but stopped. Alternative methods, resources and practices must be objectively considered.

Currently, that is not the case. Inertial economics, persist in favoring disparity, toxicity and inefficiency, plaguing our species with social unrest, while continuing to poison our Mother Earth, even as we acknowledge that She is dying of man's unrelenting avarice.

In a perfect world, mankind would coordinate our ability to communicate electronically, globally, instantaneously, to implement "essential civilian demand" for the "strategic resource" identified (in seven U.S. Presidential Executive Orders) as "hemp." The most time-efficient protocol for achieving needed changes in human values must be initiated in order to overcome the inertia of past influences over cross-sectoral policies.

Military aggression must itself be recognized as obsolete in the face of a larger threat of systemic collapse, the ultimate "weapon of mass destruction." Failure of governance in prioritizing cooperation over conquest is an evolutionarily regressive, global threat to all life on Earth.

Military personnel must be re-directed to organic farming, using a non-invasive "pioneer crop" that is capable of adapting to virtually every soil and climate condition, including increasing UV radiation. Hemp is uniquely qualified for expansion of the world's arable base. Agricultural production and global distribution of the only crop that provides complete nutrition and sustainable biofuels from the same harvest is key to food security, nutrition.

Organic cultivation of hemp sequesters twelve (12) tons of carbon from the atmosphere per acre, each growing season; while emitting atmospheric aerosol monoterpenes essential to replenishing what has been lost with the death of 50% of the boreal forests and an estimated 40% of marine phytoplankton.

Historically, forests and phytoplankton were the primary source of the aerosols which have shielded the Earth from the deadly UV-B and UV-C rays of the Sun. Those species will not regenerate under current conditions. A massive campaign of organic hemp agriculture is mankind's only option, and time is the limiting factor that will determine survival or extinction in the 21st century.

## Hector Maletta, Universidad del Pacifico, Peru

@Jonica Otarra.

Jonica, what a lively exchange! However, let us be brief lest we absorb much of the forum space.

If you really meant that the output of maize, rice and wheat has declined, then you are factually wrong. Of course, world cereal output fluctuates a bit from year to year, but on the whole the output of all three products you mentioned, as well as the output of cereals as a whole, have been increasing, not decreasing, over recent years and decades. I have already pointed you to the source (the only one with world coverage), i.e. FAOSTAT. Between 2000 and 2013, wheat output passed from 585.6 to 715.9 million tonnnes (Mt); rice (paddy) from 598.9 to 740.9 Mt; maize from 592.5 to 1018.1 Mt. For milled rice, deduct 35% from the amount of paddy. Cereals as a whole: 2060.2 to 2779.9 if rice is counted in its paddy state; if rice is counted in milled terms, all cereals output grew from 1860.7 to 2318.6 million tonnes in that recent period (2000-2013). In fact cereal output is at an all-time high in 2013-14, continuing a steady rising trend since 1961 when the series starts.

If you meant that it was the rate of growth what "declined", i.e. that the growth of production decelerated, then you are also not quite right for cereals (the rate actually accelerated lately), and you are also wrong for total agricultural production (i.e. value of production at constant prices), because its growth did also accelerate in recent years compared with previous decades. Production increased, and growth rate accelerated, both for total production and for per capita production, at world level, for cereals and for total food and agricultural output. Moreover, all grew much more, and faster, in developing countries than in developed ones.

Concerning climate change, I agree (as the IPCC also agrees) that it may have both beneficial and deleterious effects, on agriculture and on other aspects. Regarding agriculture, projections of climate change lead to projections of future agricultural production in various parts of the globe, yielding different results in the various zones, some negative and some positive. On the whole, available projections suggest the net global effect would be negative, in this precise sense: the agricultural output of 2050 or 2080, with projected climate change, would be slightly lower than the same output would be in the absence of climate change. But the output in those future yeasrs would however be (with or without climate change) much higher than today, in both total and per capita terms, because of general factors determining agricultural growth, chiefly improvements in technology and productivity, and (to a lesser extent) a small increase in the use of land for crops.

Technology is advancing quite fast, and shows no sign of relenting. At the same time, the worldwide area of land suitable for crops would expand due to climate change (though it will shrink in some areas, and expand in others, with the net result of an expansion). This would be especially due to the vast expanses of land in the Northern Hemisphere that are constrained by cold, not by heat, and are expected to have a milder climate, enabling new lands for cultivation and giving a longer growing period to lands already cultivated, resulting consequently in more hectares and more potential production per hectare, if such hectares end up being cultivated (only some of them would). Elevated CO2 in the atmosphere would also help improve photosynthesis and plant growth, and (for C4 crops) reduce plant water needs. Also, global precipitation would increase, although not uniformly (some areas would become drier), and more rainfall is generally good for agriculture except perhaps in low floodable areas which may become unusable for crops if permanently flooded. On the whole those low floodable areas are smaller than dryland suitable for crops, so on the whole suitable land is expected to expand.

I have already cited studies documenting these claims. You have not cited any studies documenting your claim that wheat, maize and rice production have declined (or they growth rates decelerate, if that is what you meant). Do cite them, please.

Other aspects of your message are very interesting, but I'm only touching here on some aspects related to my previous comments.

## C.Palanivelayutham Chokkalingam, India

Climate change and its impact in Food security is one of the broad topic discussed over worldwide recently. The impact of this on cultivation of crops is to be ascertained in region wise. The variation of impact is to be calculated tropical, subtropical and temperate regions separately.

The sub-tropical region like India the climate change and impact in cultivation of different crops are widely noticed. In Southern India esp. setting of North east monsoon differ year to year and this intern affect the crop selection and cultivation.

Various field observation noticed that the delay in monsoon affect the crop performance in terms of yield also. Even fifteen delays delay in monsoon setting and in turn delay in time of sowing affect yield in Pulses, watermelon and other veg. drastically.

Conclusion: Region wise study is needed in each and every cultivable crop for their performance based on climate change.

## Jonica Otarra, Center for Integrated Development and Social Marketing,Inc., Philippines

Replies to Dr. Hector Malleta,

It is indeed a very lively exchange of information! I think that this is a result of our desire to find solutions to the world's most pressing problems.

As far as I know, the highest confidence level for scientific researches is 99% and the lowest margin of error is 1%. This means that all researches, have the probability/chance that they can also be factually wrong. I believe we do need to consider this fact.I have never read or heard about a research that is 100% true all the time and I would be interested to know about it if there is any, with regards to this matter.

I. These are the following data for cereals and total agricultural production:

 A. In my april6 post, I cited the March 6, 2015 ICCG webinar presentation and it’s link. To be more precise, I have attached a word file. I took a screen shot of the data presented by professor Alberto Garrido CEIGRAM (Research for the Management of Agricultural and Environmental Risks) Universidad Politecnica de Madrid. Here I can see, that the growth rate of cereals are changing and not steadily rising since 1961. Here is a direct link: <http://www.iccgov.org/FilePagineStatiche/Files/EVENTS/Seminars/6march2015/Garrido_2015_FEEM_ICCG_Webinar_6_march_2015.pdf>

B.) Another is from IFPRI. The data for this is also in the word file. Link: <http://www.ifpri.org/gfpr/2012/agricultural-productivity>

C) Another is from International Journal of Rural Development- “OECD-FAO experts expect lower global agricultural production growth. Production short falls, price volatility and trade disruption remain a threat to global food security.”- <http://www.rural21.com/english/news/detail/article/lower-global-agricultural-production-growth-expected-0000752/>

D) FAO Document- “In recent years the growth rates of world agricultural production and crop yields have slowed. This has raised fears that the world may not be able to grow enough food and other commodities to ensure that future populations are adequately fed.”(<http://www.fao.org/docrep/004/y3557e/y3557e03.htm>)

II. Climate Change is one of the planetary boundaries that has been already exceeded. This means that it has a negative impact on the resilience of the earth system procecesses that could destabilize the earth, as a whole. This is according to the Planetary Boundaries Framework of Johan Rockstrom,et. al. "The Planetary Boundaries framework was first launched in 2009. Behind the framework lies over 50 years of international scientific effort to understand physical climate, geochemical and ecological processes and their driving forces"- [http://www.stockholmresilience.org/download/18.6d8f5d4d14b32b2493577/1422535795423/SOS+for+Business+2015.pdf](http://www.stockholmresilience.org/download/18.6d8f5d4d14b32b2493577/1422535795423/SOS%2Bfor%2BBusiness%2B2015.pdf)

Here is a link to the updated version of the paper <http://www.sciencemag.org/content/347/6223/1259855>

Some of organizations/people, that recognize/support the Planetary Boundaries Framework:

\*WBCSD- <http://www.wbcsd.org/work-program/capacity-building/sdmi/src.aspx>

\*IISD- On the 2009- year historical timeline : <https://www.iisd.org/pdf/2012/sd_timeline_2012.pdf>

\* Kate Raworth- Author of Doughnut Economics- <http://www.kateraworth.com/about/>

\*The Ministry of the Environment of Finland, in cooperation with Sweden, Norway, Denmark, United Nations Environment Programme (UNEP) and Stockholm Resilience Centre (SRC), organized an international workshop “Planetary boundaries and environmental tipping points: What do they mean for sustainable development and the global agenda?” on 4-5 November 2013 in Geneva, Switzerland".- <http://www.ym.fi/planetaryboundaries>

## Lisa Kitinoja, The Postharvest Education Foundation, United States of America

I would like to comment on the first topic: What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing policies and programmes?

During the past few years the global community has been awakening to the serious but long neglected issues of postharvest food losses and waste, and many organizations are now involved in research, education, planning and outreach activities in the field. Food losses and waste negatively impact both nutrition/food security and the environment, since throwing away one third to one half of the food we produce before it can be eaten is a huge strain on the productive resources of all countries. Climate change and current worries about the stability of productive resources will only make these issues worse, so now is the time for policy makers to focus on how best to support agricultural development programs that will reduce food losses, protect natural capital and improve food security.

Dr. Lisa Kitinoja

The Postharvest Education Foundation

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## Ron Ockwell, France

Hi Florence,

Hector Malett’s third contribution referenced below is far more optimistic about future food production and supplies than most predictions I’ve seen. If the figures he quotes are correct, why is it that so many other ‘experts’ are foreseeing food supply problems in the coming decades? Have they not examined the same data, or do they interpret them differently? Can someone (in FAO or elsewhere) please explain.

But there seems to be another issue that Hector does not take into account: the (unsustainable) current contribution of agriculture - including both crops and animal/meat production - to global warming and to the pressure being put on other ‘planetary boundaries’ including nitrogen, phosphorous and ocean acidity to name but three. The team of scientists that has proposed the planetary boundaries (the Stockholm Resilience Centre and others) and many of the experts who are working on ‘sustainable development’ (e.g. Jeffrey Sachs) tell us that there is an urgent need for a ‘transition’ not only in the production and use of energy but also in agricultural production methods and food habits (notably by eating less meat) if we are to limit global warming to the famous 2’C and also stay within the other planetary boundaries. If I understand him correctly, Hector is counting on a more-or-less linear development of existing food production systems, and that would quickly drive us beyond the 2’C target and other planetary boundaries. Am I missing something?

(Ron Ockwell)

## Peter John Opio, Food And Agriculture Organisation Of the United Nations, Uganda

*1) What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing policies and programmes?*

**Policy review**

Awareness of policies, climate change and impacts on food security and nutrition (Past and present and areas to change).

Can the policies/programs/plans in their current form make communities, including the (vulnerable) adapt to climate change.

Policies, some of which were formulated fifty years ago need to be reviewed to;

Meet the current demands in the changing climate and changing food systems

Amend the areas that may not have been considered during enforcement

*2) What are the key institutional and governance challenges to the delivery of cross-sectoral and comprehensive policies that protect and promote nutrition of the most vulnerable, and contribute to sustainable and resilient food systems?*

**Accountability;**

What are the terms of operation at organization, community and individual (Staffing level)?

Do the institutions/communities/individuals have the capacity/knowledge/skills to deliver what is expected of each? If no what measures are in place to bridge such gaps

How many people are to be reached in a given period?

How are they to be reached?

What is expected out of each institution/individual after a given period reflecting on the terms of operation?

*3) In your experience, what are key best-practices and lessons-learned in fostering cross-sectoral linkages to protect and improve nutrition while preventing, adapting to climate change and reducing and removing greenhouse gas emissions in projects?*

**Participatory plan development and enforcement at different scales by interdisciplinary teams.**

This arises from approaches/tools including but not limited to;

Integrated watershed management (Large scale) and Agro-ecosystem analysis to understand plots, farm and village systems. The approaches and tools engage communities to appreciate strengths, threats, weaknesses and opportunities at watershed and farm level.

Plans if developed and filed by communities may be reviewed to enrich and or fix missing areas of interest to meet nutrition, food security and nutrition and environment health while also reducing emission of greenhouse gases and or absorbing it from the atmosphere.

## Robert Mburia, Climate Emergency Institute, Kenya

Policy issues: policy makers would do well to recognize that policies are only as good as instistitutions implementing them. Best policies do fail where institutional capacity is weak; limited funding and lack of visionary leadership. Developing nations need to move from threory to practise especially on food security and poverty alleviation matters. Nonethless current food security policies are insufficent to deal with climate change impacts: a shift from reactive policy measures to pro-active approaches in mainstreaming sound, achivable, ecosystem based climate change policies across all socioeconomic sectors; removal of barriers that limit most small scale farmers who constitute majority of agro-communities in developing nations. Policy should also focus on the possible impacts of adapatation practices on water availability and access as farmers seek to mantain/improve production.

Most of the exististing food security/agricultral polcies, programs and projects are localized and not taken up nationally as yet and their implementation remains with civil societies or NGO's orfarmer groups with minimal govrnment leadershi/intervention. National food security policies and implementation in response to climate change and piverty eradication; sufficient investiment in agricultre in research, human development, extension services, farm application and tool, technology etc. water and land resources management is key in adapting to climate change as water scaricity increases.

*Africa Climate Change Policy: An adaptation and development challenge in a dangerous world*

<http://www.fao.org/fsnforum/sites/default/files/resources/AFRICA%20CLIMATE%20CHANGE%20POLICY-CEI.pdf>

## Katy Lee, International Agri-Food Network, Italy

Dear Florence,

Thank you for guiding us through this excellent topic! The International Agri-Food Network represents tens of thousands of agricultural businesses, and farmers, in 135 of the UN's member countries.

The 'climate change' position paper of the network is attached (<http://www.fao.org/fsnforum/sites/default/files/resources/CFS_ClimateChange_PRESSPDF.pdf>) for your interest and we have some more thoughts that are relevant to your discussion below:

1. Safeguard natural resources

* Protect natural habitats by avoiding deforestation and land clearing by sustainably improving yields on existing arable land.
* Protect the integrity of watersheds, wetlands and pasturelands to preserve ecosystem services and biodiversity.
* Invest in technologies and techniques to promote water-use efficiency, such as improved irrigation systems, conservation agriculture and better water allocation systems.
* Build up soil organic matter and prevent erosion by applying techniques such as conservation tillage and nutrient management.
* Facilitate drought-preparedness and mitigation through appropriate technologies, including use of remote sensing, local weather forecasting, drought-tolerant crops, early warning information systems, irrigation technology and the building of resilience in rural communities.

2. Share knowledge

* Encourage education in locally-relevant agricultural practices and technologies which significantly increase carbon sequestration, reduce GHG emissions and improve agricultural productivity, particularly in developing countries.
* Create international programmes which share best practice and build capacity for the efficient application of existing climate-friendly technologies by making them more affordable and efficient in use as well as more accessible to farmers.
* Foster energy-efficiency improvements and emissions reductions in nitrogen fertilizer production by helping producers of all sizes to adopt best practice techniques.
* Reduce livestock-related emissions through rapid education and dissemination of improved efficiency of grazing systems, manure management, methane capture for biogas production and enhanced feeds and feed additives.
* Use Integrated Crop Management (ICM) best practices (notably by deploying the right nutrient source, at the right rate, right time and in the right place to improve nutrient use efficiencies) and apply Integrated Pest Management (IPM) to optimise pesticide effectiveness.
* Recognise and support the development of synergies between resilience and mitigation through the inclusion of improved farm management practices in research programmes.

3. Build local access and capacity

* Mainstream and co-ordinate funding for climate change and agricultural programmes, in ways which address grassroots needs and reach all levels of farming.
* Encourage improved cropping systems (e.g. the use of cover crops and appropriate crop rotation methods, such as nitrogen-fixing legumes), cultivation practices (e.g. by limiting fallow periods and reducing cultivation) and soil quality practices to increase overall resource productivity.
* Invest in infrastructure-building and related training programmes.
* Provide training to existing extension networks to increase the efficiency and effectiveness of farm inputs (e.g. fuel, mineral and organic nutrient sources, seeds and crop protection).
* Invest in bioenergy to achieve energy security and rural development through sustainable local production.
* Secure access to land and water resources, especially for women farmers.
* Provide risk management tools to support farmers in managing weather and market variations.
* Localise the application of agronomic knowledge, pest identification and meteorological information.
* Facilitate the use of modern varieties which are resistant to pests and diseases and decreasing the need for tilling.

4. Protect harvests

* Reduce emissions by minimising pre- and post-harvest losses.
* Support efforts to enhance food quality and safety and to reduce waste along the food chain through to endconsumers.
* Improve safety testing for food-handling and processing equipment, as well as storage techniques, cold-chain systems and transportation infrastructure.

5. Enable access to markets

* Channel new and additional funding for climate change mitigation, adaptation and technology transfer directly to the agricultural sector.
* Reward all responsive farmers using sustainable agricultural practices through positive incentives which acknowledge their vital role in providing ecosystem services.
* Develop innovative financial mechanisms for the transfer of technologies in order to support farmers in developing countries.
* Support farmers’ organisations, enabling them to operate as aggregating agencies bringing together individual farmers to improve access to financial mechanisms, funding and carbon markets.
* Mainstream climate change related efforts into market development.

6. Prioritise research imperatives

* Invest in R&D aimed at scaling up a broad range of new mitigation and adaptation technologies and practices addressing diverse climate needs.
* Develop climate information services and early warning systems, as well as best possible estimates of weather and climate impacts on crop or forage production, at a temporal and spatial scale useful for vulnerable rural communities.
* Promote partnerships between farmers and scientists to develop adequate and fit-for-use technologies as well as land and water management tools where they are most needed.
* Improve scientific insight into the role of GHG emissions from methane (CH4) and nitrous oxide (N2O). Increase research on areas of potential savings in order to include them in any future monitoring and accounting rules determined through the Copenhagen process.
* Improve the capacity of a broad range of crops to grow in harsher climates, developing locally-adapted drought- tolerant, salinity-tolerant and heat-tolerant varieties.
* Instigate a system for monitoring GHG emissions from agriculture, including developing performance indicators for agricultural practices that reduce emissions.

## Florence Egal, Food Security and Nutrition expert, Italy

Dear all,

As this consultation is reaching its end, let me forget my role of facilitator and add my own grain of salt (this contribution will of course not be reflected in the summary unless you believe it brings something to the very lively debate of these last weeks).

There seems to be an agreement 1/ that the poorest are likely to be most affected by climate change and 2/ that climate change affects food security and nutrition. I would therefore suggest that we provide specific attention to households affected by malnutrition and/or social cases in climate change affected areas/hotspots: they are in my view the emerging tip of the iceberg. If we understand the local-specific causes of either malnutrition or destitution, we should gain a better understanding of the pathways through which climate change is concretely affecting food security and nutrition in that areas and the coping strategies adopted, and therefore gain insights on possible prevention, mitigation and adaptation measures and strategies.

I would like to say goodbye to all of you, it was great to hear and learn from you, and to renew contacts with old friends and colleagues. As we move towards CoP21, I hope some of the issues you brought up will feed into the debate in the coming months. I will do my best to summarize your inputs and come up with a document that all of us can live with and use where and when appropriate.

Florence

## Juan Antonio García Pineda, KanoboSur, Venezuela (Bolivarian Republic of)

[*Original contribution in Spanish*]

Saludos desde Caracas, Venezuela.

En mi experiencia en el pueblo de Cata, Ocumare de la Costa de Oro, estado Aragua Venezuela. He podido vivir como el cambio climático está afectando los arboles de cacao criollo, y como poco a poco el calor y los factores de lluvia, incrementan las perdidas de la recoleta de cacao.

La comunidad, siempre está en un constante desafío de aprendizaje de cómo crear sistema de riego de agua, para apoyar a los árboles, sistemas de riegos que no afectan el causal del río. Es bueno poder ver que la sabiduría de los habitantes locales pueden aportar soluciones sustentables.

Sigo leyendo los documentos, saludos a todos.

[*English translation]*

Regards from Caracas, Venezuela.

In the village of Cata, Ocumare de la Costa de Oro, Aragua, Venezuela, I have seen how climate change is affecting the Criollo cocoa trees, and how heat and rain are gradually increasing the cocoa harvest losses.

The community continuously faces a learning challenge: how to create irrigation systems that help the tress without impacting the river flow. It is good to see that local wisdom can provide sustainable solutions.

I go on reading the documents. Best regards.

## Subhash Mehta, Devarao Shivaram Trust, India

Dear All,

I would like to endorse Katy Lee complimenting Florence and also, with your permission, record our appreciation, of her finding the time and conducting a positive and transparent consultation, focusing on the needs of the rural poor producer communities, looking for solutions for the agrarian crisis and for their long term sustainability. My answer to the 3 thematic Qs given below, with supporting attachments.

Subhash

Food, Nutrition & Health Security through ‘Agro ecology’ also Mitigates Climate Change:

Climate change directly affects rural poor communities producing own requirements of nutritious food. Following conventional agriculture systems has pushed 100’s of million people into deep distress, increasing hunger, malnutrition and poverty, reducing net income and purchasing power, thus hitting them the hardest, especially women and youth, resulting in migration to urban slums. Producer communities, pastoralists, forest dwellers and fisher folk are facing hardships in producing and accessing nutritious food due to unseasonal hail storms, rain, floods, etc. In the long term, following conventional agriculture systems is the cause of the present agrarian crisis, climate change, soil degradation, etc., seriously affecting the environment and therefore nutrition, food and health security.

Climate change has mostly occurred in areas following high cost high risk green revolution conventional agriculture, reducing numbers of trees, hardening of soil, increasing use of agro chemicals and water, year after year with productivity plateauing, has been harmful to the environment and cause of the agrarian crisis. Conventional agriculture facilitates climate change and being high cost high risk, will exacerbate the crisis of hunger, malnutrition and poverty with increasing prices, with the producer communities not having the money to buy own requirements of safe, nutritious food.

’Agro ecological systems (interface between climate change, food, health and nutrition) of each area being low cost low risk is the obvious solution to ensure producers access to own requirements of safe nutritious food also mitigates the effects of climate change, FAO September 2014 conference. Urgent measures are urgently needed to be taken by countries for re converting to the low cost low risk safe and nutritious food production, following agro ecology of each area, putting the rural poor producer communities to work and gainfully, produce own requirements of nutritious food and cash, at little or no cost and to reduce the greenhouse gas emissions, hunger, malnutrition, poverty and suicides, whilst increasing net incomes/ purchasing power to improve livelihoods of about 50% of the population dependent on agriculture thus calling for policies, programmes and projects being integrated, following Agro ecology systems of the area.

This is in keeping with Rome Declaration on Nutrition and Framework of Action adopted by the 2nd International Conference on Nutrition in November 2014 recognized:

 “the need to address the impacts of climate change and other environmental factors on food security and nutrition, in particular on the quantity, quality and diversity of food produced, taking appropriate action to tackle negative effects” and recommended to “establish and strengthen institutions, policies, programmes and services to enhance the resilience of the food supply in crisis-prone areas, including areas affected by climate change”.

We need to create awareness of the richness of the knowledge document and as applied by successful producer communities, to their soil and agro climatic conditions and managed in their area around the world, learning from the AR4D being done by successful farmers, season after season, not the research being done in labs, most of which is not replicable in the field.

I have highlighted the impact of conventional agriculture on climate change, food, health and nutrition and provide possible solutions to improve livelihoods while reducing and removing greenhouse gas emissions thus ensuring long-term nutrition, food, health and climate security, thus have endeavored to answer the following thematic Qs, focusing on meeting the needs of the rural poor smallholder producer communities in my above contribution:

1) What are the main issues for policy-makers to consider when linking climate change to food security and nutrition through agriculture, in particular when designing, formulating and implementing policies and programmes?

2) What are the key institutional and governance challenges to the delivery of cross-sect oral and comprehensive policies that promotes access to low cost nutritious food to the most vulnerable, and contribute to sustainable and resilient food systems in the long term?

3) What are key best-practices and lessons-learned in fostering cross-sect oral linkages to improve nutrition and food through agriculture, while preventing, adapting to climate change and reducing and removing greenhouse gas emissions?

##  Gisèle Yasmeen, University of British Columbia, Canada

Dear Colleagues:

I don't have as much time and expertise to contribute to this discussion compared to others (e.g. sustainable food systems). However, before it closes, I would like to offer a few points for your consideration:

1. There is growing attention being paid to the "food/energy/water nexus". The discourse around all three tends to be similar. On the one hand, there is concern around "shortages". However, upon closer scrutiny, we have plenty of food, water and energy for the earth's current population (and many demographers are now challenging the "reaching 9B" hypothesis due to low birthrates around the world) but there are issues around access, storage, etc. I'm told one of the British research funding agencies had a "sandpit" on the food-energy-water nexus. I would be curious what came out of that exercise. Usually these "sandpits" bring together the world's top experts in a field.
2. What is the right balance between attention to mitigation versus adaptation when it comes to climate change? How much effort and for what expected gain do we focus on one versus the other in various situations. In Canada, most of which is cold, there is already attention being paid into the impact of climate change of bringing more land into the productive sphere due to global warming.  Small pacific islands, on the other hand, face potential obliteration.
3. Finally, let us not place so much attention on agricultural production at the expense of examining the impacts of other aspects of the value chain. As Nicolas Bricas at CIRAD has shown, one of the biggest GHG emitting activities in the food system is consumers driving to the grocery store to fetch groceries! See my recent op-ed on feeding the world available at: http://www.ipolitics.ca/2014/11/28/malthus-revisited-can-the-planet-support-another-billion-people/

Thanks for allowing me to participate. I look forward to learning about the outcome of this process.

Gisèle Yasmeen (most publications available at giseleyasmeen.com and LinkedIn)

## Patti Rundall, Baby Milk Action, United Kingdom

1. **What are the *main issues* for policy-makers to consider when linking climate change on the one hand and food security and nutrition on the other, in particular when designing, formulating and implementing  policies and programmes?**

**Policy makers must**:

* Prioritise ways to **conserve** natural resources
* Disincentivise the marketing of products that have a high environmental burden or the potential to harm health.
* Ensure policy setting processes are free from commercial influence
* Adopt, as a minimum requirement, the *International Code of Marketing of Breastmilk Substitutes* and all subsequent relevant Resolutions as binding Regulations and integrate them into all relevant Codex standards.[[1]](#footnote-1)
* Adopt policies and practices that support biodiverse multi-variety, multi-crop ecological production that can adapt to changing weather patterns, allowing farmers to freely share seeds across communities, countries and continents.
* Avoid innovative quick fixes and seeds, instead focus on reducing mono cropping and practices that deplete soil quality.
* Implement transparency measures that require that lobbyist and lobbying expenses be made public
* Address the increasing influence of big economic actors on public decision-making and global democratic governance.
* Bring in effective regulations that stop corporations violating human rights – and beware of voluntary commitments.
* Support the efforts of the Human Rights Council working group to draft a binding Treaty to protect people from corporate human rights abuses.
* Avoid business language and terminology and indiscriminate/inappropriate use of business terms such as ‘stakeholder’ ‘partnership’ ‘non state actor’ etc
* Define Corporate Social Responsibility (CSR) as marketing and ban publicity surrounding CSR activities
* Adopt measure to protect whistle-blowers.[[2]](#footnote-2)
* Adopt accountability mechanisms that require independent, on the ground monitoring of what companies *DO* **-** not just what they *SAY* they do.

**Conservation**

Innovative products are often seen as win win routes to jobs and economic growth. However their potential risks are often overlooked and strategies to conserve natural resources are sidelined.

While innovative thinking is important, innovative products must be underpinned by a commitment to truly independent testing, evaluation and post-market monitoring. Impact assessments need to consider health and development – not just effects on business, as is the current case in the EU..

**Infant and young child feeding**

Breastfeeding is the first and perfect ‘food system.’ There is no food more locally produced or sustainable than breastmilk. The protection of breastfeeding and strict control of the marketing of formulas and processed foods for babies should be considered as an integral part of a package of measures to conserve carbon and water.

**Water usage in formula manufacturing** It takes 800 litres of water to manufacture a 1 litre of milk and 4700 litres of water to make a kilo of milk powder

The water usage on dairy farms used in the production of formula is also substantial.

**Water at Household Level**

To prepare the feeds for a three month old baby, a litre of water is needed each day. Two litres are needed to boil bottles and teats and more to wash and rinse the bottles that should be boiled for 10 minutes (up to 60 minutes per day).[[3]](#footnote-3)

**Baby food market**

Breastfeeding has to compete in a highly profitable and competitive market - estimated to be worth US$ 41 billion a year – and where breastmilk itself is being commoditised and its ingredients patented. The need to protect breastfeeding becomes more urgent in emerging markets where “elitist” and “scientific” products are promoted with claims for unfounded health benefits, such as the suggestion children fed on formula will have better eyesight or be more intelligent.

Meanwhile corporations are investing in public/private partnerships across a broad spectrum of players in public health and development. Through these partnerships and the new trade agreements, industry influence is growing and facilitating industry’s top strategic priority to change traditional food cultures. Babies are the perfect entry point for market-driven solutions. The efforts of governments to bring in effective legislation is becoming even more of an uphill battle. Meanwhile, the market for formulas for older babies, many with high levels of sugar, is being fuelled with cross-branding and deceptive marketing tactics.

**Risks of artificial feeding.** While many more people now have better access to drinking water, sanitation and health care, the world is still an unequal place: 2.5 billion – more than one third of the world’s population – still have totally inadequate sanitation. Artificial feeding of an infant instead of breastfeeding in such settings can literally mean the difference between life and death. In such circumstances Infants not breastfed are 15 timesmore likely to die from pneumonia and 11 timesmore likely to die of die of diarrhoea.[[4]](#footnote-4) Breastfeeding could prevent 13% of all under-5 deathsAppropriate complementary feeding could prevent a further 6% Breastfeeding is far more effective than any other preventive intervention, such as water and sanitation (3%).[[5]](#footnote-5)

120m Europeans are at risk of poverty or social exclusion; 22% of EU population have access to water with lower compliance. Climate change, extreme weather and floods will increase these risks. Diarrhoea attributable to poor water and sanitation is estimated to account for over 5% of all deaths in European children 0–14. Infants and young children at greatest risk of water-related disease

**Formula is a high value added product**. According to a report by industry analysts, CoriolisA[[6]](#footnote-6), for the New Zealand authorities, ‘if you turn milk powder into infant formula, you get ten times as much for it’. It is particularly profitable for manufacturers – the formula companies – who Coriolis state typically earn $7.43 (before interest, tax, depreciation and amortisations – EBITDA) on the $25.58 that they receive for a tin of formula costing $44.18. In other words, about 30% profit, before tax etc.

**Breastfeeding is cost saving:** Aside from the acknowledged risks of artificial feeding, the economic impact of low breastfeeding rates is substantial. Investing in services that support women who want to breastfeed is potentially cost saving. For example, increasing the number of months breastfeeding has potential cost savings of at least £31m (at 2009-2010 value) in breast cancer treatment in women.[[7]](#footnote-7)

See also IBFAN’s *World Breastfeeding Costing Initiative***.[[8]](#footnote-8)**

1. **What are the *key* institutional and governance *challenges* to the delivery of cross-sectoral and comprehensive policies that protect and promote nutrition of the most vulnerable, and contribute to sustainable and resilient food systems?**

It is essential that governments and UN bodies have strong **Conflict of Interest** safeguards in place that keep the policy setting process free from commercial influence.

Governments have a duty to uphold the rights of citizens. However, in the context of ‘multi-stakeholder’ PPP ideology, the false notion is created that voluntary self regulation is preferable to binding legislation. (see above)

The participation of Corporations as (more than) equal “stakeholders” in public health policy setting and planning is a further threat and is contrary to the spirit behind conflict of interest regulation. It obscures the fact that corporations “primary interest” is not to act in the public interest (Jonathan H. Marks 2013) and that their legal fiduciary duty is to maximise profits for their shareholders. Corporations are not *“stakeholders”* in public affairs, and should not be made so through principles of “inclusiveness”

Partnerships by definition are arrangements for *‘shared governance’* to achieve *‘shared goals.*’ *Shared decision-making is their single most unifying feature*. They imply **‘***respect, trust, shared benefits’ and* pave the way for *voluntary self-regulation***.** Corporations derive strong emotional and financial benefits from the *‘image transfer’* from UN or NGO ‘partners’.

Of particular concern is the World Economic Forum’s *Global Redesign Initiative* that proposes that some issues taken off the agenda of the UN system and addressed by *‘plurilateral, often multi-stakeholder, coalitions of the willing and the able.’*  WEF seems to envisage a world managed by a coalition of multinational corporations, nation states (including through the UN System) and *select* civil society organisations.

According to David Michaels, appointed by U.S. President Obama to head the Occupational Safety and Health Administration (OSHA), *“I am convinced that conflict of interest cannot be “managed” It must be eliminated*. *Too much is at stake.”*

3**) In your experience, what are key *best-practices* and lessons-learned in fostering cross-sectoral linkages to protect and improve nutrition while preventing, adapting to climate change and reducing and removing greenhouse gas emissions in projects?**

**World Breastfeeding Trends Initiative** (WBTi) and **World Breastfeeding Costing Initiative** (WBC*i*) The WBT*i* is an innovative Tracking, Assessing and Monitoring (TAM) web tool that provides objective scoring and colour coding of countries progress in implementing measures to protect and support breastfeeding. Launched by IBFAN in 2004/05 in South Asia and then to other regions. It has been used in 82 countries.

The WBC*i is* another tool to assist IBFAN’s Global Drive for Financial Investment in Children's Health and Development through Universalising Interventions for Optimal Breastfeeding.

<http://ibfan.org/wbti-and-wbci>

 <http://worldbreastfeedingtrends.org/>

## Stephen Thornhill Dept of Food Business & Development, University College Cork, Ireland

Having just commented on the Sustainable Food Systems consultation, I was surprised there was so little mention of climate change in its draft concept note, yet the two consultations are inextricably linked....

1. Climate change and food security are also inextricably linked. Policymakers need to consider the latest research highlighted by Ackerman and Stanton (2013) which argues that climate change impacts on agriculture could be much worse than expected, particularly regarding the temperature threshold of crops, above which yields rapidly decline, and the variability and intensity of rainfall.

So first and foremost we need an increased urgency from governments to implement effective policies to reduce greenhouse gas emissions and stablilise climate change, including regulatory policies where market-based solutions have already failed: without that adaptation and mitigation policies may achieve very little.

Adapatation policies need to be nutrition-sensitive, with a greater emphasis on sustainability throughout the food system - we need to improve nutrition whilst reducing emissions. What may have been a sustainable system in the past may no longer be so in the face of climate change, requiring different cropping and livestock systems that can adapt to the changing conditions.

And policymakers need to consider the whole food system when implementing climate change adaptation and nutrition policies, from production (eg conservation agriculture) through to the consumer (eg behavioural change toward more sustainable and more nutritious diets), including trade policies which may currently exacerbate emissions.

But we also need to keep livelihoods at the forefront of such policies. In some recent research I have been doing on the impact of biofuel operations on food security, I found that households with employees on large biofuel estates in Mozambique had significantly better food and nutrition security outcomes than other households in the same locality, largely due to paid employment: food access is likely to remain the key issue in food and nutrition security.

2. Here at University College Cork (UCC) we have been running an AgriDiet project in Ethiopia and Tanzania over the past two years and institutional barriers have emerged as a key issue in linking agriculture and nutrition, not so much at the national level where policies have now been put in place, but more so at the local level where ag extension and health officials rarely liaise. We have held workshops in both countries to bring local extension and helath worlers together and there is now growing recognition of this problem and things are starting to change. It will be important that ag extension staff also work with nutritionists on climate change issues to promote resilient food systems that also deliver optimum nutrition to the most vulnerable.

UCC has also been working with the NGOs Valid International and Concern to address the barriers in sourcing locally produced raw materials and producing ready-to-use therapeutic foods in food insecure countries so that the most vulnerable households have access to nutritious foods and local farmers can also benefit through new markets.

3. The improved coordination between local ag extension staff and health workers in Tanzania is a good example of improving the effectiveness of the public sector, although climate change impacts remain a new and uncertain issue for most local extension staff. Also, as part of my bioenergy and food security research I have encountered a number of food-energy integrated projects that could be regarded as cross-sector initiatives. For example, in response to deforestation and smoke-inhalation related illnesses from open fires, a number of community-scale projects are intercropping oilseed plants to produce fuel for oil-based stoves, as well as for generators used for irrigation and food storage of perishable crops. The urgent need for clean energy to replace wood and fossil fuels is often overlooked, but without renewable sources such as solar and bioenergy, it will be difficult to improve the production of nutritionally important foods, such as fruit and vegetables and reduce wastage in hot climates.

best regards

Stephen Thornhill

Lecturer and Research Fellow at University College Cork, Ireland.

Reference - Ackerman and Stanton (2013) Climate Impacts on Agriculture: A Challenge to Complacency? GDAE Working Paper No 13-01.

## Manuel Castrillo, Proyecto Camino Verde, Costa Rica

[*Original contribution in Spanish*]

Hola a todo/as. Saludo cordial.

Las " cuestiones " involucradas por las necesidades en Seguridad Alimentaria y Nutrición y vulnerables por el Cambio Climático, son evidentes:

Pobreza, inequidad, tenencia de tierra, educación, salud, seguridad, etc...Las relaciones de poder entre minorías ( pudientes) y mayorías ( clase media para abajo ), son las variables a considerar con genuino interés para mitigar y solventar de manera sostenible la Seguridad Alimentaria y Nutrición de millones de seres humanos, los fenómenos económicos y de poder deben establecerse con una visión nueva, dadas las circunstancias. Fijar parámetros fiables en las inversiones globales de empresas y gobiernos, sustentar criterios en derechos humanos escenciales y darle efectividad a los acuerdos.

 Las inquietudes en la generación de políticas adecuadas a el CC versus Seguridad Alimentaria y Nutrición, son las mismas de siempre: efecto real y general en las poblaciones de agricultores y los recursos. Si hay decisión política en cuanto al balance económico y ambiental en los diferentes regiones, sobre todo las más pobres, se pondrán dar las condiciones necesarias para crear encadenamientos en los factores prevalentes: calidad de vida, abastecimiento y crecimiento económico - desarrollo ?-, salud, distribución de la riqueza, inclusión, tenencia de tierra, educación, empleo, etc. Los factores e indicadores siguen mostrando lo mismo: carencia de acciones oportunas y coordinadas para una implementación eficaz a escala regional y global de unas políticas que no logran aterrizar en la mayoría de los casos. Cuando veo términos como " siempre que sea posible " y " programas y proyectos siguen estando en gran parte sin vincular ", evidenciamos la falta de capacidad de lograr sinergias armónicas entre los actores involucrados. Por ello, la gobernabilidad y las relaciones multilaterales, deben conseguir un consenso en el mediano plazo y establecer controles y normativas vínculantes, convenios marco que logren una artículación real, genuina. Sistematizar procesos de investigación y protocolos que invoquen las necesidades urgentes y prioritarias y dejar de seguir investigaciones infinitas y encuentros fatuos. existe un arsenal de investigaciones prácticas y nociones claras de lo " que se debe hacer ", más " no se hace ".

Las estructuras públicas nacionales ( ministerios, agencias, universidades, ong ) deben crear sistemas coordinados de sus operaciones, agilizar la toma de desiciones y manejar presupuestos conjuntos, ejecutar estrategias consensuadas con el sector privado y ser consecuentes con las políticas sociales de derechos humanos. La extensión en los campos requeridos y los sistemas de información ( públicos y privados ) deben regirse por un norte claro: las personas.

Existen cantidad de casos exitosos, desde la investigación y su acción práctica, hasta políticas acertadas y viables, la cuestión es ponernos de acuerdo para las necesidades específicas y las más apremiantes, los recursos existen. Los "cabilderos " deben dar un salto cualitativo en su " Oratoria ".

No podemos darnos el lujo de dilatar las decisiones.

The "issues" involved by the needs in Food Safety and Nutrition and vulnerable by climate change are evident:

[*English translation*]

Dear all:

Kind regards.

The issues to consider when linking food security and nutrition and climate change are evident:

Poverty, unfairness, land tenure, education, health, security, etc ... The balance of power between minorities (wealthy population) and majorities (middle and lower class) is to be conscientiously addressed to sustainably improve the food security and nutrition of millions of human beings. Given the current situation, a new approach for economic and power phenomena should be adopted. Reliable parameters for entrepreneurial and governmental global investments must be set, criteria should be based on basic human rights and agreements must be made effective.

Concerns regarding the delivery of policies addressing climate change and food security and nutrition are the usual ones: real and overall impact on farming populations and their resources. If political commitment on the economic and environmental balance in the different regions -especially the poorest ones- exists, the required conditions for the creation of linkages in overriding factors (quality of life, supply and economic growth – development? -, health, wealth distribution, inclusion, land tenure, education, employment, etc) can be met. Factors and indicators keep drawing the same conclusion: lack of timely and coordinated actions for an effective implementation of regional and global policies, not even launched in most cases. When expressions like “whenever possible” or “programs and projects remain largely unlinked” are used, I think we are showing our inability to achieve harmonious synergies among the stakeholders. Therefore, governance and multilateral relations must reach a mid-term consensus and establish binding controls and regulations and framework agreements that yield a real and genuine bond. Research processes and protocols addressing the urgent and priority needs should be standardised, whilst endless investigations and fruitless meetings should be avoided. There is a good deal of practical research and clear guidelines on “what should be done” but is not done.

National public structures (ministries, agencies, universities, NGOs) should create coordinated operational systems, speed up decision making, manage joint budgets, implement strategies agreed with the private sector and be consistent with human rights social policies. The scope of work and the information systems (public and private) should be based on a clear goal: people.

There are many success stories, from research and practical action to sound and feasible policies. The key lies in agreeing the specific and urgent needs, as resources are available. The lobbyists must make a qualitative leap in their speech.

We cannot afford to delay decision-making.

## Peggy Pascal, Action Contre la Faim, France

[*Original contribution in French*]

Les impacts du changement climatique se ressentent déjà au nord comme au sud. Les projections sont alarmantes : si rien n’est fait pour lutter contre le changement climatique, 600 millions de personnes supplémentaires souffriront de sous-alimentation en 2080.[1] Les changements climatiques menacent de réduire à néant les progrès effectués ces dernières années dans la lutte contre la faim et la sous-nutrition.

Les changements climatiques influencent toutes les causes de la sous-nutrition

Sècheresses, irrégularités pluviométriques, hausse du niveau des mers, vagues de chaleur, perturbations des écosystèmes, cyclones plus fréquents. Frappant différentes régions du globe, les changements climatiques ont des effets particulièrement dévastateurs sur les pays les plus fragiles. Tous les déterminants de la sous-nutrition sont gravement exacerbés par les changements climatiques car la sécurité alimentaire, l’accès à l’eau, l’hygiène et à l’assainissement, et la santé des populations sont gravement impactés.

Si les tendances climatiques actuelles se confirment, la production de blé pourrait enregistrer une baisse de 10 à 20% d’ici à 2030 comparé aux rendements des années 1998-2002.[2] Globalement, en Afrique subsaharienne, un réchauffement d’environ 2°C entraînerait aussi une réduction de 10% du rendement agricole total d’ici 2050, tandis qu’un réchauffement supérieur et donc plus probable pourrait porter ce chiffre à 15 ou 20%.[3] La baisse des rendements agricoles aura certainement pour conséquence une hausse des prix des produits alimentaires de base. Sans changement climatique, l’IFPRI estimait déjà en 2009 que les prix des denrées alimentaires de base comme le riz, le maïs, le blé et le soja subiraient une augmentation importante entre 2000 et 2050. En intégrant le facteur climatique, les prix augmenteront de manière supplémentaire de 23 à 37 % pour le riz, de 52 à 55 % pour le maïs, de 94 à 111 % pour le blé et de 11 à 14 % pour le soja. De plus, les changements climatiques vont provoquer un accroissement sans précédent des maladies phytosanitaires, des zoonoses. La prévalence des maladies infectieuses à transmission vectorielle risque de s’aggraver, en entraînant un affaiblissement du statut nutritionnel. Par exemple, selon, l’OMS, 2 milliards de personnes seront exposées à la dengue d’ici à 2080.[4]

L’aide-mémoire de l’OMS de 2014 rappelle qu’il est probable que, d’ici 2090, les changements climatiques étendent les zones affectées par les sécheresses, doublent la fréquence des sècheresses extrêmes et multiplient par six leur durée moyenne[5]. Entre 350 et 600 millions d’Africains feront face à un déficit en eau (avec un scénario de réchauffement limité à 2°C)[6]. Finalement, entre 2030 et 2050, on s’attend à ce que les changements climatiques entraînent près de 250 000 décès supplémentaires par an, dus à la malnutrition, au paludisme, à la diarrhée et au stress lié à la chaleur.[7] Enfin, la concurrence sur les ressources naturelles (eau, pâturages) de plus en plus rares accentue le risque de conflits et les flux migratoires, qui à leur tour amplifieront le risque d’insécurité alimentaire et nutritionnelle. L’Organisation Internationale pour les Migrations prévient qu’on pourrait compter jusqu’à 1 milliard de réfugiés climatiques en 2050.[8]

Justice climatique et sécurité alimentaire : les plus vulnérables sont toujours les plus affectés

Les projections les plus optimistes (+2°C à la surface du globe) prévoient que le taux de sous-alimentation en Afrique augmentera de 25 à 90% d’ici à 2050.[9] Cette situation traduit un paradoxe : ceux qui contribuent le moins au réchauffement climatique sont ceux qui en souffrent le plus. Les pays du Sud et les ménages les plus pauvres subiront la plus grande partie des dommages humains et économiques causés par le changement climatique, alors même que leurs capacités de réponse sont souvent limitées voire épuisées.

Ce sont pour la plupart de petits producteurs et productrices qui vivent de l’agriculture pluviale, de la pêche ou de l’élevage, des moyens de subsistance très fortement dépendants des conditions climatiques et environnementales. Les changements climatiques et l’accroissement de la fréquence et de l’intensité des aléas climatiques entrainent un affaiblissement ou une destruction de ces moyens de subsistance et de l’accès aux ressources naturelles. La communauté humanitaire doit se préparer à affronter une augmentation de l’intensité et de la fréquence des catastrophes naturelles.

Enfin, pour certaines régions du monde comme l’Afrique subsaharienne et l’Asie du Sud Est, les capacités d’adaptation seront, quoi qu’il arrive, insuffisantes pour faire face aux chocs à répétition (sécheresses, inondations, cyclones) qui mettent en péril la sécurité alimentaire et nutritionnelle et les modes de subsistances de milliards de personnes. Selon un rapport du PNUE[10], « environ 50% de la population mondiale sera en risque de sous-alimentation en 2050 du fait d’une augmentation de la demande et du changement climatique (dans un scénario à 2°C de réchauffement) contre environ 30% sans changement climatique ».

S’adapter au changement climatique pour mieux atténuer ses impacts

Le besoin d’atténuer le changement climatique est une évidence. En effet, le GIEC nous rappelle qu’un scénario à +4°C de réchauffement ou plus par rapport aux niveaux de la fin du XXe siècle, combiné à une hausse de la demande d’aliments, engendrerait des risques considérables pour la sécurité alimentaire à l’échelle mondiale et régionale.[11]

De plus, d’après le PNUE, les coûts nécessaires à la mise en place de mesures d’adaptation, jusque-là mesurés à 100 milliards de dollars par an d’ici à 2020, ont été largement sous-estimés. Le PNUE prévoit en effet que même en réduisant nos émissions, l'adaptation pourrait coûter jusqu'à 150 milliards de dollars d'ici 2025/2030, et entre 250 et 500 milliards de dollars par an d'ici 2050.[12] En l’état actuel des financements internationaux disponibles pour l’adaptation, nous sommes encore très loin du compte. Plus le temps passe, plus le coût économique, environnemental et social sera élevé. Des fonds publics additionnels sont nécessaires dès aujourd’hui pour soutenir les pays les plus pauvres à mettre en place des stratégies d’adaptation et de renforcement de la résilience.

Le secteur privé est à juste titre considéré comme un acteur majeur du financement du développement durable. Cependant, on assiste à un déséquilibre dans les investissements privés qui vont privilégier la rentabilité offerte par les actions d’atténuation et peu s’engager dans le financement de l’adaptation. Dès lors, comment assurer une mobilisation financière à la hauteur des enjeux pour soutenir les petits agriculteurs familiaux et le développement de plans d’adaptation efficaces en matière de sécurité alimentaire ?

La sécurité alimentaire, au cœur de la convention de Paris

L’accord international sur le climat doit permettre de fixer les engagements des Etats en matière de réduction des émissions de gaz à effet de serre, d’adaptation aux impacts du dérèglement climatique et de financement. C’est dans ce cadre qu’une reconnaissance des risques sur la sécurité alimentaire doit être explicitée afin de permettre le déploiement de solutions et mesures efficaces contre la faim. Il est notamment primordial de ne pas limiter la réponse à un appel à l’augmentation de la production agricole mais bien de rechercher l’objectif de sécurité alimentaire qui comprend des enjeux tels que l’accès et la disponibilité d’une nourriture de qualité pour tous.

A Genève, lors des négociations de l’ADP 2.8 en février dernier, le terme « sécurité alimentaire » est apparu pour la première fois dans le texte pour Paris, à la fois dans le préambule du texte provisoire, mais aussi dans le paragraphe sur l’adaptation au changement climatique. Cependant, rien ne dit qu’il y restera jusqu’à la COP 21.

En effet, le texte des négociations n’est pour l’instant qu’une compilation de positions très divergentes, sur des enjeux variés. Les nombreuses options laissent la porte ouverte à toute modification. Il est impératif que la mention de la sécurité alimentaire ne soit pas utilisée comme un « trade-off » d’ici la COP 21, c’est-à-dire qu’elle soit supprimée à la dernière minute pour satisfaire un autre enjeu.

Enfin, il est impératif de demeurer vigilant face aux mirages que constituent certaines « fausses solutions », à l’instar de l’alliance pour une agriculture intelligente face au climat (AAIC) qui présente par exemple les OGM comme une action d’adaptation au changement climatique, aux dérives des marchés carbone, aux agro carburants.

Telle que définie aujourd’hui, l’agriculture intelligente face au climat est encore un concept beaucoup trop imprécis. Il est susceptible d’englober des modèles agricoles extrêmement différents, dont les impacts environnementaux (ressources naturelles), sociaux (emplois, égalité de genre, droits humains), et économiques (autonomie/dépendance des paysans) sont réels. Ce concept fait peser un risque énorme : celui de faire de l’AIC un label qui permettrait de légitimer les modèles agricoles productivistes et de l’agrobusiness, qui n’ont pas réussi jusqu’ici à assurer la sécurité alimentaire des 560 millions d’agriculteurs et d’agricultrices qui souffrent de la faim aujourd’hui. Il n’y a pas de « quick fix » à espérer pour permettre aux plus pauvres de faire face aux impacts du changement climatique. Lutter contre le changement climatique et lutter contre la faim sont deux objectifs indissociables qui ne peuvent plus être pensés et atteints de façon dissociée.

Il est donc urgent pour la communauté internationale et les négociateurs de relever un quadruple défi:

Adopter et mettre en place de manière urgente un plan d'action ambitieux d'atténuation du changement climatique, afin de maintenir la température à la surface du globe en deçà des +2°C de réchauffement en 2100, afin de limiter les impacts du changement climatique sur la sécurité alimentaire.

Faire de la lutte contre l’insécurité alimentaire et nutritionnelle un objectif commun de l’ensemble des Parties de la CCNUCC. Pour ce faire, il est important que la convention climat qui sera adoptée à Paris reconnaisse explicitement les risques du CC sur la sécurité alimentaire et s’engage à ce que les mesures d’adaptation et d’atténuation contribuent à une meilleure sécurité alimentaire.

Accroitre les financements publics dédiés à l’adaptation et assurer un rééquilibrage entre les fonds consacrés à l’atténuation et ceux destinés à l’adaptation.

Reconnaître que le changement climatique va accroître l’exposition aux risques des pays et populations plus vulnérables et mettre en place un système de compensation des pertes et dommages occasionnés par le changement climatique et qui ne peuvent être évités.

[1] UNDP, Human Development Report 2007/2008. Fighting Climate Change: Human solidarity in a divided world, 2007, p. 90 (citing Rachel Warren, Nigel Arnell, Robert Nicholls, Peter Levy and Jeff Price, ‘Understanding the Regional Impacts of Climate Change’, Research Report prepared for the Stern Review on the Economic of Climate Change, Research Working Paper No. 90, Tyndall Centre for Climate Change, Norwich).

[2] Richard Munang, Jesica Andrews, « L’Afrique face au changement climatique », Afrique Renouveau : Édition Spéciale Agriculture 2014, page 6

[3] Ibid.

[4] Hales S et al. Potential effect of population and climate changes on global distribution of dengue fever: an empirical model. The Lancet, 2002, 360:830–834.

[5] Aide mémoire de l’OMC sur le changement climatique, n°266, Aout 2014 ; http://www.who.int/mediacentre/factsheets/fs266/fr/

[6] Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof, Eds., Climate Change and Water, IPCC Technical Paper VI - June 2008, IPCC Secretariat, Geneva, p.96. Available from IPCC Secretariat

[7] Site internet de l’OMS, août 2014. http://www.who.int/mediacentre/factsheets/fs266/fr/

[8] Oli Brown, Migrations et changements climatiques, n°31, Organisation Internationale pour les Migrations, 2008, 66 pp., p.12

[9] 4Lloyd, S. J., Kovats, R. S., & Chalabi, Z. (2011). Climate Change, Crop Yields, and Undernutrition:

Development of a Model to Quantify the Impact of Climate Scenarios on Child Undernutrition.

Environmental Health Perspectives, 119

[10] PNUE, Africa’s Adaptation Gap 2 : Bridging the gap – mobilising sources , 2015, à partir de l’étude de : Dawson TP et al. (2014) Modelling impacts of climate change on global food security.

[11] GIEC, 2014: Changements climatiques 2014: Incidences, adaptation et vulnérabilité – Résumé à l’intention des décideurs. Contribution du Groupe de travail II au cinquième Rapport d’évaluation du Groupe d’experts intergouvernemental sur l’évolution du climat. Organisation météorologique mondiale, Genève (Suisse), 34 pages, p. 19

[12] UNEP 2014. The Emissions Gap Report 2014. United Nations Environment Programme (UNEP), Nairobi

<http://www.fao.org/fsnforum/sites/default/files/resources/C3_BRIEFING%20PAPER_Assurer%20la%20se%CC%81curite%CC%81%20alimentaire%20et%20nutritionnelle%20.pdf>

[*English translation*]

The impact of climate change is already felt in the Northern hemisphere as it is in the South. The forecasts are alarming: by 2080, if nothing is done to fight against climate change 600 million additional people will suffer the effects of undernourishment. [1] Climate changes threaten to wipe out the progress achieved in the fight against hunger and undernourishment in recent years.

Climate changes have an effect on allthe causes of undernourishment.

Droughts, irregular rainfall, rising sealevels, heatwaves, disturbed ecosystems, more frequent hurricanes. Hitting different parts of the globe, climate changes have especially devastating effects on the most vulnerable countries. All the determining factors for undernourishment are seriously exacerbated by climate changes because food security, access to water, hygiene and sanitation, and the health of the people are seriously impacted.

If the present climate trend is confirmed, wheat production could drop by 10 to 20% between now and 2030 compared with the period 1998-2002. [2] In general, in Sub-Saharan Africa, a rise in temperature of around 2°C could imply a reduction of around 10% in the total agricultural yield from now to 2050, while a higher, andtherefore more probable, level of warming could raise this figure to 15 or 20%. [3] This decline in agricultural production would surely result inincreased prices for basic food products. Even without climate change, IFPRI estimated in 2009 that prices of basic food products like rice, maize, wheat and soya will registera significant increase between 2000 and 2050. When the climate factor is included, prices will increase by a further 23 to 37% for rice, from 52 to 55% for maize, from 94 to 111% for wheat and from 11 to 14% for soya. Additionally, climate changes will cause an unprecedented increase in the number of phytosanitary and zoonotic diseases. The incidence of vector borne infectious diseases threatens to become worse, bringing with it a deteriorating nutritional situation. For example, according to the WHO, 2 billion people will be exposed to dengue fever between now and 2080. [4]

The 2014 WHO memorandum notes that it is probable that between now and 2090 climate changes will expand the areas affected by drought, doubling the frequency of extreme droughts and multiplying by six their average duration. [5] Between 350 and 600 million Africans will face a water deficit (with a global warming scenario limited to 2° C). [6] Finally, between 2030 and 2050 it is expected that climate change will cause almost 250 000 additional deaths per year, due to malnutrition, malaria, diarrhea and heat stress. [7] Indeed, the competition for increasingly scarce natural resources (water, pastures) accentuates the risk of conflicts and migrations, which in turn increase the risk of food and nutrition insecurity. The International Organization for Migrations forewarns that by 2050 there could be a billion climatic refugees.[8]

Climate justice and food security: the most vulnerable people are always the most affected

The most optimistic forecasts (+2°C on the surface of the earth) anticipate that the rate of undernourishment in Africa will increase from 25 to 90% between now and 2050.[9] This is a paradoxical situation: those who least contribute to global warming are the ones who suffer most from it. The countries in the Southern hemisphere and the poorest households will suffer mostof the human and economic damage caused by climate change, while at the same time their capacity to respond is often limited if not exhausted.

They are in the majority small, men and women, producers living on rain-fed agriculture, fishing or livestock, means of subsistence which are extremely dependent on climatic and environmental conditions. Climate changes and the increased frequency and intensity of climatic natural hazards cause a weakening or a destruction of these means of subsistence and of access to natural resources. The human community must be prepared to face an increase in the intensity and frequency of natural catastrophes.

At any rate, for some regions in the world, like Sub Saharan Africa and South-Eastern Asia their capacities for adaptation will be, whatever happens, insufficient to face the recurring blows (droughts, floods, hurricanes) which threaten food security and nutrition and the means of subsistence of billions of people. According to a UNEP [United Nations Environment Programme] report [10], around 50% of the world population will be at risk of undernourishment by 2050 due to increased demand and to climate change (in a scenario of global warming of 2°C) against around 30% without climate change.

Adapting to climate change to better mitigate its effects

The need to mitigate climate change is evident. In fact, the IPCC points out that a scenario of global warming of +4°C or more in relation to the levels at the end of the 20th century, combined with an increase in the demand for food would generate considerable risks to food security at global and regional levels.[11]

Moreover, according to UNEP, the expenditure needed for the implementation of adaptation measures,up to now forecast at 100 billion dollars per year from now until 2020, have been greatly underestimated. UNEP forecasts, in fact, that even reducing our emissions, adaptation could cost up to 150 billion dollars from now to 2025/2030 and between 250 to 500 billion dollars per year from now til 2050. [12] In the present state of international finances available for adaptation, we have nowhere near the budget. The more time passes the greater the economic, environmental and social costs will be. Additional public funds are needed from now on to support the poorest countries in the implementation of strategies for adaptation and thereinforcement of resilience.

The private sector is justly considered as a major actor in financing sustainable development. However, we are witnessing an imbalance in private investments which favor profitabilityarising fromalleviationinitiatives and which is not much involved in the financing of adaptation. Consequently, how can financing be mobilizedwhich is adequate to meet the challenges ofsupporting small family farmers and the development of efficient adaptation plans in terms of food security?

Food security at the heart of the Paris Convention

The international agreement on climate should enablethe commitments of States to be determined in terms of reduction of greenhouse gases, and adaptation to the effect of climatic and financial disruptions. It is in this framework that recognition of the risks on food security must be explicit with the goal of allowing the implementation of efficient solutions and measures against hunger. It is of primordial importance that the response should not be limited to a call for increased agricultural production but also tofindan objective for food security which includes issues such as access to and availability of quality food for all.

In Geneva, during the ADP 2.8 last February, the term "food security" appeared for the first time in the text for Paris, both in the introduction to the draft text and also in the paragraph on adaptation to climate change. However, that is not to say that it will remain there until COP 21.

In fact, the text to be negotiated is at present no more than a compilation of very different positions on diverse issues. The many options leave the door open to every possible modification. It is imperative that the mentioning of food security is not used as a "trade-off" leading up to the COP 21, in other words that it is not eliminated at the last minute to satisfy another issue.

Anyway, it is imperative to remain vigilant when facing illusions constituted by certain "false solutions", like the alliance for a climate-smart agriculture (AAIC) which presents for example the GMOs as actions of adaptation to climate change, to carbon markets derivatives, to agro fuels.

As defined today, climate-smart agriculture is still a very imprecise concept. It is able to include very different agricultural models whose environmental (natural resources), social (jobs, gender equality, human rights) and economic (autonomy/dependence of peasants) impacts are genuine. This concept can carry an enormous risk: that of making AIC a label which will allow the legitimization of productive agricultural models and agro-industries which so far have not succeeded in ensuring the food security of 560 million men and women farmers who at present are suffering hunger. There is no "quick fix" to enable the poorest people to face the impact of climate change. The fights against climate change and against hunger are two inseparable objectives which cannot be thought about or achieved separately.

It is therefore urgent that the international community and the negotiators take account of a quadruple challenge:

Adopt and implement urgently an ambitious action plan to reduce climate change with the objective of maintaining the temperature on the surface of the earth below +2°C of global warming by the year 2100 so as to limit the impacts of climate change on food security.

Make the fight against food and nutrition insecurity the common objective of all the members of the UNFCCC. To achieve this it is important that the convention onclimate that will be adopted in Paris recognizes explicitaly the risks of climate change on food security and commits itself to the contribution by measures of adaptation and reductionto better food security

Increase public financingdedicatedto adaptation and ensure a new balance between the funds destined to reduction and those destined to adaptation.

Recognize that climate change will increase the exposure to risks of the most vulnerable people and countries and implement a compensation system for the loss and damage caused by climate change which cannot be avoided.

## Peggy Pascal, Action Contre la Faim, France

The impacts of climate change on food security and nutrition are real. According to recent UNEP figures, in 2050, half of the world population may be at risk of hunger. If everything goes well, in september UN states will commit to eradicate hunger by 2050. In the same time, the impact of climate chnage on food and nutrition security are not negotitated under the CNUCC. However, during the last ADP 2.8 intersession in Geneva, thanks to Saoudian arabia and Egypt, food Security has been added for the first time in the text (3 times). However we only have three mentions of food security out of 87 pages of text (and only as options).

Some states argue that the mention of the increase of food production is similar than having the mention of food security. We need to advocate to ensure that in Bonn Parties will strongly support the mention of FS in the preamble, in the general objective, in the adapation and mitigation chapters.

Moreover, language on loss and damage should be also supported and reinforced.

## Paul von Hartmann, United States of America

3) In your experience, what are key best-practices and lessons-learned in fostering cross-sectoral linkages to protect and improve nutrition while preventing, adapting to climate change and reducing and removing greenhouse gas emissions in projects?

My experience includes having traveled through France, Switzerland and The Netherlands from 1996 to 2006, filming towering green stalks and flowers, bearing abundant, essential seed nutrition. Such organic resource abundance was and continues to be prohibited by “drug laws” in the country of my birth, in the California Republic of the USA.

The first time I ate fresh, raw, organic, hemp seed, in 1997, I was camped out in a tent, with my cameras, in a chanvriere's field, overlooking Lake Zurich. (Please see photos below)

I was warmly hosted at in Zurich by Martin & friends at Hanf Hause, directed to the Swiss Federal Research Station near Bern, where I was welcomed like family for several days, learning from Vito Medillavilla of terpenes and the many properties of hemp essential oils. Backpacking through the Swiss alps, I was invited to help with the harvest at several organic and biodynamic (a.k.a. “Demeter”) farms. I watched families harvest their shared wealth with gratitude to the Creator for that which is truly valuable.

Experiencing Cannabis science, culture and freedom on such deep levels, solidly confirmed previous investigations, thought and theory. It is clear that the "cross-sectoral linkage" most urgently needed, is to link food security & nutrition to the impact of counter-productive “drugs” policy, inducing essential resource scarcity.

It requires political courage, founded in strict objectivity. A closing “window of opportunity,” and our responsibility to future generations, demands that all possible biogenic solutions be applied immediately and proportionately, to the complex equation of survival we all face.

Presently, exclusive, limited-spectrum thinking is based in past lies, bigotry and confusion, determining a polar misvaluation, from essential to “illegal.” This misdirection in value continues to warp governance, dominating U.S.-style global drug policy through bureaucratic influence and economic inertia. Inadequate, or in some cases, counter-productive strategies continue to dominate decision making, squelching an open discussion of all possible courses of immediate, effective action.

The cross-sectoral disconnect between food security, nutrition, climate change and global "drugs" policy is a critical break in mankind's collective reasoning necessary for navigating toward a livable future. An uniquely essential, "strategic food resource" identified in seven U.S. Presidential Executive Orders as “hemp”; Also sequesters 9 tons of carbon per acre per growing season; As it produces sustainable biofuels; And copious amounts of atmospheric terpenes providing a “solar shield” against increasing UV-B radiation. Banned through "drugs" legislation, it seems obvious that the so-called "laws" prohibiting hemp agriculture are, at best, "void for vagueness"; and at worst, treason against God, country and planet.

Drugs don't make seeds. Herbs make seeds. As the result of this fundamental, illogical oversight, wrongful jurisdiction over a god-given "green herb" has been applied, under color of law. It seems such an obvious and important distinction to make, yet we continue to allow a disingenuous, counter-productive "drugs" policy to suppress hemp agriculture, ecology and industry in many parts of the world.

The most effective solution to climate imbalances and their increasing impact on food security & nutrition begins with recognizing the true, essential value of Cannabis. Redirection of military and civilian resources toward global distribution and cultivation to harvest and plant ancient strains of Cannabis seed is the ultimate strategy for addressing systemic collapse of environment, economics and the human social order. If our species fails to recognize why Cannabis is essential to our sustainable existence, then we will perish in a sickly and violent extinction, before the end of the 21st Century.

There are seven properties of Cannabis that make it an essential agricultural resource:

1. Our freedom to farm "every herb bearing seed" is the first test of religious freedom. Cannabis has served as spiritual sacrament and entheogen for many religions and cultures throughout human history. For example, Biblical scholars have determined that "qaneh-bosm," referred to throughout the Bible, is most certainly Cannabis -- a major ingredient needed for making the Holy Anointing Oil used by Jesus (Exodus 30:23). Without Cannabis there is zero religious freedom.

2. Complete, essential nutrition. Hemp seed contains all three essential fatty acids (EFAs); is the most available source of edestin protein; produces an abundance of terpenes, flavonoids, tocopherals, chlorophyll, vitamins, enzymes, minerals, and living, plant energy. Essential nutrition received with thanksgiving has always been celebrated as a sacrament through gratitude for Nature's grace.

3. Complete nutrition and sustainable biofuels from the same harvest.

Cannabis is unique in that food security and nutrition are increased at the same time zero-net-carbon biofuels energy is grown from the sun & soil. The Cannabis leaf is the most efficient, globally available and recyclable ‘solar panel’ on Earth.

4. Cannabis is the only crop capable of producing the quantity of atmospheric monoterpenes needed to replenish what has been lost with the death of 50% of the boreal forests and 40% of the marine phytoplankton that used to emit the terpenes that shield the Earth from deadly solar UV-B and UV-C radiation, while sequestering carbon and producing oxygen. The anti-viral, anti-fungal, and antibiotic properties of terpenes probably also play a key role in purifying Earth’s hydrologic systems.

5. Uniquely safe and effective herbal therapeutics: Cancer, severe head trauma, glaucoma, Crohn’s disease, epilepsy, chronic pain, rheumatism, muscle spasticity, multiple sclerosis, insomnia, PTSD, ADD, Tourette’s syndrome, nerve disorders, emesis and eczema are just some of the ailments that have been effectively prevented, treated and cured by Cannabis.

6. Cannabis is the safest, most ancient, and globally popular herbal alternative to alcohol and hard drugs.

7. Cannabis is unique and essential for its exceptional agronomic properties. A non-invasive pioneer crop, Cannabis is essential for regenerating depleted and contaminated soils, stopping soil erosion, expanding the Earth’s arable base, while producing biodegradable "Gaiatherapeutic" industrial products, food, fuel, cloth, paper, etc.

Cannabis is mankind's functional interface with the Natural Order. Time is running-out on our ability to heal the planet.

"Essential civilian demand" is the most time-efficient, emergency preparedness protocol for accessing hemp in time to plant globally this Spring. Accelerating a proportionate, global, biogenic response is warranted by the extreme, unprecedented conditions we're facing.

Substantiated climate science, our respect for Nature must guide our collective common sense and courage. Mankind must transcend irrational “Gaiacidal” social values, in favor of mutually sustaining, coordinated and purposeful “Gaiatherapeutic” evolution.

## Peter Carter, Climate Emergency Institute (international), Canada

Please find the attached from my recent paper.

The evidence is now clear- all countries are in a state of committed global climate change food security and emergency.

UN departments must please make recommendations on this issue- to implement IPCC AR5 best case scenario RCP2.6 right away.

Above 1.0C all crops in all practically regions will be in decline, especially considering the several large adverse impacts which are not captured by the crop models.

Only by implementing RCP 2.6 which calls for missions to stop increasing right away and to find from 2020 quite rapidly, can we possibly avoid a global warming above the catastrophic 2.0° C policy, target.

Adaptation measures should be being implemented now, though it is unacceptable in every way to assume benefits in policy making. The best result in the best situations possible is a delay of committed crop declines for less than a decade. With the projected increase in extreme weather events and climate variation we certainly cannot expect adaptation to be successful.

<http://www.fao.org/fsnforum/sites/default/files/resources/Van%20AR5%20food%20composite.pdf>

Best regards

Peter Carter

## Habiba Hassan-Wassef, National Research Center, Egypt

The question “What are the main issues for policy-makers to consider when linking climate change on the one hand and food security and nutrition (CC FS&N) on the other, in particular when designing, formulating and implementing policies and programmes” presupposes that the appropriate policy making and strategy formulating capacities and evidence based decision making mechanisms/systems exist in countries; and that decision makers (backed by political will) are able to take into consideration the comprehensive holistic vision of the inter-dependent relationships between CC, FS and nutrition problems. Furthermore, they have the ability and tools to translate it into policies and strategies for sustainable interventions that respect the guiding principles of the RIO+20 Declaration and the dominating leitmotif of the post 2015 development era, namely, “sustainability”.

Are all developing countries positioned to undertake such a task?

In a recent publication, entitled “Africa Climate Change Policy” the author to describes the situation in the African continent as being, “... Scattered and incoherent climate related policies exist but are not sufficient to give the continent a survival chance under adverse climate change impacts.” He goes on to comment on - inter alia - the lack of appropriate policies, the sluggish political systems; weak institutional capacity and framework; poor coordination and implementation of existing legislations, and more importantly the common absence of foresight in national development planning and climate resilience. The global settings are described as unfavorable to enhance the countries’ capacity to develop climate change adaptation and mitigation. The author draws attention to countries’ ability to generate climate data that may not always be availed internationally and hence, may not be incorporated into national/regional development planning or in disaster reduction strategies. More importantly, the human resource technical limitations to produce, analyze and interpret and disseminate climate data as a result of poor investment into scientific research on climate change impacts are further undermined by weak governance and surveillance of natural resources. The tendency for sectoral-based implementation of environmental policies further undermines their impact.

In short, several developing countries may be at a disadvantage and not in a posture to embark on “linking” the CC FS&N policies. Attention therefore needs to be directed towards (a) strengthening the policy formulation process that is supported by data analysis and scientific evidence.; and (b) to institutional reform and support. The latter is a prerequisite for successful implementation of the trans-sectoral strategies of comprehensive approaches to sustainable development (RIO+20 Declaration refers).

The real challenge is to develop the governance and managerial model and to undertake the appropriate institutional reform that makes it possible for true broad-based strategic approaches that cut across sectors and generate synergy that maximizes mutual benefits. Original and innovative examples of success stories in this respect accompanied the implementation of the Scaling UP Nutrition (SUN) movement[2] and involved intersectoral coordination at the policy formulation, planning and implementation levels. The experience gained from successful alignment of the SUN policy and plan with the national FS policy and strategy (a precondition for approval of the SUN country plan) is expected to facilitate the incorporation of the appropriate CC dimension. In most of the SUN countries, components of the latter (CC) are already present in the national food security strategies that promote sustainable food production systems.

[1] Robert Mburia, “Africa Climate Change Policy: An adaptation and development challenge in a dangerous world”. Climate Emergency Institute, 2015.

[2] Hassan-Wassef H “Repositioning the SUN Movement in the post 2015 Agenda for Development”, in African Nutrition Matters, Newsletter of the African Nutrition Society, Vol.2, no.2, June 2014

## Lalita Bhattacharjee, FAO, Bangladesh

Effects of climate change are exacerbated by frequent natural disasters, salinity intrusion and land degradation, low productivity of land, tradition agricultural practices, low availability of food items and poor income level of population in the southern districts of Bangladesh. Lack of dietary diversity is a severe problem in the population of this region, which results in micronutrient deficiencies and contributes to the burden of widespread malnutrition. Ongoing projects in the South of Bangladesh have illustrated some coping mechanisms and traditional technologies that contribute to production diversity in the rural home gardens. A tenth of gardens surveyed[1] in Shyamnagar Union in Sathkira district were destroyed completely by soil salinity, and seeds could not germinate; around 38% showed high levels of soil salinity and 34% moderate soil salinity. However, 50% of households implemented coping practices – 38% used organic compost and 34% planted crops in pits leached with water. Mulching with rice straw, coconut coir and other locally available organic materials were used to increase water retention of the soil and develop compost. Greater resilience was found in salinity among vegetable crops which include Indian spinach (pui shak), sweet gourd, okra and kang kong (kolmi shak) which are good sources of micronutrients (beta carotene, folic acid and calcium) and dietary fibre. Kang kong is noted to be the most saline resistant crop but is relatively new to Southern Bangladesh. Small farmers reported that production of rice, an important cash crop and source of food had decreased since the 2012 storms. Households with larger plots of land were noted to be moving from rice cultivation to shrimp cultivation which affected the day labour opportunities for poor households. Households with better knowledge and means to adopt salinity coping practices were among the better off ones. Climate change coping strategies and input resources including livelihood support need to be increasingly integrated into agriculture extension for promoting integrated home gardening for better diets and nutrition, particularly in flood affected areas.

Lalita Bhattacharjee, PhD

Senior Nutritionist

Food and Agriculture Organization of the United Nations

Bangladesh

## Tcharbuahbokengo NFINN, FEEDAR & HR, Cameroon

We organized a second meeting in the implementation of SDGs which took place in Nake Bakundu of Mbonge Sub Division. Project targeting peasant communities who do mixed farming on lands with less open bush fires and soil tilling. Decomposed Cocoa shells and other composed manure is introduced to add the excellent organic manure , soil nutirents for the cultivation and growth of crops without requiring any artificial nutrients. These crops are of high nutritional value and have the opportunity for a better market.

Project is working towards eradicating poverty, hunger and increasing the social status among rural communities by achieving the Rio Conventions and Post 2015 Development Agenda among peasant communities in South West Region.

The project intends to reach out to over 5 million people, where women and young people are the target, encouraging the youths on agriculture. It is expected that between 2015 - 2030 over 500,000 new jobs for youths will be attained and will curb rural exodus or migration, violence, crime problems among the youth population especially as many try to reach the Sahara desert or cross the Mediterranean sea into Europe. It is also expected to improve living and working hours/conditions of families and improved social status by increasing family income and additional opportunities to market farm agricultural products and food security challenges. Children and youths would be opportune to have sound nutritional and dietary choices and to go to school with filled bowels and smiles and an opportunity to study well. Communities will be empowered to make informed decisions about their rights and voting conditions.

Target Audience: This project works with Peasants, Women,Youths, Schools and Colleges,Cocoa growers, CSOs, NGOs, Cultural organizations, Chiefs and local authorities, forces of law and elected officials of government.

 Activities:

1. Capacity building of communities and local institutions including NGOs, CSO, Businesses, Cultural Organizations, Schools and Colleges on sustainable land management climate change adaptation.
2. Participatory training and education, workshops and conferences among community organizations, youths groups, schools and colleges, cultural groups, policy makers and forces of law and order on sustainable land management and climate change adaptation.
3. Tree planting and planting of crops adapted to soil nutrients and increased varieties of endangered species of flora and fauna.
4. Integrated development involving, management of towns, river basins, forests, roads, infrastructure and constructions works

Constraints of peasant farmers in implemeting the Sustainable development Goals.

* Lack of Agricultural Inputs
* Lack of loan and credit facilities
* Lack of adequate information on markets and agricultural opportunities
* New breeds
* New technology

Mr. Tcharbuahbokengo NFINN Cameroon Director General

Federation of Environmental and Ecological Diversity for Agricultural Revampment and Human Rights (FEEDAR & HR)

## Nyla Coelho, Taleemnet, India

Friends,

Let us begin by admitting that we (world citizens) have collectively been extremely sluggish, casual, and irresponsible in acknowledging the serious nature of the implications of climate change for us as well as for the planet. Doing too little too late; countries and their leaders still consider economic indicators as an universal remedy for wellbeing, progress, advancement, development.

Currently India, in particular, is riding on a seemingly unstoppable juggernaut of economic gratification at the cost of everything else. Only time will tell how this will play out in short, medium and long term repercussions and damage; benefits and advantages.

Global statistics in all key areas from energy to economics to ecology to human wellbeing don’t portray a pleasant picture from any angle such that one may at the end of the day rest well; look forward to a pleasant morrow.

If at all, one may find a few answers to the woes of our times in:

* Redefining the smallest social unit to be *a community/ neighbourhood* rather than *a family* by which definition we continue while dealing with matters of policy and practice.
* Rebuilding community for self reliance, self sufficiency, self governance
* Adopting an ecosystem approach in all spheres of human activity
* Creating systems that ensure our primary source of energy is the Sun and the photosynthetic process; and renewables.
* Abandon wasteful expenditure on territorial defense
* Work towards Global fellowship.
* Rebuild the soil, recreate forests, revisit indigenous wisdom, restore biodiversity, rejuvenate water bodies, clean up the air.
* Think and live human scale.
* Adopt an integrated approach in dealing with all issues.

If localized efforts are initiated in one or more of these areas, we may collectively hope for a relatively smooth transition through these challenging times.

I am well aware that this may all seem far fetched and out of context at first reading. The world having run out of ideas (obvious from what we have brought upon ourselves), there is only scope for dreaming left.

## Emily Lewis-Brown, consultant, United Kingdom

Many thanks for the invitation and opportunity to input into this useful consultation. Please find attached my submission on behalf of Compassion in World Farming.

Link: <http://www.fao.org/fsnforum/sites/default/files/resources/Compassion%20input%20to%20UN%20FSN%20Climate%20consultation%20ELB%20April%202015.pdf>

There are five main points to this document:

1. Grain-based intensive animal agriculture can exacerbate food insecurity, poor human nutrition, greenhosue gas emissions and vulnerability to price shocks and other shocks from climate change. It also negatively impacts biodiversity, water shortages, pollution, livelihoods, food soverignty and reduces the resource base available to humans.

2. Extensive, land-based integrated farming, combined with a reduction in over-consumption of meat, food waste and losses, can offer great benefits to food security, nutrition, climate mitigation and adaptation, as well as bringing other benefits to people, the planet and farm animal welfare.

3. Production increases alone will not be sufficient to deliver food security, nutrition, mitigation and adaptation. Avoiding over-consumption of meat; addressing poverty and other factors must all play a part.

4. Research shows that current methodologies (such as Life-cycle Analysis) and commonly used metrics (such as water footprint rather than water use impacts) do not apply well to livestock agriculture. Other methodologies, such as Impact Assessment are needed to avoid unintended negative outcomes.

5. Food Security, nutrition and climate change mitigation and adaptation are all important, and sit within a wider network of interlocking issues and agendas, such as livelihoods, animal welfare, biodiversity, food sovereignty, water and soil conservation, and so on. Developing, designing and implementing food systems for the future can be better optimized across a wider range of agendas and needs of people, the planet and farm animals, if each of these agendas is considered. Thus, farming which is all-agenda-smart (rather than just climate-smart) may be possible and preferable. Stakeholder-dialogue based planning for farming may be a useful approach to achieving optimal farming systems for a given region. Agro-ecology with the needs of humans and animals built in may provide a suitable farming model to work from.

Please do contact me if you require any further details.

Many thanks and best wishes for this work,

Emily Lewis-Brown, April 17th, 2015

On behalf of Compassion in World farming

## T. Beiermann, consultant, Germany

I guess many point of views were already shared. So far programs and policies should take into account that subsistence and smallholder farming are the key factor in securing food and nutrition world wide.

Best practices to mitigate and adapt to climate change would be agroforestry systems including commodities reducing impacts on natural resources, diversifying value chains and providing food for domestic use and if possible for local consumption. Agroforestry systems would increase protection of soils prone to loss and secure water cycles in contradiction to large scale vulnerable monocultures.

Farmer associations could be an option to increase output and generate "market power" for farmers and their single commodities. This could increase their commercial visibility and match needs of the market. Also options for subsistence are left open. I attached a briefing note of an example, where I was also involved.

Communities of practice, associations, education and research should target also smallholders.

## Peter Carter, Climate Emergency Institute, Canada

Climate Change, Food Security and Nutrition FAO April 2015

Dr Peter Carter BC Canada

Dear facilitator and FAO , please accept this submission with respect climate change food security and nutrition. There is nothing more important for all the world as this particular issue.

I include some content from my recent presentation for the Seventh International Conference on Climate Change Impacts and Responses Conference 10 April 2015.

I have posted my full response with images and figures at the following site.

<http://climatechange-foodsecurity.org/about.html>

**Conclusion**

We are in an already committed global climate change world  food security emergency situation.

This is clear when we connect the science of already committed global climate change and the science of impacts of global climate change on crop yields, and this requires immediate measures for climate change mitigation and adaptation.

Please note that the IPCC does not make conclusions on dangerous interference with the climate system.

**Recommendation**

I strongly recommend that the FAO issue a statement in support of the IPCC AR5 best case emissions scenario RCP 2.6 with respect to world food security, and that the FAO conducts an environmental health risk assessment of the up-to-date research on committed global climate change and world food security.

Please note that the IPCC does not make recommendations, and while it provides information on risk and a great deal of information for the performance of a risk assessment, the IPCC assessment is not itself a risk assessment.

This world food security emergency is clear when we connect the science of already committed global climate change and the science of impacts of global climate change on crop yields, requiring immediate measures for climate change mitigation and adaptation.

**Climate change commitment**

This emergency food security situation is made necessarily far worse by the grossly inadequate response of climate change policy- which is the greatest ever policy failure. This policy failure commitment presently endangers billions of people alive today and all future generations.

**Policy commitment**

The most up-to-date calculation of the combined national United Nations pledges on emissions is from Climate Action Tracker (approved by climate change experts).

‘Limiting warming to the globally agreed goal of holding warming below a 2°C increase above pre-industrial in the 21st century means that the emissions of greenhouse gases need to be reduced rapidly in the coming years and decades. The unconditional pledges or promises that governments have made, as of early 2015, would limit warming to 2.9 to 3.1°C above pre-industrial levels’. (Climate Action Tracker 2014)

This policy commitment, however, is considerably higher than 3°C because this is only a realized warming by 2100. The full committed equilibrium warming long after 2100 will be another 75% (IPCC AR5  “For the RCP4.5 and RCP6.0 extension scenarios with early stabilization, it is about 75% at the time of forcing stabilization” (IPCC 2013, WG1, Ch 12 , p. 1103), making the full equilibrium commitment 5°C or more.

There is not the slightest indication that the December 2015 United Nations Paris Conference of the Parties (COP21) will change this situation.

**Climate system science commitment**

Today’s global surface temperature increase of 0.8°C is already absolutely committed (or locked in) to increase to 1.5°C by 2030-2040, according to the IPCC AR5, “The era of committed global climate change 1.5°C  2030 to 2040,” (IPCC 2014, WG2 Figure 11.6). Most significantly this particular IPCC AR5 reference is linked to a great resulting increase in under-nutrition.

Certainly without a rapid emergency world emissions response, our longer term commitment due to the present extremely high concentrations of atmospheric greenhouse gases, according to the IPCC AR5, is 2° C. (IPCC, AR5, WG 1,  12. 5. 2 ).

**Extreme weather events**

The most damaging single category of climate change impacts to both human population health and crops is Extreme weather events. In most of the world where food production is labour intensive, human health impacts of climate change and the crop yield impacts combine to reduce crop productivity even more.

**Today**

We are already experiencing climate change on food security, including some episodic regional disastrous impacts on food productivity -and we are committed to a much higher degree of global climate change than we already have today causing these impacts. Such disastrous climate change-driven impacts, such as extreme weather events, which are already occurring on all continents, are committed to greatly increase.

‘Impacts from recent climate-related extremes, such as heat waves, droughts, floods, cyclones, and wildfires, reveal significant vulnerability and exposure of some ecosystems and many human systems to current climate variability (very high confidence). Impacts of such climate-related extremes include, …disruption of food production and water supply …’ (The Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014, , Climate Synthesis Report , Longer report, p. 16)

**IPCC AR5**

The IPCC (2013-2014) AR5 changed everything that has been reported before on food security. While it has for long been known that the tropical regions would be the most vulnerable to the impacts of climate change on their crop yields (with very small degrees of climate change causing declining crop yields), previous assessments assumed that the temperate northern hemisphere, at least by 2100, was not vulnerable and might even gain by some crop yield increase. Recent research has found that this is not, and is not going to be, the case. Climate change is already having negative effects on most, if not all. major food-producing regions.

‘Assessment of many studies covering a wide range of regions and crops shows that negative impacts of climate change on crop yields have been more common than positive impacts (high confidence). The smaller number of studies showing positive impacts relate mainly to high-latitude regions, though it is not yet clear whether the balance of impacts has been negative or positive in these regions.’ (The Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014, Working Group 2,  Impacts Adaptation and Vulnerability, Chapter 11, Figure 11.6)

It is therefore not surprising that the IPCC Working Group 2 scientists projected that all major crops in all major food-producing regions would be affected negatively above a local and global (they are the same at 1.0°C from 1850) temperature increase of 1°C. **‘Without adaptation, local temperature increases in excess of about 1oC above pre-industrial is projected tohave negative effects on yields for the major crops (wheat, rice and maize) in both tropical and temperate regions**With or without adaptation, negative impacts on average yields become likely from the 2030s with median yield impacts of 0 to -2% per decade projected for the rest of the century , and after 2050 the risk of more severe impacts increases. These impacts will occur in the context of rising crop demand, which is projected to increase by about 14% per decade until 2050. (IPCC, AR5, Working Group 2, Final draft, p. 3).

This is shown in the IPCC WG2 2014 graphs of crop projections, in which the assumed benefits (with one adverse exception) of climate change adaptation should be ignored.

For food security and environmental health risk from climate change taking the mean of the wide range of results (as AR5) of the crop model projections is not valid- worst-case scenarios must be used. Assuming adaptation benefit (As AR5 does) is invalid, especially in this case when the world climate is now in an unprecedented no-analog state, and the crop models do not capture a number of very adverse effects.

For food security and risk it is essential to bear in mind that the IPCC AR5 crop models still do capture a number of large adverse effects. These projections will certainly not be over-estimates with regard to crop yield declines. It would be assumed for risk,  that they will increasingly be under-estimates, as global warming, climate change, tropospheric ozone concentration and extreme weather events increase.

‘More difficult to quantify with models is the impact of very extreme events on cropping systems, since by definition these occur very rarely and models cannot be adequately calibrated and tested’ (IPCC AR5 WG2 TS 7.2.1.1. p. 6). ‘The robustness of crop model results depends on data quality, model skill prediction and model complexity.  Modelling and experiments are each subject to their own uncertainties. Measurement uncertainty is a feature of field and controlled environment experiments. For example, interactions between CO2 fertilisation, temperature, soil nutrients, ozone, pests and weeds is not well understood and therefore most crop models do not include all these effects’ (IPCC AR5 WG2 TS p.11). ‘The rarity of long-term studies of plant diseases and pests is a problem for the evaluation of climate change effects’. (IPCC AR5 WG2 TS p.15).

It is therefore vital that important international agencies like the FAO urgently review plans and policies with respect to climate change and food security.

The fact is our only option to avoid committing (condemning) the future to a world food security catastrophe is a rapid reduction of emissions for mitigation. The 2007 IPCC AR4 made it clear that to avoid a warming of 2 to 2.4° C, emissions ‘must have reversed by 2015 at the latest’. The only emissions scenario of the IPCC AR5 that does not lead to a surface warming above 2° C by 2100 is the best case emissions scenario RCP 2.6. This scenario requires emissions to stop increasing right away and to be in decline from 2020. It is still just possible to achieve this. But this scenario is not on the agenda or any documents of the UNFCCC for the 2015 Paris climate conference negotiations.

‘RCP2.6 is a scenario that aims to keep global warming below 2°C above pre-industrial temperatures’ (IPCC 2014, WG3, SPM. 2.1).

The world is in a desperate emergency situation with respect to climate change and food security. In this unprecedented situation, threatening billions of people today and the future of humanity,  the relevant and involved United Nations Departments are obligated to explain the emergency and certainly to simply (while most significantly) recommend the IPCC AR5 best case emissions scenario RCP 2.6.

In conclusion I appeal to the FAO to at least publish a statement in support of the IPCC AR5 best case emissions scenario RCP 2.6.

Sincerely,

Peter Carter

BC Canada

## Peter Steele, Independent Consultant Agricultural Engineer, Italy

**Getting the right messages across to everyone**

I can remember my Regional Agricultural Officer once rounding on me at a monthly staff meeting with the comment: ‘It’s better to have contaminated food than none at all’, when I had drawn attention to the iniquities of our current recommendations at that time for use of DDT in vegetable gardens. Nutrition and climate change has similar contradictions – concern for the former becomes lost in the urgency to take account of the latter. Simply producing sufficient food irrespective of quality may come to dominate – and our descendants may be eating foods from a mix of traditional, non-traditional and synthetic biological systems.

**Preamble**

This has been an excellent debate with participants criss-crossing the spectrum of issues that for me, at least, has emphasized the overwhelming complexity of the many challenges involved when linking nutrition and climate change. It makes the debate difficult to focus. Where to start? How to make a contribution that has not already been covered? How to encourage the FSN network of enthusiastic people to continue to develop and share information, send messages and highlight the dramatic risks involved by downgrading – side-lining even – the projected impacts of climate change (and this long after the debate has concluded).

Not so much ‘nutrition’ then – and here you can sympathize with Team Leader Florence Egal the lack of focus of which she complains – but lower quality foods, lack of food, reduced agricultural production, insufficient natural resources and more that could arise as ambient global temperatures shift above 2degC during the latter part of the 21st century. Issues of this kind have been gaining momentum and have been described by the IPPC (2013) and others for the risks involved with our current ‘business as usual’ approach to socio-economic development just about everywhere.

**Greenhouse gas emissions**

These include recognition that current levels of atmospheric CO2, CH4 & N2O are the highest they have been for almost a million years. Think about that. We occupy a planet that is 4.5 billion years old, the modern version of our species has been around for just 200,000 years (but with ancestry dating back another six million years) and we seem to have blown it in little more than 250 years as our species has multiplied, occupied the entire planet and then, as a society, ‘industrialized’ in unsustainable manner.

We need to hold cumulative atmospheric CO2 emissions to around 1,000 Gt with which to manage that 2decC rise. It seems increasingly unlikely that this will be achieved, and that temperature rises may be twice this target, with the movement of regional climates, the instability of weather patterns including extreme events that will follow and, for best, rises in average sea-levels that have been estimated at 600 mm. Seas cover two-thirds of the surface of the planet and they are a natural sink for surplus GHGs but, the downside, this increases levels of marine acidity. Further, estimated 40% of the world’s people live within 100 km of the coast.

The main culprit is geological carbon released from the fossil fuels that once lay deep beneath the surface of the planet – originally separate from atmospheric carbon cycles, but currently widely exploited for the ease with which energy can be extracted and used, thereby releasing stored carbon as a by-product of combustion. Of the order 6 Bt of carbon continue to be released each year and this is changing our climate. On human scale, this kind of change will be irreversible.

**What to do about it?**

The solution is a relatively easy one to suggest – leave the remaining unexploited fossil fuels in the ground and shift to alternative energy resources. However this is, as everyone knows, easier-said-than-done. It will simply not take place fast enough given the entrenched position of these fuels in international energy models, and given the power of those who own and exploit them within world commerce.

**Lower quality foods**

Projections for the quality of foods that will be grown as CO2 levels in the atmosphere rise are typically based upon a scale of parts per million (ppm); from 250 ppm before the industrialization of human society to around 400 ppm today (a staggering 60% increase in a little over 250 years) and projected levels of around 570 ppm by 2050 (and this with serious effort to curb emissions by governments, starting now). R&D with popular staples such as rice, wheat, maize, etc. shows diminished levels of essential nutrients such as iron, zinc and others, and reduced protein content – the quality of foods suffer.

Boosting food intake to compensate for is an obvious approach, but with food production required to double to meet increased populations estimated at 9-10 billion before stabilization, and greater demands for higher value foods – dairy foods, meats, fish and similar – as a function of higher economic growth, the reality of the ‘haves’ and the ‘have-nots’ is likely to become more, not less, pronounced. As-of-now there is already around one billion food insecure people worldwide.

**Focus**

Having set the scene, as-it-were, my contribution to the debate is concerned with ‘Messages for people who are not aware of the implications of climate change - what can you do?’

You only have to explore the language of ‘climate change’, to look around you at the lack of concern by the man and woman in the street (as-it-were) and the limited cooperation that is underway between the various countries and blocs that are talking about change mitigation[[1]](http://www.fao.org/fsnforum/forum/discussions/climate-change-and-fsn%22%20%5Cl%20%22_ftn1%22%20%5Co%20%22). Leave aside the iniquities of blame, economic growth linked to levels of emissions (and those responsible today and historically) and, importantly, the ‘catch-up’ requirements of the industrializing countries. Consider instead the messages that should be promoted, shared and taken up by everyone.

I have recently been exploring ‘value chains’ in the countries of NW East Africa – resource poor communities, rural densities >450/km2, income levels <US$2/day and few options for the future for themselves and their families. No one wants to be a subsistence farmer. My brief was to highlight and promote dairy industries, exotic horticultural crops, bee products and similar from which smallholder growers in organized and supported agro-business groups could boost incomes, attain improved levels of economic development and become more secure.

Project planning has been reasonable, a budget estimated at US$8M was well-spent during an investment period of more than five years and the development and intermediate objectives were largely met. At no time, however, was there reference to climate change and the practices required for security of production into the future; markets dominated thinking – not climate. What resources did the central governments of the recipient countries have available to boost their awareness of climate issues – who knows? These were not included within the public services described and/or available.

The point being that no effort was made to include ‘climate change/mitigation’ where issues of agronomy, economic performance, crop/livestock care, transport and more took priority. And why not? National planning rarely has a 50 year cycle; a rolling five year plan is more typical where poverty, employment, livelihoods and similar remain the main focus of national development objectives.

And not just the low income countries. In my country things are much the same. Like most other people, I continue to drive my petrol/diesel powered car, eat preferred foods irrespective of conversion ratios, live in a house that leaks heat energy, and give little thought to my personal carbon footprint. I am aware that this is probably around 15 tCO2e annually of which 60% comes down to personal choice – housing, travel, food, non-food products and services. I am also aware that I pay little more than lip-service to reducing my footprint. (And, in fact, this year I have already blown things by flying from Melbourne to Rome). That smallholder in East Africa to whom I referred earlier – living with few modern resources – will probably already have a footprint of 1 tCO2e or less – the level required for everyone on Planet Earth to provide the basis for atmospheric GHGs to stabilize.

The bottom line, however, is a requirement for government imposed guidelines that eventually become taken up such that they become the norm for everyone. This means, in reality, those of us in the industrial and industrializing countries – the rich people; it means changes to current lifestyles, foods, services and more. And not just governments either for that is a ‘pass-the-buck factor’; we all have personal responsibilities to make a difference.

Failure to make it happen will bring changes that are hard to envisage; your children’s children will eventually reap the ineptitude, indecision and challenges of the current day in their unpredictable world of 2100.

**Peter Steele
Rome**
**16 April 2015**

[[1]](http://www.fao.org/fsnforum/forum/discussions/climate-change-and-fsn%22%20%5Cl%20%22_ftnref1%22%20%5Co%20%22)‘**Impact of climate change ... adaptation’.** Explore the Power Point information provided by FAO/Kanamaru to appreciate the complexity of these messages. First interpret the pictures and words, put them into plain language, and provide them to every man/woman everywhere. Better still promote messages in classrooms worldwide. Collectively, our generation may already be too entrenched to make a difference.

## Theresa Burrington, United Kingdom

I would like to make a general comment:

The All Party Parliamentary Group on Agroecology are doing good work in the UK and are proposing different ideas to those being put forward by the UK Government, namely the Agri-tech Strategy, which is not without its critics.

Good work is also being done by The Campaign for Real Farming and by various organisations proposing an Alternative Trade Mandate: http://www.globaljustice.org.uk/european-alternative-trade-mandate

Many are hoping there will be a change in direction by Government and "establishment science".

I would like the forum to be aware that a challenge has been made to the UK's Royal Society:

<http://beyond-gm.org/wp-content/uploads/2015/03/DRUKER_OPEN-LETTER-TO-THE-ROYAL-SOCIETY_Final.pdf>

## Moises David Rojas Peña, Dominican Republic

Introducción

Las estimaciones mundiales más recientes de las tendencias de las emisiones de los bosques, muestran que las emisiones totales se redujeron en más del 25% durante el periodo 2001-2015. Los datos de la FAO muestran que la disminución global se debe a una disminución significativa en las tasas de deforestación a nivel mundial, mientras que las emisiones de la degradación de los bosques, estimadas hoy por la FAO por primera vez, por el contrario están aumentando con el tiempo y representan un cuarto de las emisiones netas provenientes de los bosques. Las emisiones de globales de carbono derivada de la desforestación y de la degradación forestal apuntan a un 25% en las emisiones procedentes de la desforestación es decir es decir, 3,9 a 2,9 Gt de CO2 eq por año, según estimaciones de la FAO.

En República Dominicana los efectos del cambio climático en las estaciones de lluvia han provocado un cambio de patrones durante todo el año. También los periodos de sequía han cambiado, con estimaciones de que su impacto será mayor en las próximas décadas, debido al fenómeno.

En algunas regiones del país se registran descompensaciones importantes entre recursos naturales, población y necesidades básicas. Las desproporciones son más marcadas y notorias en regiones áridas, semiáridas y subhúmedas. Las regiones áridas y semiáridas comprenden el 18 % de la superficie del país y están caracterizadas por un balance hídrico negativo casi todo el año.

Como consecuencia del cambio climático, los eventos extremos se tornan más violentos, tanto en la intensidad de las sequías como las grandes precipitaciones. Es previsible que el escenario más pesimista, en cuanto a la disponibilidad futura de recursos hídricos lleve como contraparte una disminución significativa del impacto de huracanes en la geografía nacional.

Nuestra economía depende de los recursos naturales y de estos el turismo y el agua, importante aportadores de riqueza al PIB, son afectados por el cambio climático. Así el suministro de energía es una piedra angular para el país, con un gran potencial no sólo para la mitigación de gases de efecto invernadero, sino también para el ahorro de gastos.

El gobierno ha realizado varios estudios tomando en consideración que estos sectores son estratégicos en el desarrollo económico del país y poder lograr un desarrollo sostenido. Esta iniciativa busca fortalecer las capacidades nacionales sobre planificación sectorial en el ámbito del cambio climático, y mejorar la coordinación de las propuestas de políticas para enfrentarlo.

Cambio Climático y su Impacto Seguridad Alimentaria Republica Dominicana

La Republica Dominicana presenta una diversidad bioclimáticas y topográficas que van desde seca (450/mm/año) ha humedad (2,500mm/año) que conforma una amplia gama de ecosistema y hábitat, que incluyen tierras y aguas bajo el nivel del mar. Cinco ríos aportan 1,962 millones de metros cúbicos de agua a los lagos de 18 presas que suplen para los sostenimientos de la agricultura, la producción de energía y el consumo humano. El 27% de los bosques están en concentrados en áreas protegidas las cuales producen el 28% de la producción pesquera. Son fuentes de bienes productivos como alimentos, medicinas y materiales de construcción. Son reguladores de los procesos naturales y de los procesos naturales y de los sistemas que dan soporte a la vida; secuestro de carbono, formación de suelo y purificador de agua.

Al aumentar la temperatura por el cambio climático y la temperatura de los mares sique en aumento esto afectara los ecosistemas, los corales se irán muriendo, el nivel del mar ira en aumento, la isla se sumerge, la sequia ira avanzado y los incendios se multiplicaran. Se incrementara el poder e intensidad de los huracanes y se presentaran temporales fuertes e inundaciones más crecientes. Se reduce el potencial productivo de los suelos, los bosques, las costas y los mares. Y al final se afecta la seguridad alimentaria reduciéndose la reserva de los alimentos. El cambio climático seguirá reduciendo el acceso al agua potable, afectará negativamente a la salud de los pobres y planteará una auténtica amenaza a la seguridad alimentaria en muchos países de África, Asia y América Latina. En algunas zonas en que las posibilidades de sustentos son limitadas, la reducción del rendimiento de la cosecha amenaza con provocar hambre y la migración puede ser la única solución ante la erosión de las zonas costeras. Los costos de macroeconómicos del impacto del cambio climático son sumamente inciertos, pero es posible que puedan poner en peligro el desarrollo de muchos países.

Prácticas e Inversiones para Enfrentar Cambio Climático

Como apuntaba anteriormente, los sectores turismo, agua y energía son afectados por el cambio climático lo cuales producirán aumento en la temperatura, elevaciones del nivel del mar, prolongaciones de los periodos de sequia, y aumento e intensidad de los huracanes tropicales. Para adaptar a los sectores de turismo y agua a los impactos del cambio climático serán necesarios una inversión de US$4,451 millones y para mitigar las emisiones de gases de efecto invernadero en sector energía supondrán un ahorro de US$7,102 millones. La Evaluación de los flujos de inversión y financiamiento (FI&F), componente del Proyecto Global del PNUD “Fortalecimiento de las capacidades de los encargados de la formulación de políticas para hacer frente al cambio climático”, busca fortalecer las capacidades nacionales sobre planificación sectorial en el ámbito del cambio climático, y mejorar la coordinación de las propuestas de políticas para enfrentarlo.

Se ha creado un Comité interinstitucional de trabajo, que abarca a los tres sectores a analizar, con representantes técnicos de alto nivel de los principales ministerios, academia y sector privado involucrados en cada sector a decir: Turismo, Agua y Energía.

El objectivo de la evaluación de flujo es determinar los FI&F necesarios para abordar el cambio climático. La evaluación se basa en estudios, planes y estrategias elaborados por el Gobierno del República Dominicana para responder a las necesidades «Desde una perspectiva de desarrollo. Para cada sector se desarrolló un escenario de línea base y un escenario de adaptación/ mitigación para determinar los flujos de inversión (FI) y financieros (FF) así como los costes de operación y mantenimiento (O&M). Los valores se dan en dólares EEUU constantes de 2005 (1US$ = 38.8DOP). Las entidades de inversión analizados son: los hogares, las empresas (privadas y ONGs), así como el gobierno (fondos públicos). Para la mitigación en el sector Energía, se consideraron 2 subsectores: Eléctrico, que constituye una parte importante de la energía consumida - y Transporte, que representa el 31% del consumo de energía. Durante el período 2006-2030, habrá un ahorro de US$ 7102,3 millones.

Las principales medidas seleccionadas fueron:

Por el subsector Eléctrico, las medidas de mitigación seleccionadas se dividen en 2 líneas de acción: Introducción de nuevas capacidades de energía renovable y de energía térmica con características de mayor eficiencia; uso de combustibles menos intensivos en carbono –lo que conllevará a una reducción de 114 millones de toneladas de CO2, con una inversión de US$ 5820,4 millones, y un ahorro en los costos de operación y mantenimiento de US$ 16117,5 millones (equivalente a un ahorro neto de US$ 10297.1 millones);

Por el subsector Transporte, hay 2 líneas de acción propuestas: Introducción de mezcla de combustible y potenciación de la penetración de combustibles menos carbono intensivo –lo que conllevará una reducción de 6 millones de toneladas de CO2 e inversiones de US$ 8851,6 millones, que alcanzará un total ahorro de US$ 5656,8 millones en los costos de operación y mantenimiento (US$ 3194.8 millones).

Para el sector Agua, Durante el período 2011-2030, el sector deberá invertir aprox. US$ 2792,52 millones.

Las principales medidas seleccionadas fueron:

Agua potable y saneamiento: Revertir la pérdida de calidad de los cuerpos de agua dominicanos, elevando la cobertura de tratamiento de aguas residuales de origen doméstico, industrial y agropecuario; establecer un sistema tarifario basado en la gestión de la demanda de agua (US$ 1296,86 millones);

Gestión integrada del agua y riego: gestión integrada de los recursos hídricos, bajo el paradigma de gestión de la demanda de usos múltiples (US$ 1005,11 millones); y Gestión ambiental: Protección y conservación de los servicios ambientales de los bosques y de los ecosistemas acuáticos con un enfoque ecosistémico (US$ 490,55 millones).

Para el sector Turismo Durante el período 2007-2030, el sector deberá invertir en las medidas un estimado de US$1658,5 millones. Las principales medidas seleccionadas fueron: Infraestructura y técnicas de protección del recurso costero, medidas institucionales y sistema de incentivos para fomentar la mejora del sector, investigación y sensibilización social, fomento de la gestión sostenible y manejo de riesgos (US$ 1658,5 millones).

Las implicaciones de las políticas para la reducción de las emisiones de CO2. Para el sector energía: hay la posibilidad de utilizar los beneficios de la reducción de emisiones asociadas para la atracción y canalización de recursos financieros, que contribuyan su aplicación. Identificar y reducir las barreras que existe entre el sector privado y público. El fortalecimiento e integración coordinada de instancias/mecanismos de coordinación en materia de mitigación y la concretización de proyectos e iniciativas ya en marcha. Para el sector Agua las implicaciones serán: un esfuerzo de concertación es necesario entre los actores institucionales, el sector productivo y la sociedad civil. La reforma del marco legal e institucional para la gestión del agua tiene que implementarse. Para la implementación del sistema tarifario, la sociedad tiene que ser involucrada y debe percibir que dichas reformas están orientadas a la gestión sostenible de los recursos hídricos. Para el sector Turismo: implementar el Plan de Ordenamiento Territorial consensuado. Fortalecer y aplicar las regulaciones ambientales, incluyendo la Evaluación Ambiental. Diversificar productos y mercados: Potencializar los segmentos de turísticos alternativos al turismo de playa: gastronómico, deportivo, cultural, salud. Promover fomento de las capacidades y programas de educación incorporando la variable ambiental y la adaptación al cambio climático.

## Moises David Rojas Peña, Dominican Republic

El Cambio Climático y La Pobreza

Un informe de Panel Intergubernamental de Expertos sobre el Cambio Climático (IPCC) publicado en el mes de marzo del 2014, presenta un panorama difícil para las naciones si no se toman las medidas necesarias a tiempo. El informe prevé aumento en el desplazamiento de las poblaciones, especialmente las zonas costeras que se verán afectada por el aumento del nivel del mar, las inundaciones y la erosión de las costas. En el mismo se alerta sobre el descenso de la cosecha, la extinción de especie, la degradación de los ecosistemas y se producirán conflicto y guerra civiles.

Las actividades humanas son las responsables del cambio climático y los daños causados —subida del nivel del mar, acidificación de los mares o el derretimiento de los glaciares— se mantendrán durante siglos si los gobiernos no toman conciencia de que el calentamiento es real y muy grave. Aunque lo enfrentaran con firmeza, ya hay efectos con los que conviviremos al menos 1.000 años. Dependiendo del escenario, entre el 15% y el 40% del CO2 emitido puede quedarse ya en la atmósfera. Según sus previsiones, el nivel del mar subirá entre 26 y 82 centímetros y la temperatura aumentaría hasta 4,8 grados a finales del siglo. Este informe pensado para los representantes políticos, reúne las evidencias científicas de los últimos seis años, en el cual participaron 831 experto de 85 países.

Actualmente más de mil millones de personas viven en condiciones de pobreza extrema, con menos de 1 US$ al dia. Y si los llevamos al nivel de 2 US$ por dia esta cifra asciende a 2,800 millones al dia (OCDE 2001). El cambio climático agravara esta situación de pobreza y su impacto adverso será particularmente intenso en las naciones en desarrollo debido a sus condiciones geográficas y climáticas, a su elevada dependencia de los recursos naturales y a su limitada capacidad de adaptación a un clima cambiante. El cambio climático constituye una seria amenaza para la erradicación de la pobreza y la estrategia de desarrollo tienden a pasar por alto los riesgos del cambio climático.

Los actuales compromisos para mitigar el cambio climático mediante la limitación de los gases de efecto invernadero (CEI), aunque lleguen a ejecutarse, no estabilizarán las concentraciones atmosféricas de estos gases. La creación de una capacidad de adaptación para minimizar el daño causado a los medios de vida por el cambio climático constituye una estrategia necesaria para complementar los esfuerzos de mitigación del cambio climático. La adaptación, es toda repuesta a condiciones climáticas que reducen la vulnerabilidad, y la cual constituye una parte integrante y urgente de la estrategia global de la lucha contra la pobreza. Cada vez hay mas contribuciones que prueban que los cambio climáticos han contribuidos a diversos cambios en los sistemas biológicos y físicos en numerosa parte del mundo.

Los países en desarrollo se verán afectados por la escases de los recursos hídricos, ellos se debe a la importancia económica de estos sectores sensibles al clima como la pesca y la agricultura, y de su limitada capacidad humana, institucional y financiera para prever y responder a los efectos directos e indirectos del cambio climático. Los PMA son los más vulnerables por la poca capacidad y los poco recursos y son los que soportaran la carga mas pesadas en pérdida de vida y los efectos a la inversión y perdida económica.

La extensión y el alcance del impacto regional del cambio climático dependerán del grado de mitigación. Por tal es necesario adaptarse. La reducción de las emisiones de gases de efectos invernadero retrasaran y reducirán los daños causados por el cambio climático. Mientras mas bajo sea el futuro nivel de estabilización de la concentración atmosférica de gases de efecto invernadero, menor será el probable daño. Los PMA deberán proteger el sistema climático en beneficios de las generaciones presente y futura de manera equitativa y en conformidad con sus responsabilidades comunes. En consecuencia, las Partes de los países desarrollados deberán ponerse a la cabeza de la lucha contra el cambio climático y sus efectos adversos. Si en el supuesto de que las emisiones de gases de efecto invernadero se frenases inmediatamente, la temperatura media mundial seguirá subiendo debido a la lentitud de la repuesta de la atmosfera terrestre a las emisiones ya producida.

Antes de hacer frente a la adaptación al cambio climático en el contexto del desarrollo, es importante reconocer que hoy día el clima ya influye en las oportunidades económicas y las perspectivas de desarrollo. Los países y las personas pobres tienden a ser particularmente vulnerables a las desviaciones de las condiciones climáticas medias y a los fenómenos climáticos extremos. Al comparar los datos sobre los peligros naturales entre los países en desarrollos y desarrollados, la pérdida de vidas y el número de personas afectadas tiende a ser considerablemente mayores en las regiones de los países en desarrollo por lo que respecta a las catástrofes naturales de magnitud comparable. El impacto de la variabilidad climática en los países queda también bien ejemplificado por los daños ambientales y socioeconómicos asociados a El Niño. Este fenómeno afecta al clima a escala mundial y su impacto se concentra en las regiones tropicales y subtropicales. Este cambio de temperatura de la superficie del mar afecta a la productividad marina y en tierra firme es asociado a las inundaciones y a las sequias, así como a los cambios en los fenómenos climáticos extremos y a las distribución de enfermedades transmitidas por vectores.

La capacidad de repuesta a estos fenómenos naturales es ensimisma dependiente del desarrollo económico, y las alternativas en termino de vida de los pobres son mas reducidas y mas sensibles al clima que aquellos que no son pobres. Los pobres son particularmente vulnerables a las desviaciones de las condiciones climáticas como la sequia, la catástrofe y las inundaciones. La vulnerabilidad varia, entre los mismo pobre ya que algunos posee mas recursos financieros, sociales y políticos que los ayuden a procurar medios de vida para poder salir de la situación de riesgo que los otros. La capacidad de los pobres para enfrentarse a los problemas esta siendo sometida a presión debido a varias tendencias actuales, entre las que se cuentan el VIH/SIDA, el incremento de la densidad de población y las fuerzas perjudiciales asociadas con la globalización. El cambio climático se sumará a estas tendencias e incrementará la vulnerabilidad.

La vulnerabilidad y las combinaciones de las misma para enfrentar el cambio climático dependerá de como se aborde el mismo. Por ejemplo un agricultor pobre que este sometido a lluvias de periodo erráticos durante dos años deberá abandonar sus cultivos y dedicarse a ofrecer sus servicios como trabajador en otras granja mas productivas. Esta dependencia de trabajo físico como único medio de subsistencia incrementara su vulnerabilidad, ya que la malnutrición y las enfermedades pueden reducir su capacidad de trabajo manual.

Dichas desviaciones de las condiciones climáticas normales y de la experiencia pasada pueden ejercer una presión adicional del cambio climático sobre los pobres e introducir cambios drásticos en la estrategia de los medios de vida. Cuando la diversificación económica es escasa, las oportunidades de obtención de ingresos y por ende, las posibilidades de crear nuevos medios de vida en respuesta al cambio climático pueden ser limitadas.

El impacto dependerá del contexto y de los factores geográficos, económicos, sociales y culturales así como de las prioridades y de las preocupaciones de los individuos de las familias de la sociedad y de los problemas institucionales y políticos. Los pobres dependen directamente de los bienes y servicios de los ecosistemas, ya sea como una fuente primaria o suplementaria de alimentos, forraje, materiales de construcción y combustible. Esto lo hace vulnerable a la degradación de los ecosistemas. A la vez las condiciones socios económica empujan a los pobres a zonas marginales obligándolo a explotar los recursos naturales para mejorar su medio de vida, el cambio climático erosiona la calidad de los recursos naturales reforzando la condiciones de pobreza.

La seguridad alimentaria está en función de varios factores interactivos, entre ellos la producción alimentaria y el poder adquisitivo de alimentos. El cambio climático podría incrementar la frecuencia del hambre debido a sus efectos negativos directos en la producción y a su impacto indirecto en la capacidad adquisitiva. Los cambios de la temperatura, las precipitaciones y los fenómenos climáticos extremos aumentarán la presión sobre los recursos agrarios en numerosas regiones de los países en desarrollo y reducirán la calidad de las zonas dedicadas a la producción agrícola. Dado que el acceso a las tierras productivas es importante para reducir la pobreza rural, el impacto del cambio climático en la productividad de la tierra obstaculizará aún más los esfuerzos para combatir la pobreza rural.

El impacto del cambio climático en el suministro de alimentos varía considerablemente según las regiones. Existe un verdadero riesgo de que el cambio climático afecte negativamente a la seguridad alimentaria y exacerbe el hambre en algunas regiones de los países en desarrollo.

El impacto potencial del cambio climático en la salud humana incrementaría la vulnerabilidad y reduciría las oportunidades afectando directamente la educación y la capacidad de trabajo. Un efecto directo el incremento de las enfermedades y fallecimiento relacionados con la temperatura. La ola de calor intensas y prolongada, unidad a la humedad pueden incrementar los índices de mortandad y movilidad. Los cambios en la temperatura y las lluvias pueden cambiar la distribución geográfica de las enfermedades transmitida por vectores. Los niños y las mujeres embarazadas y sus hijos aún no nacidos son especialmente vulnerables a la malaria.

Los fenómenos meteorológicos extremos como la sequia, las inundaciones y otro fenómeno meteorológico provocado por el cambio climático, degradan y reducen el suministro de agua potable. Las principales causas de la mala salud y de enfermedades que ponen en peligro la vida en los países no desarrollados es provocado por el acceso inadecuado de agua potable, la falta de condiciones higiénica aceptable y combinada con la mala practica.

Los efectos directos e indirectos del cambio climático y su interacción con otras vulnerabilidades y riesgos ambientales pueden llevar a migraciones en masa, al verse degradados los recursos fundamentales y amenazados los medios de vida. A ello debe añadirse el riesgo de conflictos potenciales, entre los que se incluyen el malestar social, la inestabilidad política y las guerras debidas a la disminución de los recursos hídricos o de otros recursos naturales y la posible migración en masa debida, por ejemplo, a la pérdida o la degradación de tierras y a los fenómenos meteorológicos extremos. Estos conflictos podrían tener considerables costos, tanto en términos macroeconómicos como de sufrimiento humano.

El cambio climático además de constituir una amenaza a nivel mundial, representa un problema para el desarrollo, ya que serán estos los que sufrirán los máximos efectos adversos al tener la mínima capacidad de adaptación y por ende los más vulnerables. El cambio climático supone una amenaza adicional que se suma a los riesgos existentes, interactúa con ellos y puede reforzarlos al someter a nueva presión los medios de vida y las estrategias de los pobres para hacer frente a dichos riesgos.

El cambio climático pone en peligro los objetivos del desarrollo del milenio (ODM) y los objetivos asociados a nivel nacional de erradicación de la pobreza y de desarrollo sostenible. En conclusión, hay que tomar medida concreta y urgente para reducir la vulnerabilidad e incrementar la capacidad de adaptación de los pobres garantizando su capacidad para adaptarse a la variabilidad del clima actual. La siguiente tarea para la comunidad para el desarrollo consiste en reforzar la capacidad de adaptación de las personas y los países pobres y ayudar a ejecutar acciones concretas para hacer frente al impacto del cambio climático.

## E.V.S. Prakasa Rao, Independent Researcher, India

Crop diversification, knowledge based rural enterprise will enhance food security systems' viability among small farmers.We have done some studies where incorporation of aromatic plants and aromatic plants based agro-enterprises alongside food crops have helped livelihoods, economic gains and environment.

Thank you.

E.V.S.Prakasa Rao

1. The *International Code of Marketing of Breastmilk Substitutes (IC)* and the subsequent relevant WHA Resolutions (that clarify and update the IC) are designed to remove obstacles to breastfeeding and ensure that breastmilk substitutes are used safely if needed. They aim to protect everyone from misinformation and commercial promotion – protecting both breastfed and artificially fed babies. They are not just for developing countries: they are *minimum* requirements for *ALL countries***.**

The *Convention on the Rights of the Child*. Article 24 of CRC calls on governments to provide parents with information on nutrition and breastfeeding and the CRC General Comment No. 15 explains what this means. It stresses the obligation for States to protect, promote and support breastfeeding through the implementation of the World Health Assembly *Global Strategy for Infant and Young Child Feeding. (GSIYCF)* It also sets a direct obligation to companies to abide by the IC universally. Nations that ratified the Convention are bound to it by international law and thus have clear obligations. Governments must not allow anything undermine a human right international law and thus misinterpret duty/obligation under it. [↑](#footnote-ref-1)
2. Whistleblowing: Food Safety and Fraudby Yasmine Motarjemihttp://www.babymilkaction.org/archives/837 [↑](#footnote-ref-2)
3. Linnecar A, 1989, WHO, 2008; IPCC, 2014a, *Formula for Disaster*

<http://bpni.org/ibfan-newswire-2014/9>]

<http://www.eea.europa.eu/soer-2015/synthesis/report/5-riskstohealth#section5-4>

<http://www.euro.who.int/en/health-topics/environment-and-health/water-and-sanitation/data-and-statistics>

<http://www.eea.europa.eu/soer-2015/synthesis/report/5-riskstohealth#section5-4> [↑](#footnote-ref-3)
4. Unicef 2012 [↑](#footnote-ref-4)
5. Jones G et al. (2003) *How many child deaths can we prevent this year?* The Lancet, no 362, 65-71.) [↑](#footnote-ref-5)
6. Coriolis (2014), Infant Formula Value Chain, prepared for the New Zealand Board of the Pacific Economic o-operation Council, New Zealand. Available at: <http://nzpecc.org.nz/20901/index.html> [↑](#footnote-ref-6)
7. *Potential economic impacts from improving breastfeeding rates in the UK.* Pokhrel S, et al. Arch Dis Child 2014;0:1–7. Doi:10.1136/archdischild-2014-306701

[Http://adc.bmj.com/content/early/2014/11/12/archdischild-2014-306701.full.pdf+html](http://adc.bmj.com/content/early/2014/11/12/archdischild-2014-306701.full.pdf%2Bhtml) [↑](#footnote-ref-7)
8. <http://ibfan.org/wbti-and-wbci>

 <http://worldbreastfeedingtrends.org/> [↑](#footnote-ref-8)