



Abstract - Il ruolo dell'agricoltura biologica nella lotta ai cambiamenti climatici

24 agosto 2015 - EXPO, Parco della Biodiversità, Teatro della Terra

□ **EDUARDO AGUILERA** - Senior technical support for research, expert in climate change and soil in agriculture, Pablo de Olavide University

Title: *Mediterranean organic farming and climate change. Potential for mitigation and adaptation.*

Climate change impacts are expected to be specially severe for Mediterranean agriculture. At the same time, Mediterranean agricultural systems are an important source of greenhouse gas emissions (GHGe) responsible for climate change. Our research shows that organic farming practices in Mediterranean cropping systems usually lead to a reduction of soil nitrous oxide emissions and to enhanced carbon sequestration. Increased soil carbon content and diversity levels under organic farming are key aspects in adaptation strategies to climate change. These processes are added to a reduction in emissions related to the production of agricultural inputs, resulting in lower GHGe balances estimated through life cycle assessment. In the majority of crop types, reductions can be observed both per hectare of cultivated land and per kg of product, despite yields are usually lower under organic management. In addition, local organic farming has the potential to feed the Spanish population despite the present dependency on synthetic fertilizers and feed imports. However, this objective could only be realized if technical changes at the farms are accompanied by the recovery of Mediterranean dietary patterns and the reduction of food waste.

□ **LORENZO CICCARESE** - Researcher at ISPRA - The Institute for Environmental Protection and Research

Nel corso della presentazione saranno discussi due temi principali:

1. Agricoltura biologica e effetti ambientali

Esiste una corposa e solida evidenza scientifica a dimostrazione dei vantaggi dell'agricoltura biologica rispetto a quella convenzionale per gli aspetti relativi alla salute umana, al benessere degli animali allevati e all'ambiente *sensu lato*. Viceversa, l'agricoltura biologica, che non ha come obiettivo principale il raggiungimento d'elevati livelli di produzione, ha dei livelli più bassi di produzione per unità di superficie rispetto a quelle convenzionali. Da qui deriva una questione fondamentale nel dibattito sul contributo dell'agricoltura biologica per il futuro dell'agricoltura mondiale: l'agricoltura biologica potrà essere in grado di produrre cibo a sufficienza per sfamare il mondo e garantire la sicurezza alimentare?

Il confronto tra la produttività dell'agricoltura biologica e di quella convenzionale ha un ruolo centrale in questo dibattito. Va segnalato tuttavia che la sicurezza alimentare, secondo la definizione ufficiale del World Health Organisation (1996) è raggiunta quando la popolazione ha accesso a cibo non solo sufficiente, ma anche sano e nutriente ("... all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life"). Numerosi studi dimostrano che la produzione delle colture bio è, mediamente, 20% inferiore rispetto a quella delle colture convenzionali, passando da uno scarto tra il raccolto di frutta bio e convenzionale del 3% per la frutta e del 34% per la verdura. D'altra parte va registrato che i terreni sottoposti a forme intensive di agricoltura sono soggetti ad un calo della fertilità e della capacità produttiva. Alcuni studi stimano che quasi il 40% dei terreni coltivati intensivamente andrà perso entro il 2050. Al contrario, i suoli bio tendono a mantenere le proprietà biologiche, fisiche e chimiche nel corso del tempo, mantenendo la produttività e garantendo di conseguenza la sicurezza alimentare a lungo termine.



2. Agricoltura bio e cambiamenti climatici

Le relazioni tra agricoltura e cambiamenti climatici sono estremamente complesse. Da una parte l'agricoltura è una delle principali fonti di emissioni di gas-serra, tra cui anidride carbonica (CO₂), metano (CH₄) e protossido di azoto (N₂O), alla radice dei cambiamenti climatici in atto. Secondo la FAO, le emissioni agricole di produzione vegetale e animale ammontano a 5,3 miliardi di tonnellate, pari all'11,5% del totale delle emissioni di tutti i settori (<http://www.fao.org/news/story/en/item/216137/icode/>). La fonte principale di emissioni di gas-serra è la fermentazione enterica, per via del metano che si forma nella fase di digestione degli alimenti, che da sola totalizza il 39% dell'intero settore agricolo. A questa fonte segue quella della distribuzione di fertilizzanti sintetici: 13% delle emissioni agricole (725 Mt CO₂ eq.). Anche in Italia, il comparto agricolo è un emettitore netto di gas-serra e contribuisce per circa il 7% alle emissioni totali nazionali. D'altra parte, l'agricoltura, grazie all'attività fotosintetica delle colture, può avere un ruolo significativo nelle strategie di mitigazione dei cambiamenti climatici se fossero implementate quelle pratiche agricole (tra cui una migliore gestione dei suoli agricoli e dei pascoli, delle risaie, degli animali e delle loro deiezioni, dell'irrigazione, il recupero dei suoli organici) che portano a una riduzione delle emissioni di gas-serra, alla produzione di bio-energia in sostituzione delle fonti fossili e di sequestro di carbonio nel suolo e nella biomassa. Infine va ricordato che l'agricoltura è uno dei settori produttivi più colpiti dagli effetti negativi delle alterazioni climatiche, soprattutto attraverso l'innalzamento delle temperature medie e l'intensificarsi dei fenomeni estremi (quali siccità e inondazioni). L'IPCC (2014) stima che le anomalie climatiche potranno provocare una riduzione della produttività agricola, da qui al 2050, compresa tra il 9 e il 21%.

Secondo il Rodale Institute (<http://rodaleinstitute.org/fst>), l'agricoltura bio usa il 45% in meno di energia rispetto a quella convenzionale e fa un uso più efficiente dell'energia; i sistemi agricoli convenzionali producono il 40% in più di gas-serra; i suoli bio hanno una funzione di *carbon sink*, che è mediamente quantificabile in 0,5 tonnellate per ettaro l'anno. In questo senso l'agricoltura biologica offre agli agricoltori opzioni significative sia nelle politiche di mitigazione sia di adattamenti ai cambiamenti climatici.

Nel corso della presentazione saranno forniti alcuni dati sul ruolo che l'agricoltura biologica in Italia ha avuto sulla fissazione di carbonio e sulla riduzione delle emissioni clima-alteranti rispetto all'agricoltura convenzionale.

□ **ERIC GALL** - IFOAM EU Policy Manager

The need to tackle climate change, to reduce our emissions and to put in place agricultural systems more resilient to extreme weather events, could be a chance to transform our agriculture and to move towards agroecology and organic farming. But the agriculture sector could also be exempted from any significant reduction effort.

Eric Gall, IFOAM EU Policy Manager, will present the European policy context in which these discussions on agriculture and climate change take place. The European Union has set itself a 40% greenhouse gas emissions reduction target for 2030. To translate this objective into binding legislation, the Commission is preparing a new Effort Sharing Decision that will assign individual targets to Member States (-30% on average compared to 2005 levels) for sectors not covered by the European carbon market (ETS). These include transport, building, and non-CO₂ emissions from agriculture (methane emissions from livestock and nitrous oxide emissions from fertilisers). The agricultural sector accounts for 10% of total EU greenhouse gas emissions and about 19% of the non-ETS greenhouse gas emissions, but its share of emissions is much higher in some Member States. According to the Commission's impact assessment, the agriculture sector should reduce its emissions by 28% in 2030 (compared to 2005). But the industrial farming sector and several Member States believe that agriculture should be given a special status and be exempted from any significant reduction effort, in the name of «food security».

Another problem is that afforestation could be used to artificially "hide" agriculture emissions. The CO₂ emissions from the Land Use, Land Use Change and Forestry sector (LULUCF), which includes emissions from forest management, croplands and grasslands are so far accounted for separately, but they will be integrated into the system for 2030. Given that the LULUCF sector is a carbon sink in Europe and is projected to sequester more carbon than it releases, its inclusion could weaken the European target and would likely lead to fewer mitigation activities in sectors like agriculture.

□ **HANS HERREN** - President & CEO of Millennium Institute, co-founder and president of Biovision

Yes, organic agriculture can nourish the people and nurture the planet, so we shall all be able to thrive, and this within the planetary boundaries. However, the transformation of agriculture, from the present degenerative to a new regenerative model, will only be possible if we consider and act on the entire food system, and this at global, regional, national and local levels. We need to take a



holistic and long term view of this system, understand its interconnection and be inclusive when it comes to decision making processes.

There are very good examples regarding organic, and other forms of sustainable agriculture, which we summarize under Agroecology, but we also need to strongly exclude and oppose Climate Smart Agriculture, as this is agri-business's trojan horse, to keep doing what they know best, green revolution, input high, low diversity agriculture, which produces the cheap food we supposedly need to feed the poor. The issue with this is that the cheap food is costly for society as a whole, in particular in the long term and in all three sustainable development dimensions. In the end it won't solve the problem of access to food for the poor anyway. What is needed is an agriculture and food system which is regenerative and which employs people, the poor and others, in a sustainable production and consumption system. Organic agriculture is an example of a practice that is moving in the right direction, more can and need to be done to reach all farms, small and large, and include them in the evolving transformation process.

We may have two unique, and timely opportunities to make the needed changes: the Sustainable Development Goals (SDGs), in particular Goal 2 and the Climate Summit (COP21), in the next four months to get it right. We know what to do, how to do it and also who should be involved in the policy formulation and implementation. Will we grab that opportunity in good time, let's hope. We all need to make our views known, time to act is NOW.

□ **PAOLA MIGLIORINI** - Vice-president of IFOAM Agribiomediterraneo; Assistant professor in Agronomy, University of Gastronomic Science

Title: *Organic agriculture and climate change in the Mediterranean with focus on Italy*

Five of the global issues most frequently debated today are the decline of biodiversity and in particular of agrobiodiversity, climate change, increase of hunger, malnutrition and poverty and decrease of water quantity and quality. The five issues are connected with each other and they should be dealt with as such.

Effect of climate change in the Med and in Italy is described. Climate change affects all of us. We now have solid evidence about climate change. Even if some climate changes may have some positive aspects for some northern European regions, it will be mostly negative, affecting regions already suffering from environmental or other changes. Farming will be most affected in the southern and south-eastern regions. Many semi-arid areas (e.g. the Mediterranean Basin) will suffer a decrease in water resources due to climate change. The role of agriculture in green house gasses emission and mitigation is explained. In particular the positive practices of organic farming are discussed. A study is presented where we evaluated the carbon balance of two agroecosystems (organic vs conventional) through a simplified set of indicators, which include both carbon emissions (expressed as CO₂eq) and carbon sequestration of crop rotations. Results from Montepaldi Long Term Experiment (MoLTE) are presented. With regard to the crop rotation applied during the reference period (2003-2007), the emission level of CO₂eq per unit of area and per unit of product from the organic system was 58% and 61% lower compared to the conventional one. The carbon stock in the two farming systems was found to be statistically different: the carbon stock was 14% higher in the organic system compared to the conventional system with + 3.4 Mg C ha⁻¹ (over five years).

These results are confirmed in numerous studies published recently which highlight that organic systems can have positive effects on the carbon balance by reducing the use of inputs and increasing soil carbon sequestration.

The development of organic agriculture in Med and in Italy should be seen as an effective practice capable to mitigate the negative effect of climate change even in the most pessimistic future scenario.

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