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Good Agricultural Practices and Climate Change

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Good Agricultural Practices and Climate Change

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Agriculture is facing a dual challenge nowadays: providing food and nutrition security to a growing population and supporting its own sustainability by conserving natural resources.

Despite undeniable progress regarding food security improvement in the region, the impact of climate change may jeopardize these achievements, by accelerating natural resources degradation trend and the decline of agricultural yields. Recent studies show that agricultural land will reduce, by progressive desiccation of cropland in the South and the flood risk related to the rise of the Mediterranean sea (WB, 2014; IPCC, 2014); a range of consequences can be identified, that show the increase of the vulnerability to climate change:

- Economic: the pauperization of farmers, of rural people and broadly growing food insecurity
- Social: the intensification of migration flows in the region, of conflicts regarding the access to productive resources
- Environment: the loss of biodiversity, of water, of land and of other environmental factors that enhance the resistance to climate shocks.

Box 1 defines more in details the notion of vulnerability to climate change.

Box 1: The vulnerability to climate change according to the IPCC

The vulnerability can be defined as "the propensity or predisposition to suffer damage." It consists of two elements: the susceptibility of the exposed element to be damaged and its adaptive capacity (the ability to access and mobilize resources to anticipate, adapt and absorb the damage). (IPCC, 2009).

"Marginalized people socially, economically, culturally, politically, institutionally or other aspects

are particularly vulnerable to climate change and to some adaptation and mitigation responses. This increased vulnerability is rarely due to a single cause. It is rather the product of concomitant social processes resulting from socioeconomic inequalities in status and income and exposure. Such social processes include, for example, gender discrimination, class, ethnic group, age, and ability or disability "(IPCC, 2014).

Source: GIEC, 2014

In this context, major challenges to be resolved in the Mediterranean Region can be listed as follow:

- I. make agricultural food production systems cope with climatic (and market) shocks;
- II. combine food production with subsequent provision of environmental services such as preservation of water and soil resources,
- III. provide both rural and urban consumers with safe and nutritious, culturally acceptable and economically accessible foods;
- IV. Sustain rural populations through increased farmers 'revenues and employment generation.

➔ **Studying adaptation means defining the appropriate adjustments to be made to cope with climate change:**

- its concerns the definition and implementation of agricultural good practices, both in terms of farms techniques, and of organizational improvements;
- it can also concerns the production of collective infrastructures of adaptation
- **And it is also linked to the capacities of actors.**

For examples,

- the use of differentiated seeds varieties on one farm is a means to limit agricultural loss by securing a minimum level of production,
- organizing post-harvest production storage can limit production loss and enhance the access to markets,
- improving agricultural skills and valorizing local knowledge can enhance the definition of innovative resilient practices,

These adaptations take a wide range of forms, they can be technical or organizational, they are established at different scales and organization levels, from global, regional, national to local, and they concern different types of actors, both public and private such as governments, local organizations and farmers.

UNEP has distinguished between Reactive adaptation implemented spontaneously by farmers when climatic shocks are occurring and Preventive adaptation that is being elaborated through sound reflections combining inputs from:

- Researchers: science support
- Civil society Organizations: local knowledge and organizational support
- Public Administration; in charge of policies, from elaboration to implementation and assessment
- Private Actors: funding support.

➔ **Studying adaptation is therefore a matter of identifying means and types of interventions / changes that maintain and improve agricultural systems through time.**

Institutional and historical approach may allow retrospective and future comprehension of adaptation leading to the characterization of the organization of agricultural development in terms of:

- main actors coordination,
- existing strategies evolution over time,
- social acceptability of identified solutions.

Social acceptability means bridging the gap between technical solutions and socio institutional process. It is crucial as it impacts directly on the level and process of new techniques and organization adoption.

In general, targeting agricultural production increase and production adapted to climate change relates to five crucial elements of the Mediterranean context:

- I. the Mediterranean population is expected to carry on increasing (from 446 million in 2000 to 579 million in 2025), and the region is characterized by important movements of population due to economic and social factors or political conflicts (Mediterra, 2008) therefore, it seems imperative to increase agricultural production performance and resource use efficiency.
- II. More specifically, for Southern and Eastern Mediterranean countries, agriculture still plays a major role in their economies with an average contribution of 12% to total GDP in 2010 (compared to 15% in 1990). Yet these countries account today for almost 25% of world food imports, whereas they represent only 7% of the world population. This trend is explained by dramatic increases of human and animal food needs from the 60s, +100% in average, with a maximum of 500% in Egypt (Mediterra, 2008)

- III. Climate change is already impacting the physical and biological environment of agricultural production: increase in average temperature, decrease in precipitations and increase in rainfall variability higher frequency of extreme events (drought, flooding, heat waves, storms...) have been reported, as well as invasions by new pests and weeds,
- IV. Changes in food consumption patterns impact significantly both on agricultural systems and territorial agro-ecological resources biodiversity. Some Mediterranean countries are already experiencing a nutrition transition involving large shifts in diet and activity patterns.
- V. Agricultural rainfed crop production in the Mediterranean area is the most variable worldwide. Aridity spells may explain the lower agricultural production in some specific years. Water and soil resources are limited, fragile and unevenly distributed over space and time. Over-irrigation and poor drainage are also leading to soil salinization in many parts of the region (Mediterra, 2008). Despite the amount of water used (82% of total water demand for southern and eastern countries), the irrigated lands are still, except for Egypt, a low part of the cultivated area (8% in Tunisia and 13% in France). But those lands have a strong impact on social and economic activities.
- VI. Public policies aim at increasing agricultural production, reducing poverty, increasing food security and limiting migration to cities. They tend to concentrate agricultural production in regions and farming systems that specialize on few crops and animal products with high added value for export, thereby stimulating the intensive use of water, fertilizers, pesticides and soil resources. Even if highly intensive agricultural systems (AS) were developed in specific areas benefiting from a more favorable environment, the agricultural sector in southern and eastern countries is still dominated by smallholders and subsistence farming (Mediterra2009). Most of these smallholders have no access to land property and are extremely vulnerable to market and climate changes.

→There is a need to reflect on the type of agricultural development that is needed to enhance adaptation.

Several authors indicate that adaptation of Mediterranean agriculture vary depending:

- On the climatic stimuli to which adjustments are made,
- on farm types and locations including soils and other resources such as water, forests etc,
- And on the economic, political and institutional context.

Three hypotheses can then be elaborated to enhance reflections:

- First hypothesis considers that the diversity of agricultural practices, of agricultural systems and contexts brings more adaptation. Diversity allows rusticity and more flexibility of production systems. Diversity refers to differentiated combinations of technical

management, of socioeconomic specializations, of natural resources availability and of local priorities of development.

- Second hypothesis says that adaptation and performance of the system are not necessarily antagonistic and can be achieved through a better use of available resources,
- Third hypothesis, the adaptation is depending on socio-institutional processes: the actors' new games for answering the disturbances and it is linked to a balance between the external economic dependency of the territory or country –adaptation of subsistence- and the internal organization of actors –adaptation of change.

➔ **Main questions to be addressed:**

- Climate: What are the elements of climate change?
- Vulnerabilities: What are their economic, social and environmental impacts in the field of agriculture?
- GAP: what GAP or changes in the GAP are needed to cope with these changes? What are their expected impacts?
- Adaptations and policies, from GAP changes to the organization of agricultural production: what are the possible ways of adaptation to foster agriculture development through time in a context of climate change?

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Contacts:

Hatem Belhouchette, expert senior ENPARD ; belhouchette@iamm.fr

Mélanie Requier-Desjardins, expert senior ENPARD ; requier@iamm.fr