

Sub-Saharan agriculture and migrations

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Abstract: In Sub-Saharan Africa, the rural population accounts for 70% of the total population and the family farming for 80% of all agricultural enterprises. It would seem logical to think that an unprofitable agriculture is responsible for the migration phenomenon. This is in part certainly true, but numerous other causes contribute to the phenomenon. However considering the current Sub-Saharan situation, family farming structured in cooperatives still remains the most suitable land management model to achieve social, economic and ecological integration. On the contrary, we have to note that the commercial agriculture with the monocultures and in the recent past the Green Revolution and the GMOs have not achieved this integration which is fundamental for development. The migratory phenomenon (internal and external to Africa) with its many causes is part of a complex framework where in the background the low profitability of family farming and the precarious availability of arable land impend with the inherent conflicting situations. The proposals presented in the paper concern the management and technical enhancement of the family farming, with the hope that they will be supported by local Governments, International Organizations and the NGO. We are conscious that what is indicated in the proposals will certainly not stop the migration phenomenon but could make it more aware and hence reduce it. In the conclusion is reaffirmed the role of cooperatives as main actors for implementing managerial and technological innovations and therefore for the development of agriculture and consequently for the geo-political stabilization of the Sub-Saharan area.

Keywords: Sub-Saharan agriculture; Land use; Land regime; Land grabbing; Migrations; Conflicts

Introduction

Much has been said and written on agriculture in Africa and in particular on the family farming to which the year 2014 has been dedicated. In the belief that family farming is the most suitable for African agricultural development, the paper illustrates the modalities to support and strengthen the agriculture of Sub-Saharan Africa by integrating social, ecological and economic aspects. Basic instruments for achieving

this goal, which could contribute in the limitation of the migratory phenomenon, are the cooperatives.

The types of Sub-Saharan agriculture are numerous and diversified because of the different pedo-climatic, agro-nutritional, socio-cultural, land regime and political situations. Therefore some of the main common aspects are here presented, but the illustrated examples cannot be generalized. The paper is divided into seven sections: **a)** framework of the African realities influencing agriculture, **b)** lands and their access, **c)** main types of agriculture in Africa with particular reference to the family farming, **d)** cooperatives, **e)** relationships between migration and agriculture, **f)** proposals and **g)** conclusion.

Framework of African realities influencing agriculture

The rural population, most of which is practicing agriculture, is largely prevailing in Africa (Fig. 1).

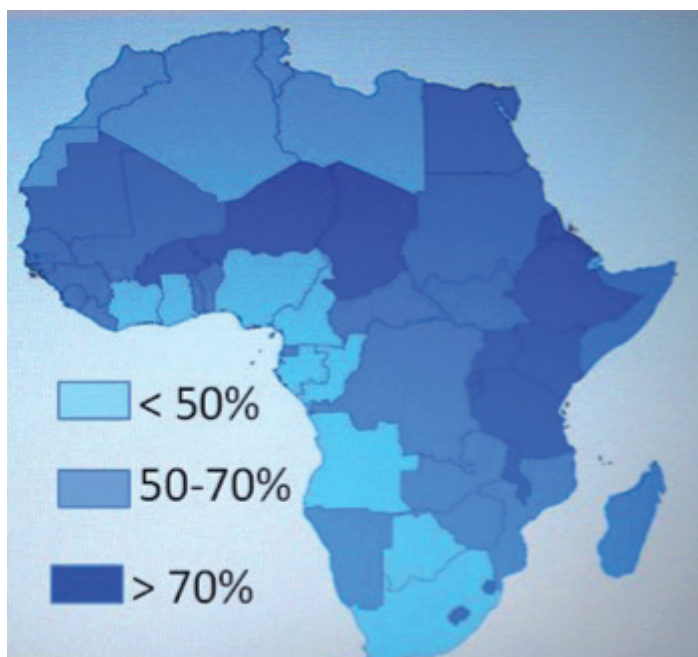


Fig. 1 - Percentage of rural population in Africa.

Sub-Saharan Africa basic data are presented in Table 1 compared with the Italian ones.

Tab. 1 - Sub-Saharan Africa basic data.

		Africa surface %	N° times Italy
Population x 1000	1.256.268	81	17
Surface (firm land) km ²	23.587.900	75	55
Surface effect. cultiv. km ²	1.910.620	87	15

FAO, 2016

The agricultural sector accounts for 20% of GDP¹ in the Sub-Sahara area, with peaks of 70% in Somalia, 59% in Sierra Leone, 50% in Chad and Guinea Bissau, 43% in the Central African Republic and Niger, 37% in Ethiopia and Kenya and 21% in Nigeria (World Bank, 2017 and FAO 2018)². These few data show the importance of this sector in Africa. The percentage subdivision of agricultural land in Africa is shown in Table 2.

Tab. 2 - Percentage subdivision of the African agricultural area (FAO 2014)³.

	% agriculture area on total surface	% of agricultural area			
		arable Land*	permanent crops	permanent pastures	irrigated surfaces
1991	37	17.0	2.0	80.0	1,0
2011	43	19.0	2,5	77.3	1,2

*Arable land is 8.1% of the total surface

FAO, 2014

¹ It is recalled that GDP is an indicator of macroeconomics that has considerable limitations because it doesn't indicate the distribution of wealth and in this regard the director of FAO (Ban Ki moon, 2015) states: "the productive and economic growth alone do not solve the problem if those who suffer from hunger remain excluded".

² In Italy the impact of agriculture on GDP is 2.2%, or 4.0% considering food industries (ISTAT, 2017).

³ The total area of the African continent is 30,221,532 Km², nearly equal to 100 times Italy.

The total area of Sub-Saharan Africa is 23,587,900 km², the agricultural area (cultivated, woody plants, meadows and pastures) is 10,081,000 (42% of the total area), that actually cultivated is 2,422,405 Km² (8.1% of the total area). In these numbers is the paradox of Sub-Saharan Africa, that is part of a continent with great agricultural potentiality but that imports food to feed its population (Kelley, 2016), which however still remains largely undernourished as data show (FAO, 2015): malnutrition in Sub-Saharan Africa has increased by 24% in the last 25 years. In the laps of time 1990-1992 the undernourished people has passed from 176 million to 218. In the twenty years considered in Table 2, the increase of cultivated land, of woody plants and of irrigated areas meant the reduction of pastures and meadows with significant consequences in the relationship between farmers and shepherds.

80% of all farms are family-based with the presence of 63% of the active population, of which more than 50% are women who, almost never having the right to land ownership, constitute a serious gender problem. The average area of family farms is less than 1.5 ha, with only 1/4 actually cultivated⁴. The energy input to cultivate the land derive from manual labor for 65%, animal work for 25%, and mechanized work for 10%⁵. Chemical input (fertilizers) in the year 2002 amounted to 13 kg / ha compared to 73 in North Africa and the Middle East and 190 in East Asia (FAO, 2016). Considering that 80% of farms are family managed with 63% of the population occupied therein⁶ it can be said that a model of agricultural management that does not consider family farming cannot satisfy, at the present time, the requisites of a balance between the economic, social and environmental aspects that is the aim pursued in this paper

The agricultural and pastoral systems in Africa are often threatened by numerous interconnected factors that together contribute significantly to the phenomenon of migration. The main ones include the following:

- climate changes whose negative effects are particularly relevant in fragile environments as in many African areas,
- demographic pressure with the unavoidable consequences of deforestation, cultivation of easily degradable marginal lands, small size and fragmented fields ,impoverishment of the best soils subjected to excessive repeated cultivation on the same plot, overgrazing, soil erosion and therefore widespread environmental degradation. Since 1950 about half a million km² of land have been degraded with the consequence that the losses of agricultural yields due

⁴ Traditionally each farm has twice as much or more fallow area as cultivated one.

⁵ In other parts of the world the situation is very different, for example in South America the percentages are in the order 25%, 25%, 50%, in South Asia 30%, 30% and 40% (FAO, 2016).

⁶ In Africa there are 13 countries with rural population exceeding 70%: Burkina, Niger, Chad, Eritrea, Ethiopia, Kenya, Uganda, Tanzania, Rwanda, Burundi, Malawi, Lesotho, Swaziland (NEPAD, 2013).

to soil erosion are the highest in the world (UNEP 2013),

- instability of governments that, sometimes caused by economic interests external to the country, gives rise to conflicts,
- economy systems that allow the control of natural resources to financial, political and / or military power, enriching only a minority,
- insecurity in access to land, this situation is common to most of the African countries where, in the absence of official titles of ownership or use, the land can easily be expropriated by foreign companies (land grabbing) with the local Government consensus,
- absence of infrastructures that often remove agricultural activity from common social and economic aspirations of the rural population,
- difficulties or impossibility to obtain bank credits. Microcredit operated by NGOs and anticipation systems (warrantage) (Bello, 2015) are for now confined to a few local examples,
- poor health situation that sees alongside ancestral diseases such as malaria and river blindness those recently appeared as HIV, AIDS and ebola,
- rooted forms of certain traditions that hinder development,
- widespread poverty. Half of the population of Sub-Saharan Africa lives on less than 1.25 dollars / day (World Bank, 2015).

Beyond these extremely serious and binding conditions, we must also consider the foreign debt⁷ and globalization that favor large companies to the detriment of small enterprises.

A forecast for 2050 (FAO, 2009) sees the doubling of the population and the growth in food demand. At these events we try to cope with different strategies:

- search for new lands. This option will have only limited application as the land suitable for good agriculture is already committed. Marginal lands remain available but the agriculture performed there gives modest results and often triggers the soil degradation,
- search for new water resources. It should be pursued in every African region

⁷ Foreign debt is the crucial point of neocolonialism. It is observed by Coquery-Vidrovitch (1995) that: "all the big banks-and the World Bank is no exception- are interested first and foremost in acquiring markets that provide high profits. The bigger the loan, the higher the interest will be. Contrary to what is commonly believed, banks do not care much about the amount of capital invested (underdeveloped countries are clearly unable to pay such figures); what they hope is to secure regular profits through the secured collection of interest, even if to pay them debtor countries must contract new loans". Since 1995 (the year in which Coquery-Vidrovitch wrote) to date, things have not changed much: "The sharp decline in raw materials prices obliges African countries to issue new bonds in dollars on the financial markets to finance public spending, such as a hangman's noose on the derelict African economies, favored by the strong devaluation of national currencies. Rating agencies begin to lower the country rating. And repaying the debt costs more every day" (Barlaam, 2016). Therefore the finance crushes the Emerging Countries.

because it is the mean to make agricultural land more productive and to enhance those lands that are currently marginal. However it must be noted that in many instances effective management of water will need coordination at scales beyond the individual farm. Water management requires environmental impact assessment procedures to be sure that the environment does not receive damages and in the case of big dams people deprived by their land should receive reasonable compensation,

- intensification of agriculture on the good or fairly good lands. This is certainly the option to follow but it involves the Government crucial choice between large companies or family farms. For the mentioned social reasons the second is aimed, and to assure economic efficiency we must think about structuring the family farming in cooperatives.

The forecast for 2050 is however burdened by the uncertainty deriving from several factors including those related to globalization, political choices of Governments, commercial treaties, urbanization, non-agricultural work alternatives, agricultural raw materials for biofuels and increased GDP.⁸

Among the forecasts it is desirable that food security and sovereignty should also be included, (Forum Sovranità Alimentare, 2007). The first concerns physical and economic access for all people to a sufficient, safe and nutritious amount of food to satisfy their dietary needs and food preferences for a healthy and active life. Food sovereignty over security adds a political perspective by affirming the right of peoples to define their policies and strategies for production, distribution and consumption, underlining that the land cannot be sold without the agreement of the communities present⁹. The alimentary security and food sovereignty to be efficiently supported should also coexist with other securities such as those related to politics, energy sources, infrastructures, technologies and know-how

Land and access to the land

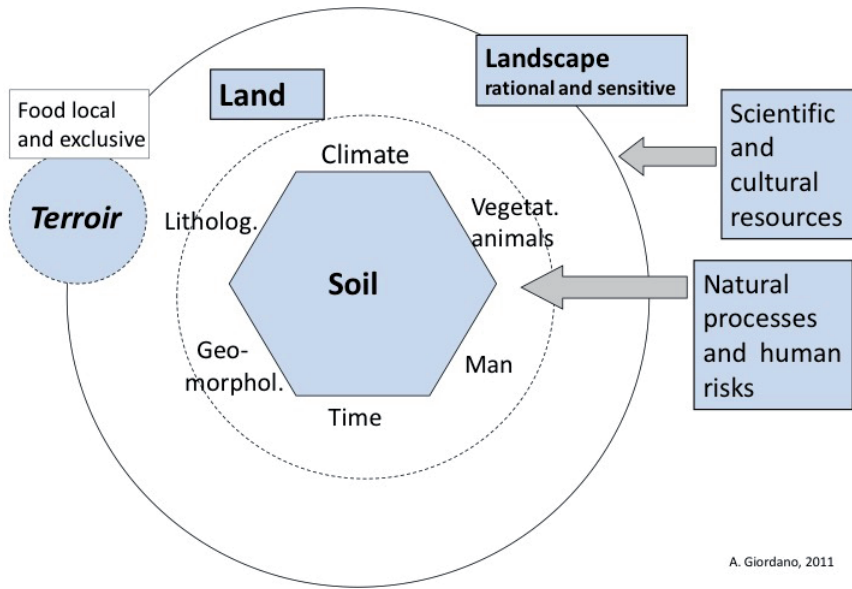
Since in this paragraph and in the followings we will talk about soil, land, territory and *terroir* it seems appropriate to clarify these terms by means of a scheme (Fig. 2). Starting from the soil¹⁰ that represents the basis of land, landscape, *terroir* and in general of all human activities, it is noted that in Sub-Saharan Africa there are

⁸ The increase in GDP is also due to the export of agricultural products that forces farmers to buy imported products with a significant deficit in their family economy.

⁹ The elements of discordance between the neo-liberal development model and the one promoted by food sovereignty are described by Randazzo and Sassi (2007).

¹⁰ The importance of this resource can be summarized in the *bamileké* proverb of Cameroun: "from the soil the hen's beak never returns empty".

ubiquitous soils common to all environments and others that are specific to certain climatic areas.



A. Giordano, 2011

Fig. 2 - Relations between soil, land, landscape, and terroir.
(Land becomes territory when subjected to an authority)

Among the ubiquitous soils, classified according to FAO (2006), we see: **a) Arenosols** (22% of all the soils of Africa), they are sandy soils with strong limitations due to poor water retention capacity, low cations exchangeable capacity and erosion risk. Despite this they are appreciated for their easy management, especially if there is water availability. **b) Leptosols** (17%) (depth <25 cm) can be used only with irrigation and fertilization. **c) Cambisols** (11%) can be good agricultural soils if there are two basic conditions: sufficient depth and fair or abundant quantity of bases and clay. **d) Fluvisols** (3%), due to their position in the landscape and their depth, they present a wide range of possible uses, provided that they are not excessively burdened by limitations such as floods and malarian swamps. **e) Luvisols** (4%) are characterized by a B horizon of clay accumulation. Generally they are suitable for a wide range of agricultural uses, especially cereals and forage. **f) Vertisols** (3%) are clayey soils that due to strong climatic contrasts shrink during the summer and swell during the winter. They are very fertile having a high amount of organic matter but they are difficult to work. **g) Gleysols** (2%), strongly conditioned by a water table, are mostly used for rice cultivation.

Coming now to the soils specific of certain climatic areas we see: **h) Plinthosols** (5%), often present as paleosols, in areas with dry tropical climate, they are characterized by a horizon of clay rich in iron (plinthite). They may be fairly good agricultural soils as long as the clayey horizon is not brought to the surface as the consequence of erosion of the overlying horizons; in this case the iron oxidizes and the clay hardens irreversibly, creating the so frequent in tropical Africa, lateritic crust on which no cultivation is possible. **i) Nitisols** (2%), with a stable polyhedral structure that guarantees a good permeability, they can be very productive. In the humid tropical environment, in addition to plinthosols and nitisols there are: **j) Ferralsols** (10%) they compensate their lack of nutrients with a series of favorable physical characteristics for agriculture and therefore they are very appreciated, together with Nitisols, by Multinationals Companies for huge plantations of coffee, cocoa, tea, pineapple and banana. In fact, large Companies fear soil erosion, while low chemical fertility is a problem that can be solved with massive doses of fertilizers. **k) Acrisols** (3%) and **l) Alisols** (1%) both typical of the rainforest, have their fertility concentrated in the humus layer where the roots of the plants are found. The limiting factors are acidity and aluminum, which can be toxic to cultivated plants; the traditional cultivation technique is “slash and burn” but the recommended one is agroforestry. With semi-arid climate it is not infrequent to note in the areas with groundwater: **m) Solonchaks** (1%) that with their high salt content can only accommodate tolerant plant species, such as barley or cotton and **n) Solonetz** (1%) dominated from sodium chemistry and more difficult to cultivate than solonchaks. The remaining 15% is represented by other soil types each of them with an extent less than 1%¹¹.

The soils, considered individually, provide indications on their possible use but do not allow the evaluation of the productive potential to define which the soils must be considered together with the climate, geomorphology and vegetation, in just one word with the land (Fig. 2).

The land is the basis for operating the agro-ecological evaluation identifying which are really the areas with good soil capability and suitability for agriculture (FAO, 1996). Providing some data we see that the best areas for wet agriculture are located in Ethiopia, the best sub-wet type in Ethiopia, Kenya, Angola, Democratic Republic of the Congo and Madagascar, the best semi-arid in Ethiopia, Somalia, Kenya and Tanzania and finally the best arid in South Sudan, Morocco, Kenya, South Africa, Zimbabwe and Mozambique. It is not by chance that the phenomenon of land grabbing is particularly active in all the States possessing good lands. In the remaining 42 African countries, agriculture is mostly practiced on moderately good

¹¹ In recent times in the rainforests of the Democratic Republic of Congo and part of the Republic of Congo peat bogs (**Histosols**) have been discovered for an extension of 145,000 km² (0.5% of the total surface of the continent). These peat bogs have accumulated carbon in the soil to a figure of 30 billion tons (Greenreport, 2017).

soils such as those of the sub-humid belt of Uganda or marginal ones like those of the semi-arid belt of Angola and Zambia (EU, 2013). Figure 3 shows the major land uses in Sub-Saharan Africa.

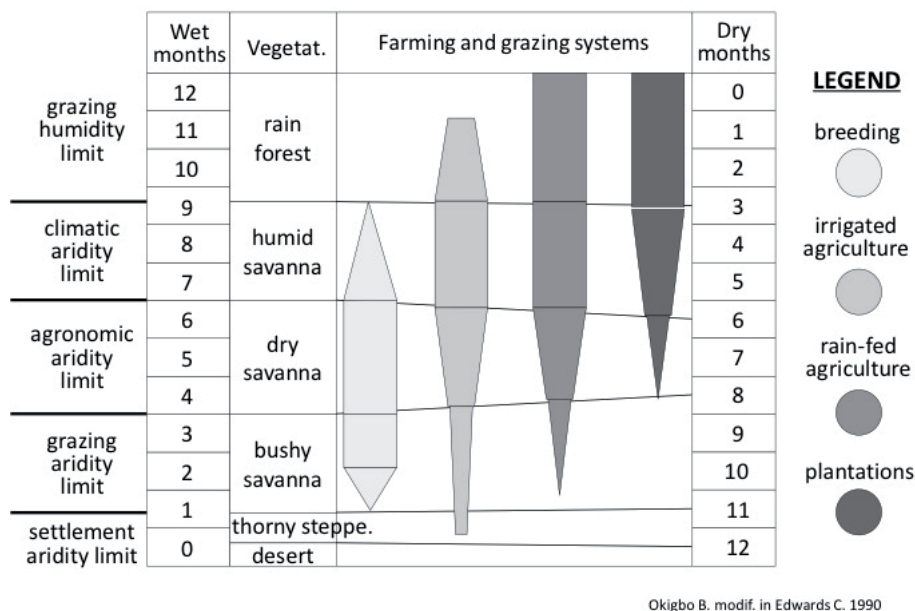


Fig. 3 - Scheme of the major land uses in Africa.

Beyond their physical and biological characteristics, the land from an anthropological point of view assumes in Africa specific connotations very different from those defining it in the Western World where the concept of property dominates. In a large part of Africa it has historically prevailed a conception of usufruct: the land is a common good and the village chief, considered descendant of the first occupant, assigns the land to the different components according to their needs¹². The African society is therefore topocentric because is the place which determines the use of the land and the inherent social relations according to the “nature-culture” vision (Gallais, 1967).¹³ This observation shows a fundamental difference with the

¹² In the *Mandingo* society of Mali the land was collectively owned by the head of an extended family. Each component was assigned a certain agricultural work in exchange for the means of subsistence (system called *foroba*). The purpose of the community was continuity rather than production (Paulme, 1960).

¹³ For example, the *Ibo* of Nigeria manage, or better managed, the land according to three principles (Paulme, 1960): the lands belongs to the community and cannot be alienated without the consent of the community, within the community each member has a land right corresponding to their needs, and no one is excluded from the land allocation.

European mentality which, being anthropocentric, allows the individual to possess the land considered as a marketable object to which a pecuniary value is attributed (Giordano, 2011). However, the traditional system of communitarian land should not be too idealized because it is not free from serious faults such as social and legal inequalities related above all to the age of individuals and the subordinate role of women. Moreover, in traditional agricultural systems the land can be pledged in exchange for an immediate benefit and this practice allows the emergence of exploiters who become big landowners, distorting the sense of collective land regime¹⁴.

The patterns of African land use, especially those related to family farming and forestry, are of particular interest today because they are often strategic factor not only for food security but also for the possibility of mitigating the climate changes that are becoming “threat multipliers” (Zupi, 2011) in a range of events from water conflicts to migratory flows. So the land must be protected favoring its sustainable uses but in human interventions on the environment the risk of environmental degradation must always be considered.

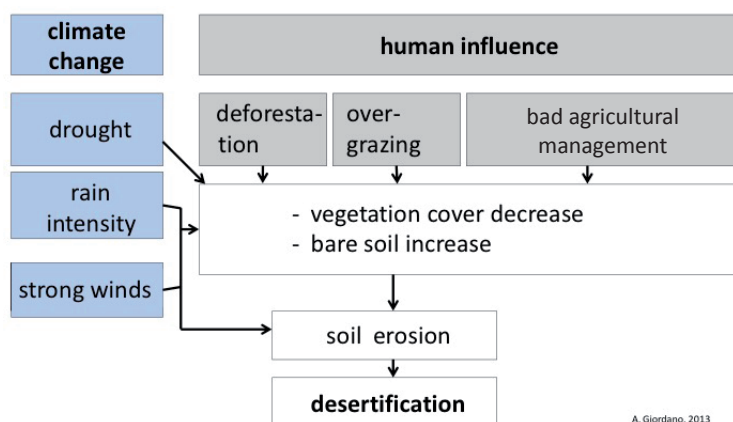


Fig. 4 - Processes of desertification.

Agriculture is not immune to this risk, which has been worsening in recent times due to monocultures, intense application of energy inputs and cultivation of marginal areas. The most evident manifestation of land degradation is soil erosion¹⁵ which,

¹⁴ The land regime is a set of rules that determine how the land can be owned, given in usufruct, sold or destined in other ways within civil society. These rules can be formulated by the State or customs and the rights may apply to individuals, families, communities or organizations. Community rules prevail in Africa and may or may not be recognized by the State. Land tenure is the legal regime in which land is owned by an individual.

¹⁵ This phenomenon is very present in the conscience of the local populations that in some cases per-

strengthened by climate change, can turn into desertification¹⁶ (Fig. 4).

By examining in detail the human influence on the processes of soil erosion and desertification, we note that deforestation, despite many international initiatives to defend forest areas, continues to proceed. The forest is cut to commercialize the timber, or even just to clear the area and prepare it for other uses. The deforested area is often converted into plantations that do not provide the same soil protection as the previous forest floor. Traditional family farming can cause soil degradation if it applies the shifting cultivation with too close cycles and if it tends to cancel the fallow practice. Commercial agriculture based on monoculture repeated on large surfaces almost always worsens the physical and chemical characteristics of the soil, thus determining its unsustainability. A consistent part of soil degradation in Sub-Saharan Africa is due to the cattle transhumance which has always been an integral part of the history of the African land use and in particular of the Sahelian belt. Pastoralism is a complex and controversial topic presenting subjective points of view and objective truths, such as that the amount of animal protein produced by cattle is only 4% of the vegetable proteins they feed on (Schmidinger, 2012). This reasoning may have its justification if one thinks of converting agricultural or forest lands to pasture but does not make sense in the arid or semi-arid zones, where the shepherds feed their animals using a vegetation that is not directly edible to humans. In these environments, in fact, there is no possibility to practice rain fed agriculture, and irrigation is almost always uneconomic. Consequently NEPAD (2013) states “transhumant pastoralism is the only system that adds value to arid areas”. It would seem that the solution is to reduce the number of livestock by conserving the best and thus protecting the pastures from overgrazing. Certainly this will be the solution in the long run but in the meantime the mentality of the shepherds is oriented to the opposite. A Peul shepherd, to whom I asked 15 years ago (through interpreter) why not reduce the number of animals did the following reasoning: “in the years of total drought I know that I will lose half of the animals. If a shepherd has many animals, after the drought he can continue to be a shepherd but if he has few animals with the remaining will not be able to maintain his family, then he will be forced to sell the animals and to change work. Since this is not what I want I will always try to have as many animals as possible.” Reasoning that finds its counterpart in the Maghreb proverb “the goat is

ceive it as an ineluctable fact that has to do with the life cycle itself. *Peul* shepherds describe the erosion of the soil in that way: “there is a moment in the life of the soil when the fine earth goes away and the stones are born”.

¹⁶ In the word “desertification” there are two complementary meanings: one is “desertization” (result of a climatic process that extends the desert in areas that previously were not desertic), the other is “desertion” (result of various processes that, regardless of the climate, make an area depopulated and inhospitable for human activities).

the bank of the poor “¹⁷. Position strongly opposed by the former Prime Minister of the Republic of Guinea and former Ambassador to Italy Diallo Cellou (2016) which provides as a solution the insurance of livestock,¹⁸ because in this way you can have a smaller number of animals but of high quality.

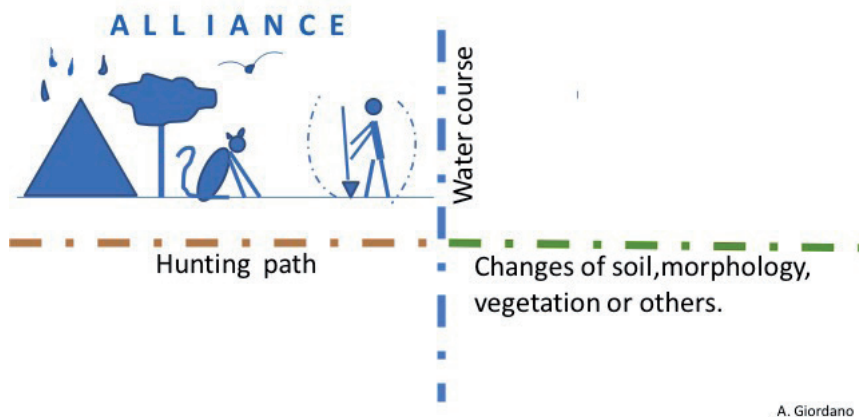
In recent decades, pastoralism is faced with some new facts that have a strong impact, almost always negative, on the pastoral economy of the different Sub-Saharan countries: **a)** the increased pressure on the pastures that have been reduced to the advantage of agriculture, **b)** the greater importance given by Governments to sedentarisation, **c)** the increase in domestic demand for animal proteins, **d)** the greater number of refugees crossing the borders with their livestock, **e)** the creation of natural parks where grazing is regulated or prohibited. To try to solve these serious problems, it is necessary to change the mentality of the shepherds who see in the number of animals the social status of their families. Contemporaneously, a change in diet is required, favoring short-cycle animal proteins, such as those deriving from poultry and internal aquaculture. However, it should not be forgotten that a radical change in the food system of the world would be desirable because one third of arable land is dedicated to the production of food for animals and there would be food shortages for the world population if meat consumption were to remain as it is or increase. This aspect, together with bio-fuels, constitutes the paradox contained in the question “does the land have to feed people, animals or cars?”.

Let us now examine what is meant in Sub-Saharan Africa by territory, i.e. a portion of the earth's surface administered by a person or a community that holds power. The concept of territory in Sub-Saharan Africa is born from the idea of an alliance that the progenitor of a group has stipulated with the entities of a place (the terrestrial

¹⁷ The pastoral system as performed today in a globalized world can lead to situations that are worsening the environment. The case of shepherds who illegally sell their cattle in other countries willing to pay more is relatively frequent. To meet the market demand, shepherds increase the number of their animals well beyond the carrying capacity of the land and tend to take advantage of a part of those lands where they practice agriculture, creating conflict situations

¹⁸ Traditional forms of livestock insurance are present in Sub-Saharan Africa. The most widespread time ago was to divide the livestock among several trusted shepherds who performed transhumance in different areas. In this way the risk of drought, that does not affect in a generalized way, was reduced. At the end of the transhumance period the animals returned to the owner who somehow rewarded the shepherds. A more advanced type of insurance is the *takaful*, system of Islamic areas that spreads the risk among underwriters who provide mutual assistance. The *takaful* can be improved with the financial contribution of the state and especially with a scientific methodology that ascertains the damage caused by the drought (Jeune Afrique, 2014). The compensation in this case is not calculated on the basis of the lost items, which are otherwise impossible to certify, but on the basis of the intensity of drought assessed according to the remote sensing technique of NDVI (Normalized Difference Vegetation Index) which measures the degree of vegetation cover of the pastures. Very good results have been obtained in Kenya and Ethiopia. In the agricultural sector, more modern forms of insurance replace the old *tontines*, widespread in the Sahel.

forms, the vegetation and the animals) receiving the permission, valid also for his descendants, to inhabit the land and to manage it (Fig. 5).



A. Giordano

Fig. 5 - Concept of territory in Sub-Saharan Africa.

Following this alliance, the territory results as a space interwoven with bonds, exchange flows and memories that root human beings to their land and environment (Tshiyembe, 2000). The concept of territory exceeds that of the land because it contains in itself the right to self-determinate the present and future of the community according to the needs and demands of all users: farmers, forest people, transhumant and nomadic shepherds, fishermen and migrants. Territories are separated from each other by elements related to the life of the community: lineage¹⁹, water courses, paths, soil changes, morphology or vegetation. The plurality of these elements demonstrates the failure of territories defined by the colonial geometric logics. Trying to define a common border between territories without the legitimization of the local people

¹⁹ The lineage consists of all the members of a family descended from a single non-mythical ancestor. The link between the non-mythical and the mythical common ancestor is known through a specific language that allows the grouping of lineages to become a unitary group. The English term corresponding to lineage is house-hold which defines a co-residential, social and political unity minimizing the importance of consanguinity. In the power structure the lineage relationships are fundamental, as are the relationships of personal dependence which confirm the former. (Coquery-Vidrovitch, op.cit.). The lineage is then identified in the memory of a group and "by its very nature the lineage is foreign to its circulation outside the group" (Cutolo, 1999). This is evident when conflicts over land access rights occur.

can generate serious conflicts. The concept of territory is made rather fluid by transhumant shepherds who, while following in principle agreed rules and spaces, cannot have fixed boundaries as they look for the most favorable pastures according to the seasons and the year.

Before talking about access to land it is appropriate to refer briefly to the history of the last 70 years (Figure 6), premising that before the colonial period the land was in most cases a collective good under the control of the village chief whose objective was to guarantee the maintenance of the village as a productive unit and not the profit. During the colonial period the best lands were taken by companies or individual European owners; the local populations were pushed on less fertile lands or were employed, sometimes forced, as agricultural workers in the colonizers' businesses. With the independence, the colon private properties have been requisitioned for the benefit of the State while the companies have often been able to continue in their business by joining local enterprises. Today the main land regime systems in Sub-Saharan Africa are: private property, leasehold, commons, state reserve and customary land. In many countries the whole land belongs by law to the State who grants the tenure titles but, in spite of this law, the majority of the land rights continue to be customary subdivided in primary and secondary. The primary concern the males belonging to the lineage when the secondary, very different from the primary, concern women, persons not connected with the lineage, shepherds and the poorest.

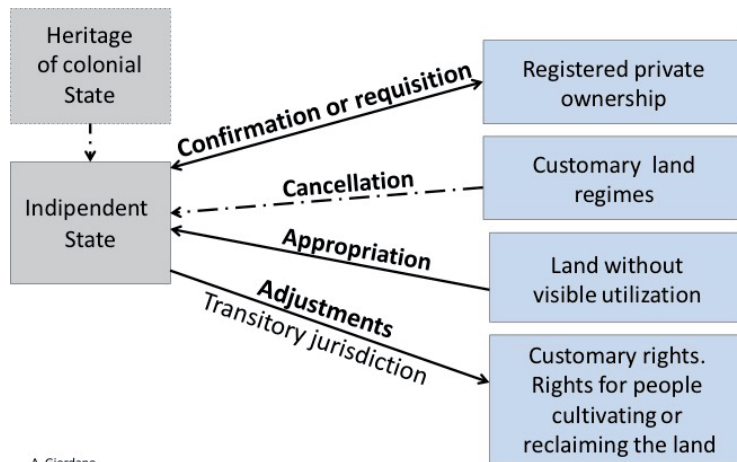


Fig. 6 - Transition from colonial state to independent state.

At present the situation of the land regime in Sub-Saharan Africa is extremely complex: if on the one hand there are overlaps of interests on the same area (Fig. 7)

from another there are numerous forms of legal, customary and religious rights that make hard to understand, interpret and improve the land regime

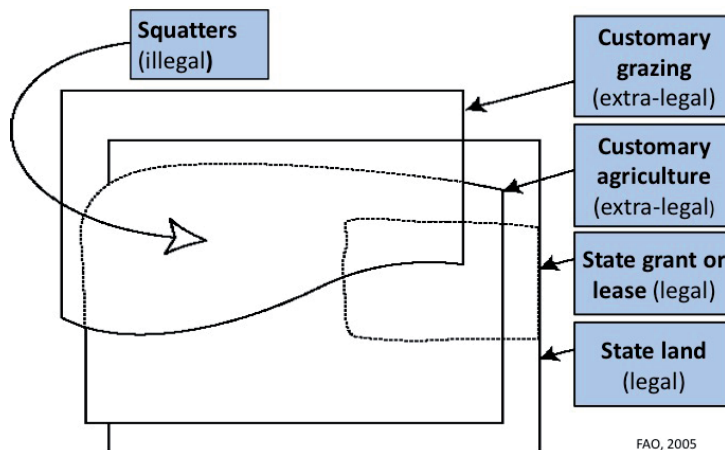


Fig. 7 - Situation of land regime in most Sub-Saharan countries.

Ownership or land use rights are different not only from State to State but also from a unitary group to another²⁰. In summary it can be said that in most African countries there has been and still today there is a double land regime system: the legal and the customary or informal divided into a myriad of forms. “The two systems often mix and sometimes collide at points of intersection” (Knight, 2010). Conflict and population exodus further complicate land rights problems, especially when refugees return (Kiggundu, 2016). This complexity, you want confusion, is also due to the political and social transformations that have greatly reduced the power of traditional authorities. At the same time, the collective and family structures have gradually broken up into a plurality of individual rights with a progressive weakening of the rules of the local populations to access the land. The result is a process of Government claim of all the lands “available” but, in most cases, the lands defined

²⁰ A census and statistics of the various forms of land ownership and / or use are still lacking in Sub-Saharan Africa. In some publications related to this topic, it is noted with a “yes” or “no” the presence in a State of certain land regime forms without indicating their extension area (Bruce, 1998). In some cases the real estate agencies provide some guidance data, such as, for example, Uganda for which it is known that 60% of the land is in the customary regime, 10% configure the feudal institute of the “mailo” in the regions of Buganda and Bunyoro and the remaining 30% consists of lands with different forms of private or state property (Ecoland Property Services, 2017).

as such are not “available” because they are used by shepherds and small itinerant farmers who, however, have no title to property or use²¹. Given that the rural lands, in 90% of cases, do not have official title (World Bank, 2013) their use is extra-legal or illegal and therefore they are vulnerable to expropriations with low or no compensation and to the land grabbing^{22, 23}.

The history of land grabbing began during the colonial period with the displacement of farmers from the fertile lands to the less fertile one. In recent times, neo-liberalistic economic policies have made even worse the situation for the following causes (IPC, 2006):

- international macro-economic trade which, in many cases, has canceled the feasibility of small family businesses,
- disinterest of the government in carrying forward what already exists concerning land reform and agriculture land redistribution,
- aid in marketing and privatization of natural resources, including agriculture,
- inactivity in promoting agriculture chains that have been monopolized by Multinational Companies that set costs and prices unfavorable for small farmers.

Land grabbing is justified in Africa by the companies involved in the investment and by the compliant Governments with the consideration that this concerns “unused” land (but in reality there are no unused land) and therefore it is convenient to entrust the land to investors capable of enhancing it. In recent decades, liberalistic policies have hampered the development of local production by benefiting from the importation of low-cost products and then facilitating land grabbing (LVIA, 2008), (Ghione, 2010).

Moreover, the authorities often don't favor the legal process that leads to the recognition of a title since they prefer to have lands free of constraints and rent or sell to large Multinational Companies with immediate financial benefits. Multinationals are sometimes hidden behind the façade of local businesses in order to evade the taxes imposed on foreign companies. Water and mineral resources are also part of the land and therefore land grabbing also refers to these resources, showing how “land

²¹ In Tanzania, the census indicated 4 million unused cultivable hectares. Following the local people protests, the figure was reduced to 2.5 million. Asking to a person who had participated in the census if those lands were really unused, the answer was negative explaining that were registered the less exploited lands, which never were completely free. The myth of the “empty land” was then fed (Roiatti, 2010).

²² In the term “land grabbing” may sometimes be included Government transactions that not necessarily have a negative meaning, therefore in the institutional setting the term “large scale land acquisition” is preferred.

²³ In some regions of Ethiopia, peasants prefer to work on the lands of the State rather than on land with different forms of private property because the former give greater security against expropriation (FAO, 2006 b).

grabbing has many forms, from the small balkanization of the pastoral territory to the continental war scenarios” (Salza, 2011). At year 2012 (Table 3) the large land acquisitions had a total of 13,607,785 ha, equal to 45% of the surface of Italy, and from that year the phenomenon has been accentuating.

Tab. 3 - Large-scale land acquisitions (East and South Africa).

<div>The last three cases concern the tea and vine cultivation.</div> <div>127 cases analyzed</div>	% of cases	Persons employed per 1000 ha
	37	< 50
	16	50-150
	12	151-250
	11	251-500
	11	501-1000
	11	1000-2500
	2	> 2500
Nolte et al., 2016		

The large land acquisitions are used in the following percentages: 32% agro-fuel, 39% edible products almost always for export, 9% non-edible plant products, 3% breeding and 17% not specified. The most affected climatic zone is that of the tropical savannah which accounts for 38% of the large acquisitions. The actual purchase is limited to 6% of the cases while for the remaining 94% one speaks of concessions and leases (Nolte et al., 2016). Examining the regime of lands subject to large acquisitions, we see that 32% belong to individuals with large land extensions used mostly by small farmers (e.g. share-cropping, occupants), 28% to Communities, 25% to the State and 15% to individuals with small surfaces. Examining the previous land uses we note that agriculture on a large scale was practiced on 23% of the surface, agriculture on small areas on 36%. The remaining 41% of the area was divided between forests 29%, conservation of nature 7% and grazing areas 5%. Very serious cases occurred in several countries and among them in Ghana where the total area alienated with land grabbing is 5% of the total area (Land Matrix, 2016) and the 25% of the agricultural

area²⁴, 60% of which is dedicated to *jatropha* plantations (Shoneveld, 2013).

The lands at high risk of dispossession are:

- agricultural or pastoral lands of the communities,
- seasonal grazing lands and livestock corridors,
- agricultural lands owned or used by the poorest members of society,
- agricultural or forest land used by women, ethnic minorities and migrants.

A process for some aspects similar to land grabbing is the acquisition by wealthy planters of small or very small plots that are the result of demographic pressure. Thus starts a land capitalism where the revenues are generally invested in activities related to urbanization obtaining profits much higher than those of agricultural production confirming that “the city eats the countryside” as an African proverb says.

To bring order to the African land regime a law transforming customary rights from informal to legal is required. The advantages of this operation are: **a)** the certainty of the land rights that can prevent land grabbing and vice versa can promote agreed investments, **b)** the protection of less wealthy (individual or in community) farmers who work according to customary customs and rules but don't have an official title, **c)** the protection of land rights of women²⁵, pastors and the most vulnerable social components. A law of this kind must satisfy certain conditions, including the critical revision of customary rights, since not every custom respects social justice and a certain flexibility that takes into account the continuous evolution of the customary field in response to political and environmental changes. The gender is a relevant problem in the present time because according to customary rights the women cannot own the land and they can have access only through their male relatives. The many recent laws on the land regime are supposed to rectify this out of date position.

At the end of what has been said about the land regime, it should always be remembered that strengthened land rights and farming intensification take place simultaneously (Place and Otsuka 2002).

African agriculture with particular reference to the family one

Dealing with African agriculture a preliminary observation on traditional agricultural knowledge is needed. A common misconception about traditional cultures wants their knowledge is static. While it is true that these cultures are

²⁴ This figure has to be considered overestimated since Donggul (2018) reports: “it is possible that part of the land acquired by foreign investors comes from farmland expansion and not from domestic agriculture”.

²⁵ Tigray (region of the North-East of Ethiopia) has a gender-progressive land proclamation: both husbands and wives have equal rights to land (FAO, 2018).

conservative and have long standing traditions, there is abundant evidence that on the contrary traditional land use systems are dynamic and innovative. To be viable over thousands of years traditional cultures have been resilient and responsive to changes that have occurred in nearly all environments. In his "History of Africa", Fage (1985) observes that "to leave fallow or forest more land than that under cultivation was not necessarily a primitive and expensive practice but could constitute a clever reply to the environment".

Basically in Africa there are two types of agriculture: subsistence and commercial. In the first one the production is consumed in large part by the family that represents both the production and the consumption unit. In subsistence farming, in many cases it is practiced the shifting cultivation which, ecologically valid in times without demographic pressure, is today to be banned as one of the most direct causes of environmental degradation. The future perspective addressed to the search for the socio-economic-ecological integration, indicates that it is necessary to move from subsistence agriculture to the commercial one, a fact that does not exclude, rather that it may favor family farming on small surfaces.

Commercial agriculture can be divided into plantations, contract farming, and market. The decision of which of these models is the most suitable for a given situation has to be examined in the light of at least four conditions: farm stability and financial sustainability, inclusion of small farmers, local development of agriculture and economy, protection of the rights of workers and land users.

The plantations almost always have a connotation based on maximum profit. Often their starting point is the land acquisition, rent or leasing permitted by the Government without the consent of the local populations (land grabbing). The plantations use advanced techniques accessible to large companies, which can operate with massive external energy in the form of agricultural mechanization, fertilizers, pesticides and genetic engineering. Monoculture is the typical expression of this type of agriculture where the mechanization being more and more specialized provides a machine for each specific type of operation applied to a specific crop. The financial investment in that highly specialized machinery determines the consequence of its prolonged use for a single type of agricultural management, namely monoculture (Levetin and McMahon, 2015).

The model proposed by the plantations standardizes the production processes by disconnecting them from the local context and making them dependent on external factors, thus creating a farmer with a low capacity for initiative and autonomy designed to correctly execute a set of operations prescribed by the external assistance (Van der Ploeg, 2006). They therefore do not represent a convincing social model but at times even economic because, due to external pressures, a number of private companies have found themselves in financial difficulties and have withdrawn. Others, despite using a limited number of agricultural workers, have suffered from labor shortages

due to competitors.

Contract farming (also called “outgrower scheme”) is based on an agreement between the farmer and the crop buyer, usually a Company or a Multinational. The contract is formalized by setting the quality and price of the crop, the date and the method of delivery. Often the buyer provides input for the preparation of the fields and transport. In contract farming, the results are better if agricultural workers have access to plots of land for family consumption and for self-sales. This type of agriculture creates economic links and transfers of technology: the farmers can have good revenues that make the market run or allow reinvestments in agriculture. It would seem to be a good model, and in some cases it is, especially when a balance between the autonomy of farmers and the rights of the company is reached. However, when the contracting company has a monopsony on the market and a monopoly on supplies, the local economic prospects are in fact excluded and there are few opportunities for farmers to benefit from technical expertise. Considering the land regime the land can be made available by the company, in which case, in order not to open a dispute with the local people, it would be desirable that the land belongs to the State, or to private owners. In this second case it should be noted that Companies, in order to reduce costs and risks, prefer to deal with large producers rather than with the small ones who are so excluded from the beginning from access to credit, input and technical assistance. Contract farming does not therefore target the objective of reducing poverty in the countryside and therefore, in general, does not represent the reference model for integral sustainability.

The market farming occurs when the producer and the entrepreneur are represented by the same person who, once satisfied his family food needs, can place on the market the surplus of production. This type of agriculture is mostly practiced as family farming²⁶ in Africa where it occupies the first place by area extension and number of employees. The concept of family and / or family nucleus is very variable according to the countries and according to the methods of statistical surveying. It is rarely of a restricted type, while more frequently it is of the widened type now multigenerational, now extended to distant relatives employed as agricultural workers or as servants (Snyder and Cullen, 2014), thus weaving a solid network of interpersonal relationships of considerable human and social significance. The great ecological advantage of family farming is to create a closed cycle where all that is produced is reused to restart the production process.

Family farming market can be local in a short supply chain, or external through the application of more productive technologies that allow export (cocoa coffee,

²⁶ “Family farming is a means of organizing agricultural, forestry, pastoral, fishing and aquaculture production managed and carried out by a family and based mainly on family work that includes women and men. In the developed countries as well as in the developing ones the family farming is the predominant form of food production” (FAO, 2014 b).

fruit, etc.), albeit with a certain risk due to the uncertainty of international prices. At present, family farming is not able to practice precision farming but remains open to organic farming²⁷. The “Slow Food Association” (2016) project “10,000 vegetable gardens in Africa” is moving in that direction.

The work productivity of large companies employing mechanical means and few people is higher than that of small family farming but if we consider the importance of the social problem concerning job numbers, then the advantage is in favor of family farming. However, the FAO (2009) observes that the higher productivity of family farming implies a lower productivity of labor that perpetuates the cycle of poverty and slows down development. It is therefore imperative to increase productivity per worker and thus increase the incomes of small farms in rural areas. Unfortunately, the States tend to favor large plantations and monocultures that pay rather than family farming for which the Government should spend for land reform, infrastructure construction and credit facilitation.

Equipping African agriculture with means of production similar to those of the Western World would require a financial investment that is not conceivable in the medium or even in the long term. Let's imagine together with Dumontet and Figliuolo (2004) that this scenario is possible: because of the increase in per capita productivity, three quarters of the population would be unemployed, creating a social, economic and political cataclysm with unimaginable consequence. A current scenario, limited to 127 cases of large land acquisitions (Tab. 3), confirms the seriousness of the employment problem: the people employed per 1000 hectares are less than 50 in 47 cases, between 50 and 150 in 20 cases, between 151 and 250 in 15, between 251 and 500 in 14, between 501 and 1000 in 14, between 1000 and 2500 in 15 and more than 2500 in 2; these last three cases concern the cultivation of tea and vine (Nolte et al., 2016).

With the Green Revolution the large-scale agriculture has benefited but not the family farming because the high yield varieties, on which the Green Revolution was based, demonstrate their potential only in presence of high levels of energetic input (mechanization, fertilization, irrigation) that poor farmers cannot afford (Levetin and McMahon, 2015). So it is true that African agricultural production has increased but small farmers, excluded from a productive-technological cycle, have found themselves to be poorer and the number of unemployed has increased (Lacoste, 1996).

The conclusion can be found in the words of Rosset (2000) “The model of the small farm is really the only model that will allow us to have more food and less hunger, instead of repeating the mistakes of the era of the Green Revolution when we

²⁷ Morocco is mentioned, even if it not a Sub-Saharan country, to remember that a practice of organic production is part of an ancient cultural tradition. This is the *beldi* that designates products from small producers that use natural inputs. Even today these products are consumed during religious festivities (Lahcen, 2001).

had more food and more hungry”²⁸.

Coming to the GMOs it should be noted that these do not adapt to family farming in Africa for several reasons. In fact they cancel food sovereignty and biodiversity, worsen ecosystems (Lymn, 2012) contribute to extend the power of finance and with debt represent a sword of Damocles on the neck of farmers (AFSA, 2013). In connection with the use of GMOs there is also the problem of the increased consumption of glyphosate herbicides (on which a proposal for an EU ban is pending), the GMOs being resistant to glyphosate this can be used even after sowing. All this, ignoring the aspects related to human health for which it seems that there is no danger until proven otherwise²⁹. The FAO (2001), admitting that there are disagreeing opinions, suggests to regulate and monitor every introduction of GMOs.

Finally (FAO, 2014 b) states that, since hunger in the world is a problem of distribution of food rather than production, GMOs are not the only resolvers of the food crisis and notes that they have overshadowed other forms of biotechnology like agro-ecology.

Even the seeds of the F1 hybrids, obtained by crossbreeding between different plants, each with a positive character, such as high productivity and resistance to drought, do not represent an advantage for family farming because they are very expensive and should be bought each year as the seeds produced by the F1 do not maintain the initial characteristics. It is therefore reasonable to focus on the biodiversity of local seeds^{30,31} which, if properly selected, obtain sustainable yields. We must also reflect on the fact that an agricultural system based on a limited number

²⁸ Explains Touadi (2006): “When the peasants of a dry and rocky land in the north of Benin are forced by the Government - or deceived by the officials of the Rural Credits - to snatch the yam (tuber that serves as a staple food) from the ground to planting cotton for export, we are returning to slavery in disguise, cotton grows but sells little, and prices are lower every year, food scarce and cotton money are no longer enough to buy imported food”.

²⁹ Recent researches carried out by the Sant’Anna School of Advances Studies of Pisa and the University of Pisa (Pellegrino et al. 2018) provided strong evidence that GE (Genetically Engineered) maize is no harmful for humans and perform better than its isogenetic line. GEs are essentially an extension of GMOs.

³⁰ “Historically the famine that struck Europe in the mid-19th century, leading to death about two million Irish, can be attributed to the extreme genetic uniformity of potatoes grown in the continent, coming from a small amount of genetic material, homogeneous, brought in the sixteenth century from Latin America. When the crops were hit by *Phytophthora infestans* could not cope with the European famine and millions of people emigrated to the United States. The problem which was not controllable by the use of chemicals and pesticides, was solved with the search, in Latin America, of a different potato varieties from which to extract the cure (Saré, 2005).

³¹ Plant genetic resources are recognized as a world heritage site (1983). With the International Treaty on Plant Genetic Resources for Food and Agriculture “(2004) were granted the Farmers Rights panels linked with Plant Breeders Rights

of varieties is very fragile compared to a system rich in local varieties that are well acclimatized to the environment where agriculture is practiced (Slow Food, 2015).

Family farming presents a number of qualifying aspects:

- high employment and consequently contribution to the rural stabilization,
- innovative capacity and adaptability to climate changes and to the market,
- need for modest financial investments,
- ability to create networks of solidarity and therefore facilitation in structuring peasant organizations,
- soil and water conservation practices,
- agricultural and productive differentiation,
- maintenance of biodiversity,
- maintenance of a landscape that can also include ecotourism,
- presence of livestock whose consistency increases from the wet to the semi-arid zones,
- presence of vegetable gardens,
- recycling of organic matter and carbon sequestration,
- agroforestry³² in different ways.

The family farming foresees the presence of livestock realizing an integrated closed-loop management. Animals can be usually kept in range free or controlled. In some mountain countries with high human pressure the animals are raised in stall and they benefit grass from small meadows (FAO, 1990; East African Dairy Development, 2010). The mentioned situations are entirely different from the big cattle breeding practiced by large companies on huge rotation paddok. The family farming of the Sahelian zone has historical and consistent relationships with the transhumant shepherds that periodically make their animals grazing for a certain period on the land where the farmers have already harvested the crop. If they reach an equilibrium with the number of the heads and the length of the period there is a mutual interest from both sides farmers and shepherds.

As far as agroforestry it is worth of note to point out its many advantages: different forms of food production, fodder for animals, combustible material, soil protection, biodiversity protection, air thermoregulation, wind speed reduction, nitrogen fixation (in the case of leguminous plants), carbon sequestration and mitigation of the adverse effects of climate changes. The total productivity of agroforestry is higher than that obtained by keeping agriculture and forestry separate: 1 ha of agroforestry produces as much as 0.8 ha of agriculture added to 0.6 ha of woody plantation (Smith, 2010; Briggs, 2015). The agroforestry maintaining elements of the forest or having however perennial wood species favors the conservation of the soil allowing greater food security, especially in times of crisis (IUFRO, 2015).

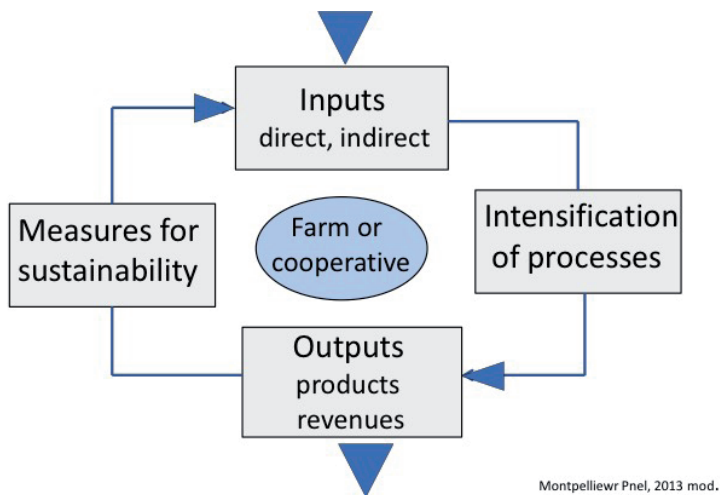
³² The term agroforestry refers to a primary production system that associates agricultural crops with trees that can typically be fruit and/or forest.

Given the numerous advantages of family farming, the problem is how to make it more productive. While asserting that family farming has always used valid agricultural management techniques, this is not enough, as Hausmann (1964)³³ already pointed out; hence the contribution of modern physical, chemical and biological techniques that are characteristic of integrated agriculture are necessary. So input from various sectors would be needed: hydraulic engineering for soil protection and irrigation, mechanization and / or animal traction, plant and crop protection before and after harvesting, change of some plant species at times, use of genetically valid seeds, animal prophylaxis and others.

Even more important would be those indirect input such as certification of the legal status of land, the implementation of agricultural cooperatives, access to the market and credit, use of energy from renewable sources, infrastructures, professional training and research.

With these input the possibility would be open for an increase in income which, if used also to improve sustainability practices, could help to make farming management more efficient as illustrated in the Montpellier Panel (2013) (Fig. 8).

The reference frame in which the virtuous circuit indicated in Fig. 8 is developed must therefore have a sufficiently wide connection with the other sectors presented in Fig. 9.



*Fig. 8 - Inputs supporting the agricultural production
(Fig. 8 represents the central part of Fig. 9).*

³³ “It would be extremely risky, as well as insufficient, to rely today - for the purposes of the conservation of soil fertility - exclusively to the teachings of traditional cultural systems” (page 318 “The earth and man”).

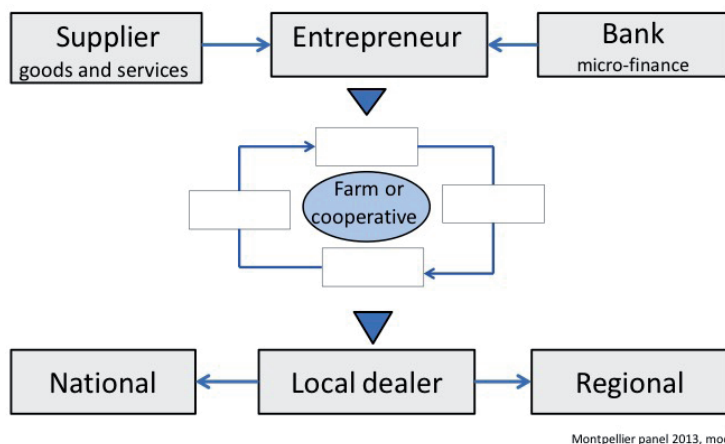


Fig. 9 - Framework of the connections for the agricultural production (please refer to Fig. 8 for the central part).

For every African State there is a basic choice: to sell, to rent or lease the land, enhancing the possibilities offered by the technology applied to the agro-industry on which there is the interest of the great finance³⁴, or favor family farming.

With the first option, the development of rural areas with small-scale farmers, and the respect for the environment and local culture are brutally canceled and the interest is oriented towards plantations and farms that are not integrated into the local environment, while at the same time there is a further development of the urban proletariat.

Instead, favoring family farming one would have the following four fundamental advantages: **a)** trend towards officially recognized land regime that may be private property, rent, community use and others forms related to local tradition³⁵, **b)** investments in sustainable agricultural techniques, **c)** development of agricultural cooperatives and/or community-based peasant associations, **d)** a reduction in migration.

A reality in clear growth in recent decades is that relating to a particular type of family farming: urban and peri-urban gardens. Historically in Africa there has

³⁴ Great finance seeing in food the safer investment has entered in the agricultural sector for several decades. This fact that has not previously occurred, has brought disadvantages to small farmers and has often produced commodities that have no connections with the local environment.

³⁵ The certification of property rights increases economic development but some experts point out that those who benefit from it, to the detriment of poor farmers and women, are individuals with greater financial resources and political connections.

never been a clear separation between the rural and the urban world and many people, following seasonal rhythms, came and went from the countryside to the urban outskirts realizing what is called circular migration. At the end of the last century the flow of urbanization and enlargement of the informal neighborhoods around the big cities has intensified considerably and the urbanized people, mostly of rural extraction, have started to cultivate small areas creating family gardens whose importance has continuously grown (FAO, 2012).

Initially opposed by local authorities (Kwaku, 2000) they are now on the way to be officially recognized because the urbanization process goes hand in hand with the demand for vegetable products. “It is an attractive market that opens up to the products of the *terroir*, especially if the Africanization of the kitchen is strengthened” (Fall and Cissé, 2007). The situation of urban gardens in Africa is presented in Table 4.

Tab. 4 - Framework of urban and peri-urban vegetable gardens in Sub-Saharan Africa to 2015.

Urban populat. (millions)	Urban populat. practicing cultivat. %	Qualifying aspects	Land regime	Main problems
270	40 (mostly dwelling in the informal neighborhoods)	<ul style="list-style-type: none"> ➤ Job ➤ Fresh products ➤ Reduction of transport costs ➤ Organic waste recycle ➤ Green areas 	<p>Generally informal (want abusive).</p> <p>Some cities recognize or are going to recognize rights of use</p>	<ul style="list-style-type: none"> ➤ Irrigation ➤ Excessive use of herbicides & pesticides ➤ Rapid decay of products ➤ Fraudulent intermediaries ➤ Uncontrolled market

Total Sub-Saharan population: 973 millions

data.worldbank.org/region/SSA 2015

Before closing this chapter on African agriculture, it must be stressed that Africa must be fed by itself, must protect its agriculture and must make reference to African markets and secondarily to those of Europe or other continents. In this regard, unavoidable questions emerge, to which only African and European Governments can give an answer. LVIA (2008) summarized them as follows:

- how to ensure the autonomy in the formulation of an African Community Agricultural Plan (CAP)?;
- how to ensure significant participation of peasant organizations in the CAP?;

- how to determine the optimal levels and protection tools for local, regional and national market?;
- what solidarity mechanisms are necessary for the construction of regional markets?;
- under what conditions the Economic Partnership Associations (EPAs) could support regional integration and family farming?;
- how to harmonize the various sectoral policies?.

Cooperatives

Family farming being mostly oriented to self-consumption can be a factor of social stability but rarely of economic development, to contribute to which even family farming must sell on the market where unfortunately it has no contractual power.

For this reason they need to be associated in agricultural cooperatives or peasant organizations (*Organisations Paysannes OP*, as they are mainly called in Francophone Africa), losing part of their autonomy and accepting group discipline. There are top-down cooperatives in which it is the State or other Institutions that promote through funding and incentives the aggregation of farmers in view of a purpose conceived by the State. These cooperatives, especially those of a productive nature, have not held up over time and in some countries they have moved quickly, sometimes traumatically, to an individual production system without the long-term certainty and stability. The top-down system has been widely used, even in a coercive form, in the colonial period.

The down-top cooperatives have been structured independently, the starting point is the enterprise of some local personalities, generally young, who want to improve the situation and make a group around a project they have developed. With patience and diplomacy they will attempt to get it approved by the village chiefs, obtaining a social recognition and then by the local authorities that, after the accomplishment of bureaucratic procedures, can establish the cooperative right to use.

Cooperatives finalized to a communitarian land use may not be widely represented in Africa because they have been often refused as a State overwhelming interference. Service cooperatives, not imposed from above, but created and managed within a community, can vice versa represent the leap in quality towards an efficient agriculture.

It will then be possible to replace the terms “supplier” and “dealer” with the sole term “service cooperatives” in Fig. 9.

ILO 2014 underlines how the four strategic pillars of the Decent Work Agenda are well present in the spirit of the cooperatives:

- promotion of fundamental work principles and rights,
- creation of jobs, decent life and reduction of the rich poor distance,
- extension to social protection,
- promotion of dialogue between workers, employees and government.

The advantages of peasant cooperative are basically to provide services to their members and to defend the interests of the members in front of the authorities, commercial partners and development projects.

Other advantages include:

- awareness of land problems and land use,
- planning closely linked to local problems, resources and limitations,
- multifunctionality dictated by the needs of the community³⁶,
- environmental protection and local culture maintenance,
- creation of short chains with a close relationship between production surplus and demand,
- possibility of storing crops, thus escaping the power of intermediaries,
- possibility for storage credit (warrantage), which is an instrument borrowed from microfinance,
- development of the horizontal structure "cooperation between cooperatives", i.e. possibility of creating a network of related agri-food cooperatives and / or supply chains,
- enthusiasm of the local people for a planning decided with their contribution.

It should always be kept in mind that the degree of commitment of the cooperative members is proportional to the advantages they think they will receive. On the other hand, there are some difficulties that must be taken into account:

- adhesion in principle to the cooperative but temporary abandonment if there is an alternative economically more advantageous,
- tendency of rural communities to devote much energy to internal relations while the main function of a cooperative grouping is to organize relations with other cooperatives and with the global society, i.e. the State and the market (Haubert, 2002),
- management of funds especially when the structure of the cooperative is not yet consolidated,
- local interest not always in line with regional and national interests,
- difficulty in integrating local planning into a more comprehensive document,
- subordination of the members of a community to the interests dominating the global society,
- possible disappointment due to bureaucratic obstacles and inattention of the upper levels,
- autonomy granted more easily to the communities of marginal areas than to those of the more fertile and strategically more interesting areas, thus contributing to the decay of the results as deplored by the World Development Bank (Hussi et al., 1993),

³⁶ Cooperatives can sometimes extend, in the absence of intervention by the State, to education, infrastructure and healthcare. (Ouedraogo, 1986; Luzzati, 1999)

- relationships of the cooperatives with NGOs not always easy: in fact the cooperatives often constitute a means for approaching the NGOs to receive equipment and money and once the contributions end the cooperatives disappear (Palombi, 2000).

The cooperatives in terms of economic development and / or improvement in the quality of life present different types depending on the cultural aspects, the presence or lack of State services and the degree of solidarity existing among the members of the community (Haubert, 2002).

The top-down cooperatives are more solid as long as their shoulders are covered by governments or other institutions involved in cooperation. But donor countries are often disappointed by the results achieved by the cooperatives and tend to favor large-scale programs related to agribusiness or model farms. Analyzing the down-top cooperatives we see a certain fragility in them because in the absence of funding from the outside the small cooperatives have difficulty in managing themselves autonomously and tend to remain as they are without further development. In this regard the World Bank (2007) talks about “conflict interest- solidarity”. The strengths of the cooperatives that start from the bottom, however, reside in the social and legal recognition and in the pursuit of purposes well linked to the local reality.

Cooperatives in Africa have shown extraordinary resilience. Despite changes in government, wars, natural disasters and dictatorial regimes, for a considerable number of years their density and the number of members (7% of the population, without counting members of informal types of cooperation and mutuality in the broader field of social economy) are remained stable.

Women’s cooperatives and agricultural female associations³⁷ already exist in some African countries but it is desirable that they can have a greater impulse because a woman alone, generally not possessing land, has little contractual power³⁸.

Educational and training structures that prepare for the formulation and

³⁷ Two examples of female agricultural cooperatives have produced very encouraging results. The first is in Uganda: MACE (Manyakabi Area Cooperative Enterprise) for the production and marketing of corn and beans; the human potential is composed of 3657 women and 115 men, corn production has increased by 50% and the income of members of the Cooperative up to 75%. The second is the AMCOS Muungano Cooperative for the production of the cashew (it is a filiation of the UPT United Peasants of Tanzania); the women present in the Cooperative account for 46% and have a 24% share capital, the production has increased by 50%. Moreover, on a sample of 101 cooperatives from Kenya, Uganda and Tanzania the production in 88 cases has increased by 186% following the entry of the women (ILO 2012).

³⁸ Women’s cooperatives are strongly motivated in putting the *burkinabé* proverb into practice “with one hand you cannot take the flour “. In Senegal there are female co-operatives based on the principle of taking charge of the other members; the naming of these cooperatives is very significant *mbootaay* “bring the child on the back”. The World Women Chart (Carta di Milano, 2015) states “Women are the bearers of capacity to do together, cooperation and sharing creative: they represent an exemplary production model to build a more sustainable future”.

management of cooperatives are present in several African countries, ILO (2014); we mention the Universities of Tanzania, Benin, Ethiopia, Kenya, South Africa and in addition numerous secondary schools and regional centers specialized in cooperation.

It is necessary to remember that in the current time the agricultural cooperatives, or rather the unions and / or the federations to which the cooperatives are headed, have to give an answer to the following points:

- to restore some control of the State because its reduction has favored individuals without scruples that have usurped the leadership of cooperatives by using them for their own interests,
- to find the optimal size: large enough to reach the economy of scale but also small enough to allow significant participation of its members,
- to widen the cooperative movement also to the informal urban economy,
- to react to climatic, conflictual, political and administrative crises through forms of representation.

The cooperatives, which are tens of thousands in Sub-Saharan Africa, grouped in unions and confederations which in turn form four regional networks (ROPFA, PROPAC, EAFD, SACA) have an increasing role in the development of regional and pan-African policies of agricultural development and are recognized as representatives of the farming world (IFAD, 2013).

Migrations and agriculture

Having illustrated the main aspects of the Sub-Saharan agriculture, we examine now its relationships with the migration phenomenon. It needs right from the start to precise that the internal migrations in the Sub-Saharan Africa, particularly in the Sahelian zone, are historically bounded to the traditional uses of the natural resources managed with the transhumant practice and shifting cultivation. The migration consuetude was intensified during the colonial period when the transfer for forced labor from a country to another was usual practice. The migrations within the African continent (quoted in this text as internal) include today millions of people while those towards Europe (quoted as external) have gone in the last fifty years from tens of thousands to the actual hundreds of thousands³⁹. The Tab. 5 provides a framework of the migrations in the world by destination and origin. From Fig. 10 it appears that,

³⁹ To December 31st, 2017, the immigrants in Italy have been 5,046,994 (ANCI *et al.* 2017), that is the 2% of the world migrations. In the last decade the immigrants to Italy original of Sub-Saharan Africa are about 70%. During 2016 the immigrants to Italy have been 181,405, namely from: Nigeria 21%, Eritrea 12%, Guinea 7%, Gambia 7%, Ivory Coast 7%, Senegal 6%, Sudan 5%, Mali 5% (as a total 70% from Sub-Saharan Africa). Statistics of UNHCR (2018) for the first three months of 2017 indicate that 77% of people landed on the coasts of Italy were coming from Sub-Saharan Africa and that proportion has remained unchanged during the year.

apart from North America and Oceania, Africa has less migrants than Asia, Europe and South America, whereas is in fourth position as a continent towards or within migrations occur.

*Tab. 5 - Migrants situation in the world to 2017
(data UN 2016, in millions).*

Destination		Origin
25	Africa	36
78	Europa	61
80	Asia	106
58	North America	4
9	South America - Caribe	38
8	Oceania	2
–	Unknown origin	11
258		258

A. Giordano, 2017

Predisposing causes to the African migrations are: **a)** climate changes which counted with natural disasters and environmental degradation provide the figure of 24 millions of migrants, **b)** political instability with the consequent conflicts responsible of 7 million (IDMC 2017), **c)** unprofitable agriculture on which lives 70% of the population, **d)** land grabbing and the commercial plantations, **e)** demographic increase, **f)** lack of infrastructure and social services, **g)** need of money not available on site, **h)** AIDS, HIV and other diseases persistent threat.

But to consider only these physical and economic causes is to lose sight of the following important anthropological factors: **i)** disintegration of lineage relations, **j)** lack of reference models, **k)** lack of consideration towards the agricultural and rural world, **l)** innate and human psychological need for a change, dependent only in part for economic reasons. “People migrate only if he has the ambition and the capability to do it. Then we can see the migration as a function of the aspiration and capability to migrate” (De Haas, 2014). The option to migrate ultimately depends on the perception held by people to realize his own aspiration in the origin country or abroad. The two aspects aspiration and perception are subjective and in continuous evolution because under the influence of the social and cultural changes and also under the influence of the information media presenting the western lifestyle imposed by consumerism

(De Haas, op.cit.). With such complexity of physical, economic, anthropological and psychological factors the migration phenomenon may be reduced but not canceled (Fig. 10).

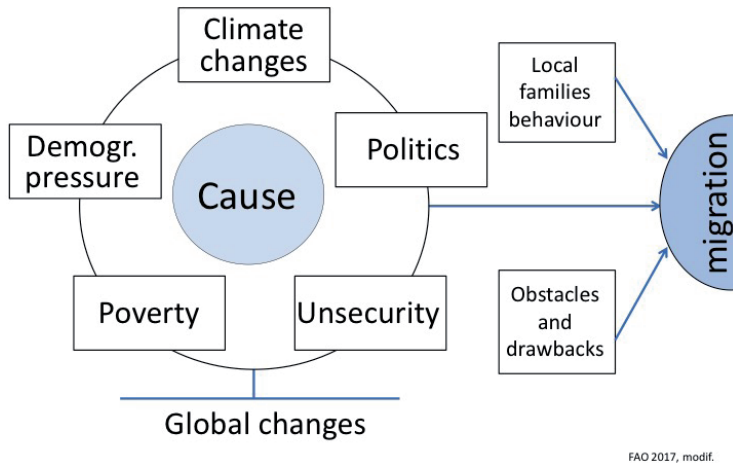


Fig. 10 - General outline of rural migration.

Dealing with migration is necessary to distinguish those internal and external. The first may be of short term related to individuals who, living or not in the same country, move where job opportunities in agriculture or in other sectors have been created. It is mostly poor people moving nearby countries. The short term migrations allow to carry out work (the cotton harvest is an example), that family farming based on its components workforce cannot. Thus forms a component capitalistic in the rural traditional systems often triggering chain reactions⁴⁰. The availability of agricultural workers favors the trend toward land private ownership determining a significant change in the community lands system⁴¹ which had the merit to achieve an agriculture respectful of the nature laws, especially if the village chief was an authoritative person.

Among the short term migrations you can also include those of circular type between urban areas and rural areas depending on the seasonality of the crops.

⁴⁰ Such as that described for Ivory Coast (Fall and Cissé, op. cit.) where the migrants coming from other African countries are employed as agricultural labors (considered a priority sector) while the internal Ivorian migrants go to urban areas. But the external migrants also migrate in urban areas due to the very low wages practiced in the plantations. Then the Ivory Coast Government has taken restrictive measurements against foreign migrants reserving some activity segments to the native Ivorian present in Africa.

⁴¹ According to tradition the land is a collective good that cannot be sold however, according to hospitality cultural value, can be lent to the newcomers.

They have been well known since long time being favored by the unstable economic situations of many cities and by the permanent weakness of the agricultural sector (Adepoju, 2006) and for this reason they are understood as a synergy achieved among people in difficulty. Circular migrations may appear beneficial because they occur during the dead season for agriculture, but the so-called “dead season” is not such because traditionally it was aimed at jobs that are just as necessary as agricultural ones like social relationships necessary for the community cohesion and participation in collective decision-making processes (Sivini, 1998). Immigrants in the city contribute to the strengthening of that “informal” way of life that is a self-regulation of the art of getting along at the edge of the global market society which tends to disregard the positive values of imagination, of small-scale applied economy (see, for instance, urban gardens), and sociality expressed by that “informal” world (Latouche, 2009). This last compared to the dual economy divided into modern and traditional and theorized by Lewis (1954) represents an evolution according to a new formal-informal model well applicable to the urban sector (Bellanca, 2009) where the petty bourgeoisie of State officials, traders and workers benefit from the informal sector that allows them to improve their standard of life. But when the informal urban sector is saturated, there is no other alternative than emigration. The cultural level of migrants strongly conditions their economic position in the cities of arrival. Since the level is low in the countryside, rural migrants are in trouble to find work in the formal sector⁴².

The majority of African countries as well as the International Development Organizations consider rural-urban migration responsible of the urban poverty and for this reason they withdrawn funds for urban development and prefer allocate them in favor of rural development projects (Black and Swards, 2009). Awumbila (2014) criticizing the African Governments for their approach oriented around an artificial rural-urban dichotomy considers “that a more balanced and nuanced understanding and conceptualization of the linkages between rural-urban migration, urbanization and their role in poverty reduction are required”. As a matter of fact the migrants in the cities can often operate a redistribution of the urban wealth to depressed rural areas of origin. On the other side cities may benefit by diversified and fresh agricultural crops grown in the rural zones around the cities, averting or reducing the bad situation of finding on the market only standardized food coming from transnational enterprises. FAO (2017) realizing the insubstantiality of limits between rural and urban spaces and the increasing importance of the rural-urban

⁴² The Education Development Center (2011) reported that in Benin there were employment opportunities namely: tourism, garment, transport, chemical, telecommunications, food processing, commerce and handicraft industries, yet most of the youth who migrate within the region do not have vocational skills in these areas.

linkages strengthens a new kind of African rurality where the presence of small and intermediate towns should play an important role for both rural and urban creating a new territorial reality shaped by migration.

It should however be noted that the migratory flow to large African cities has slowed down over the last 20 years (Potts, 2013)⁴³ and that internal African migrations from rural areas to other rural areas are more consistent compared to migrations from rural to urban areas (Lucas, 2007).

In the long term migration people move in response to better economic opportunities. A typical case is the land development due to new water resources that leading to improved agriculture opportunities is invariably characterized by immigration from less productive rural areas, and by increasing competition for land, typically involving the development of informal land markets (Peter and Kambewa, 2007). Other causes of long term migration are the climatic changes that manifest themselves with a decreased productivity of the land and therefore with a progressive demographic increase on the still productive lands and with conflicts existing within a country. The term “migrations” takes a different connotation: we will simply talk about migrants when people leave their environment of their own will, and about “IDPs (Internally Displaced Peoples)” for people who having left their residences, stay within their country, either because they do not intend to leave it or because they are rejected at the border of another country. People who, due to conflicts or environmental disasters, manage to cross the border can be recognized as refugees and may, therefore (unlike displaced persons), be protected by world organizations. An impressive case of refugees is that of Uganda hosting 1,300,000 people escaped from the ongoing war in South Sudan.

Long term internal migratory movements overlap multiple land uses, generating new territorial configurations and eventually causing new conflicts. From the environmental point of view the migrants determine a complex situation because the territorial structure of the regions in which they arrive has an organization that is expression of the culture of certain unity groups which manifests itself not only in the village and surroundings but in all the territory with diversified forms of settlement: mother village and permanent or semi-permanent detached villages, huts and changeable camps depending on the season or year (Ghisalberti, 2011). So it happens that the political legitimate sphere structured not on cadastral basis but on local customs is easily deconstructed by the migrations of people who have different customs and who almost always do not speak the same language. In the most serious cases when power is unable to control the movements of populations within its space,

⁴³ “Rural areas are emptied to the benefit of urban areas”. This idea is so ingrained that the results indicating a decline in rural emigration and the growth of emigration from cities are not taken into consideration (Fall and Cissé, op.cit.).

borders are revealed as places of power de-legitimization (Lefebvre, 2007), hence causing the birth of conflicts or in any case of a perennial state of insecurity (Fig. 11).

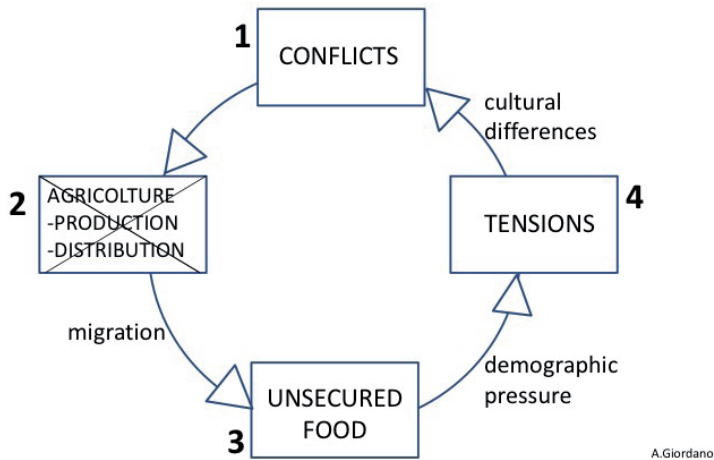


Fig. 11 - Vicious circle conflicts-migrations.

The internal migrations of the African continent show how difficult is the coexistence between the formally legal aspects and the informal customary ones that we consider morally correct, even in the absence of any certification. The legal sector relied on the land register of colonial heritage and supported by most States, is oriented towards a logic of maximum profit and is not prone to accept immigrants, unless the UN provide money. On the other hand, the collectivity of the customary sector organizes access to land and has the traditional prerogative of allowing the village chief to lend, within the limits of availability, land parcels to those migrants who request them.

External migrations are mainly directed towards Europe, especially towards Italy, that in recent years has become the main, if not the only, point of arrival for Africans who cross the Mediterranean. The migrants in this case are people who, as mentioned by De Haas (op. cit.) have the aspiration and financial capacity to undertake a trip very expensive because it is done through non-legal routes and, therefore, with exorbitant prices set by the traffickers of humans.

Research and scientific investigations on the relationship between migration and agriculture are difficult to perform and therefore are relatively few. A research (Laborde and Lallemand, 2017) has been made on the relationship between the migratory flow and seven econometric indicators: **a)** number of migrants, **b)** total population, **c)** number of poor, **d)** number of undernourished people, **e)** political

instability, **f**) labor productivity in agriculture, **g**) agricultural productivity expressed in kg / ha of cereals. The last figure accounts, only in part, for climate changes, which are difficult to quantify⁴⁴ due to their complexity presented in Fig. 12. The research of Laborde and Lallemand (op.cit.) has verified that, over the period 1990-2015, there is always a positive correlation between migration and population growth and between migration and political instability. The number of the poor presents a double face: a limited poverty and / or the tendency towards impoverishment increases the migratory flow but extreme poverty (per capita income of <1.9 \$ / day) does not change it. A separate case is that of labor productivity in agriculture: if it is low it favors migrations but these are also favored by a higher productivity of labor, on the one hand by the reduced need for labor and on the other by the greater availability of money. The relationship between economic development and migration is therefore complex and not univocal, as demonstrated by the thesis of the “migration hump”, according to which even the processes of economic recovery produce in the short term not a reduction but a growth of the migratory flow. This is because the relative increase in household income in Emerging Countries allows greater coverage of emigration costs (Stocchiero, 2015).

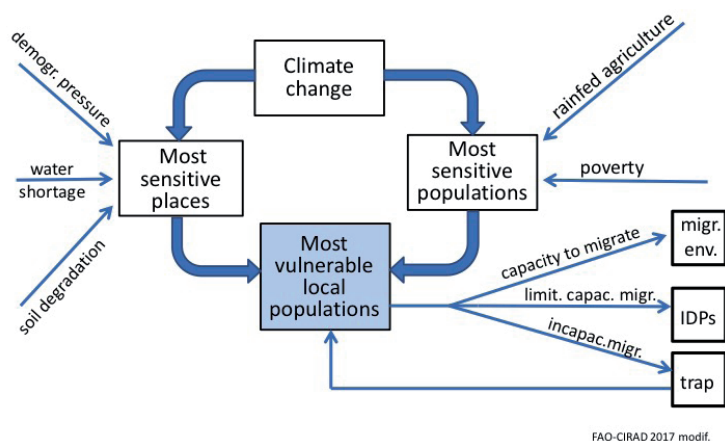


Fig. 12 - Climate changes: a complex driver of rural migration.

In many contexts, emigration is considered an instrument for the improvement of social and family conditions (Adepoju, 2004) and as such is ideologized and celebrated (Diarra, 1998) giving rise to what Adepoju, 1981 calls “village patriotism”.

⁴⁴ A study carried out in Burkina Faso, by mean of a model and related scenarios (Ouedraogo, 2012), on the climate changes impact on the agricultural revenues has proved, that there is correlation, even at very low levels of rainfall and temperature changes. Beccegato and Pittaluga (2015) affirm, as many others, that there are close relations between climate changes, environmental degradation and rural exodus.

Emigrant remittances generally serve for household expenses, for the improvement of family farming⁴⁵ and possibly for the real estate sector. It should be noted that there have also been cases where the work of the emigrants has led to an impoverishment of the rural families of origin. The lack of workforce as a result of migration modifies the productive conditions of the community causing disregard in technical innovations and in the traditional works concerning soil and water conservation and on the opposite causing intensification of exploitation of resources that make their reconstitution problematic. Migrations then determine in the countryside what Lebon 1984 calls “static expansion”, i.e. the dynamism of the circulation of money coming from remittances and at the same time the depression of agricultural activities⁴⁶. Sometimes the launch on the market of local food crops has in some cases slowed down the crisis of family farming but has not interrupted the exodus towards the cities. The flow of resources coming from the emigrants will increase, before arriving in several years, to a decrease due to the loss of interest by the young people, now socialized in the new destination, for the place of origin of their parents (Fall and Cissé, op). A direct correlation between large scale acquisitions (land grabbing) and migration is difficult to establish but there is an indirect indicative measure: the expropriated people goes to the city as a first settlement (Liberti, 2011). In any case “land grab has negative socio-economic effects on the affected farmers, particularly with regard to farm size, farm income, employment status, health status and social standing” (Ofuoku and Oghene, 2017). A correlation exists between migration and land regime: the migration phenomenon in fact determines the interest of immigrants of different origins, and consequently also of the local people for a sort of preventive defense, to transform the lands on which they operate in private property in order to have the legal recognition of their presence in that place. Private property invites investment and gives rise to the buying and selling market and therefore to the dynamism of the agricultural sector (Fig.13).

An empirical study carried out in Uganda proved that private properties of small dimensions, constituted as a result of migrations, produce more than the larger ones and reduce the conflicts (Mwesigye, 2014). Kishindo 2004 (in Zamponi, 2007) points out that if the land becomes a good it must switch over inefficient producers to the efficient ones. Then a crucial problem arises: how to face the poverty inside to the procedures linked to a globalized neoliberal world since it is well known that the most inefficient are the poor.

⁴⁵ Wouterse and Taylor (2008) expressed a rather different opinion. In a survey carried out in Burkina, the substantial remittances of the intercontinental migrants make inequality greater, have negative effects on local agriculture but stimulate breeding. On the other hand, migrations within the continent reduce inequalities while having little effect on agricultural activities

⁴⁶ Regarding the worsening of agriculture conditions due to migration the report on “the dark side of the tomato” (Auvillain and Liberti, 2014) presents the extreme case of a migratory process triggered by financial speculation that has strongly damaged the local agriculture.

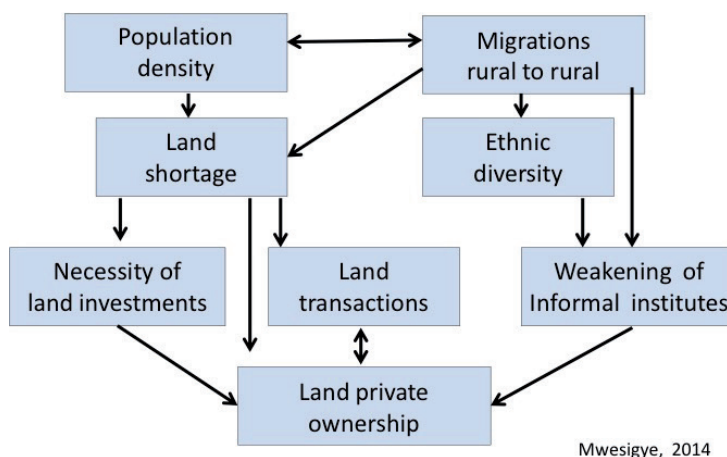


Fig. 13 - Relationships between demographic increase, migration and land regime.

The increasingly significant role of African women in the agricultural sector and their relationship with migration is not negligible, especially in the case of women alone without the migrated husbands. In some countries women have achieved a certain emancipation that, combined with initiative, allows them to dominate in many food chains with a strong value, thus determining a local development of agriculture.

In any case, a fundamental problem arises: a young African is ready to spend 3000 Euros on a risky journey and doesn't intend to use that money in his country because he doesn't believe there might be a future in his place of origin even investing in money. Beyond a research on the non-unique correlations between family farming and migration, it remains a central and sure point: the development of family farming contributes to the political stabilization of the country and then makes the migratory flow decreased. Therefore, in medium-long times, that young man could find his aspiration and his skills in a profitable family agriculture, especially if in the meantime significant changes occur in the professional education and in the technical-applicative know-how. (This point will be taken up in the proposals).

In conclusion, we can say that subsistence family agriculture being unable in times of crisis to meet the food needs, together with other causes, favors the migration in the informal suburbs of big cities⁴⁷ from where a minority part, although consistent,

⁴⁷ Many immigrants, once they have reached the host country, declare to come from a city. True declaration but in that city they were, in most cases, following the rural exodus. It also plays the fact that belonging to the urban world appears to them more qualifying than the rural one. At one time in Western Africa, migrations to Europe had an obligatory path towards the big cities of the coast as a temporary residence area where they could acquire useful information and contacts for the next trip from Africa to Europe. Today, with mobile phones and the internet, you have everywhere that information that once

undertakes the dramatic journey to Europe. There is therefore not only an ethical motivation for Western countries, but also an economic interest in creating new bases that allow the intensification of African family agriculture by moving from subsistence to the market and from customary uses to guaranteed forms of private property and / or use. In these passages, community based cooperatives and / or peasant associations play a fundamental role.

Some proposals

The proposals presented in this paper are of two categories: those related to management and those concerning the technical sector. Starting with the first ones, which were not properly developed with the Green Revolution, we need to realize that with an average area less than 1.5 ha it is very difficult to foresee any improvements for the family farming. The unification of land for the benefit of companies or few people is not desirable because, in the absence of valid work alternatives, it would create unemployment. A reasonably economic farm size can be achieved by agricultural cooperatives that cultivate the land according to an agreed community management, trying to preserve pre-existing employment as much as possible.

To achieve this goal, the cooperatives should be structured horizontally and vertically (Fig. 14), and could eventually be promoted by non-profit peasant associations. The recognition of the Government and the support of the International Agencies must be a prerequisite for implementing the so structured cooperatives.

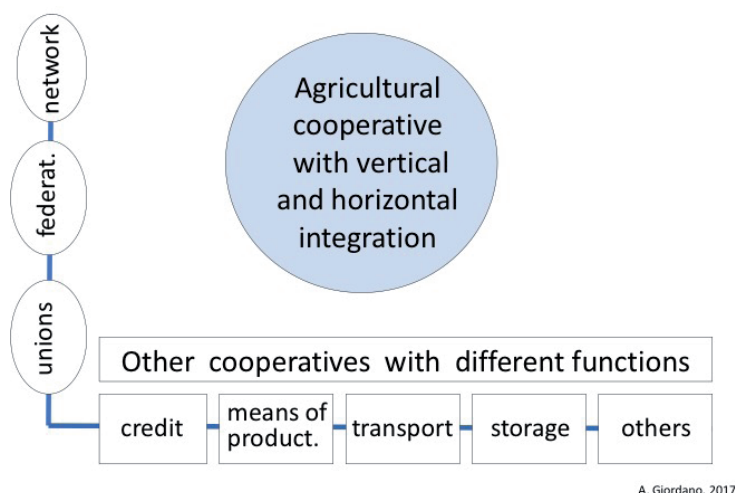
Strengthening of cooperatives power will often requires legal assistance, microfinance, storage and marketing centers, and the introduction of short or long supply chains in the case of eco-friendly exports⁴⁸.

In particular, the recognition and empowerment of women's organizations⁴⁹ would open, especially in the less developed areas, new prospects for development so far denied due to the exclusion of women from any decision (Kibora, 1999) (Soyinka, 2006).

could only be found in the cities; therefore emigration can start directly from the countryside, but this is rarely confirmed by migrants. Satterthwait and Tacoli (2003) bring into the discussion another factor that contributes to the idea that most emigrant are from urban areas: the reclassification of rural settlements as "urban" as their population increases over a certain threshold.

⁴⁸ In the certification of eco-friendly products, frauds have recently occurred (Bouessel, 2017). Then to prevent frauds a more efficient control is needed.

⁴⁹ Some pre-colonial institutions guaranteed a certain political power to women, as is the case in the northwest of the Cameroon of the *takumbeng* female regulatory societies for the defense of femininity in its duties and rights. In recent years, women have been able to conquer important areas of action within national political life by revitalizing and reworking female regulatory societies (Luraschi, 2006).



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Fig. 14 - Integrated cooperativism.

The cooperatives must be bound to the respect of the following essential conditions, and any external aid must verify whether these conditions are met:

- the members of cooperatives must make investments in the itself cooperative,
- the members of the cooperative must work together with each other,
- the cooperatives must also be inclusive of minorities (women, poor, young people, individuals of different ethnic groups and religions),
- the cooperatives must tend to the autonomous development (Italiasenegal.org, 2015) of the whole productive supply chain by creating operational skills or by consolidating the already existing structures and by implementing a network of cooperatives.

It is then necessary to study and define the role of cooperatives in the diffusion and success of technical assistance, technological innovation, and certifications. A cooperative that wants to keep faith with its mutualistic nature must have “the specificity of allocating part of the surplus eventually created in order to collective purposes, for the creation of human capital and infrastructures, without which a process of development is not possible” (Luzzati, 2001). It is also worth considering the possibility of developing collateral activities (silvo-pastoral use, responsible tourism, crafts, etc.). Once a cooperative or a peasant association has been established, these must be made known and validated at all levels in order to be helped for achieving the socio-economic results that are the reason for their existence

It seems appropriate to start favoring small cooperatives adapted to local needs avoiding the failure in which large projects often occurred: technical errors, incorrect socio-ecological evaluation and management costs higher than profits.

In the many cases in which the land registry doesn't exist, a possible starting point for a cooperative or a peasant association could, at times, be that of a participatory

cartography concerning the territory of a community. The instruments to do this are GPS (Ground Positioning System), and GIS (Geographic Information System). The African examples of participatory cartography, are several: Democratic Republic of the Congo (WWF, 2013), Republic of Congo, Central African Republic, Cameroon (Greenreport, 2011) Gabon and Mozambique (Wots, 2014). These cartographies can be used for multiple purposes (Fig. 15).

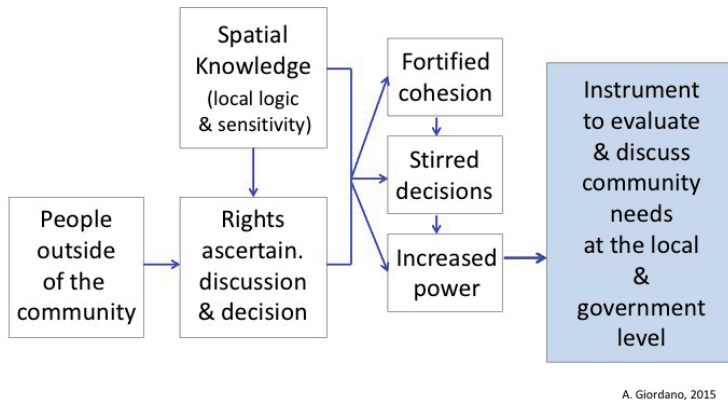


Fig. 15 - Results of a participatory mapping.

However, the item of participatory mapping is politically sensitive because it is based on prerogatives that normally belong to the State through the land registry.

The implementation of a model of sustainable family farming, structured in a community form, could be the tool to be accredited by a Government (Figure 16) and answer the questions “How and with what instruments the power for decision-making, management and contracts could be guaranteed to local communities and institutions? How to assure them the essential property rights to minimize the arbitrary expropriation and to obtain better contracts and greater certainty about the legal value of the land?” (Chiusano and Dansero, 2012).

In the process of building a cooperative based on family farming is fundamental the animation and sensitization provided by technical assistance structures, if they exist, and by NGOs. These last must know in advance the modalities of aggregation and collaboration of a certain socio-cultural environment, being in fact essential to grow in the local people the awareness of managing something that is part of their traditions.

It will then be realized with pride that pair of values “aspiration-capacity” without which there is no guarantee of success over time. It is a matter of meeting the spirit of change among young people, directing it within their own reality rather than towards migration.

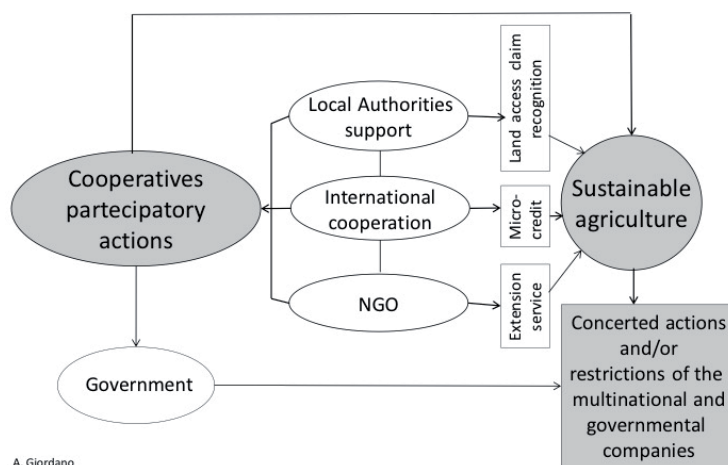


Fig. 16 - Strategy for the development of family farming cooperatives.

We come now to technical proposals. Some are related to the maintenance of soil fertility, such as the right balance between agricultural and grazing land, compost, crop diversification, crop rotations and associations, improved fallow and enhancement of the hydrological function. This last aspect is essential for the Sahelian arid and semi-arid environment.

According to the different environments we can see diversified methods: half-moon excavations (see for example the Vallerani system, 2012 in Burkina), ditches to store water, dams creating small water catchment areas to infiltrate the water in the subsoil and recover it downstream by wells (examples of the *achadas* of Cape Verde), and drip irrigation. Other practices to improve the water content in the soil are mulching, soil milling, and different combinations of bumps and furrows to achieve maximum irrigation water efficiency and limit soil salinization. A critical analysis of the different water supply options is found in Mc Cartney *et al.* (2013). Mechanization on individual, or cooperative basis, is certainly another area to be developed, once it has been ascertained that the advantages of mechanization are economically superior to those of animal traction. With regard to the marketing of agricultural products, one can think of the improvement of the structures for the conservation of crops and seeds and the improvement of the road network to reach the local markets.

These technical proposals are summarized in the agricultural best practices widely documented by FAO (2007) and based on three cornerstones: soil quality, nutrient management and irrigation. Description of traditional African systems that perform water and soil conservation are found in Reij *et al.* (1996), in Costa *et al.* (2013)

and in Prinz and Malik (2003). Good participatory practices are described by FAO-Italian Development Cooperation (1996).

The good practices UNEP (2000) deal with the measures of soil conservation divided into preventive, protective and curative. A guide to an agricultural mechanization in relation to the needs of small farms is provided by FAO (2011). A reasoned repertoire of the most widespread cultural practices of African agriculture is documented by WOCAT (2011) which at present has described the traditional systems of Tunisia, Senegal and Ethiopia.

All this considering the difficulty of adopting environmental protection measures by people who struggle daily for survival (Zupi, 2014).

Based on the dialogue held in Addis Ababa (EU-Africa 2016), it is a matter of bringing out innovations from three sectors: products ecologically sustainable, food systems of high nutritional value and bio-economic techniques and traceability in the market and in commerce. Keeping in mind these indications, to be competitive the family farming structured in cooperative must be able to make use, through the technical assistance of Governments or NGOs, of the results obtained from research and innovation which will have to be particularly developed in the following sectors:

- safeguarding biodiversity through the selection of local seeds⁵⁰ and implementation of nurseries,
- soil tillage,
- hydrology and irrigation (especially drip irrigation),
- maintenance of soil fertility (manure, composting, green manure and mulch),
- carbon cycle,
- research and studies in the agronomic and social field including gender issues.

A rational application of the themes above mentioned is in the direction of organic agriculture which, especially if the products were marketed in an eco-friendly form, should be promoted and pursued as a totally different food production from that obtained by monoculture. These innovations introduced in food production chains supported by structured cooperatives with an efficient horizontal dimension, could motivate and retain a good number of young farmers in the agricultural sector and, if necessary, can also employ people who are outside the farms (Vos *et al.*, 2017).

⁵⁰ A research on the genome of ancient hard wheat of the Ethiopian plateau carried out by the Sant'Anna High School of Pisa in collaboration with the Ethiopian University of Makelle and with the Institute for Agricultural Research of the Amhara region (Mengistu *et al.*, 2016) allowed to identify genetic factors that control morphology, growth and resistance to drought and pathogens. The research then identified local Ethiopian varieties with superior characteristics whose seeds have been redistributed to the farmers. Currently there are 5000 farmers of the Ethiopian plateau who successfully experiment with the hard wheat selected by the Scuola Sant'Anna. The research has also opened perspectives to produce new varieties through controlled crossings and selection of progeny, i.e. crossing the Ethiopian wheat with the international one to give rise to a new grain that combines the best characteristics of the two.

A notice has to be done regarding the *terroirs* that with their inherent production of typical foods can present locally a significant help for the development of a community and become, in some cases, a “presidium” of the “Slow Food Association.”

Finally, it must always be remembered that management and technical measures can be vain efforts if at the same time they don't work upstream with health facilities, schooling and renewable energy sources and downstream with the presence of efficient services, with facilitations of access to credit and market and with the possibility of realizing first transformation industries.

Conclusion

The role of agriculture and food was reaffirmed at the Italy-Africa Cooperation Summit (Abijan 2018) where the agri-food sector was indicated, together with energy and infrastructure, as the cornerstone of the development of the African continent.

FAO in its recent report (FAO, 2015 b) states that agricultural systems that require intensive use of inputs and resources have led to deforestation, water scarcity, loss of soil fertility, and high greenhouse gas emissions cannot guarantee sustainable food and agricultural production. The main challenge is to produce more with less, preserving and enhancing the living conditions of small farmers and ensuring access to food for the most vulnerable part of the society. The three aims quoted in the presentation of this paper, namely social, economic and ecological aspects may be pursued with the family farming.

If the family farming is performed in traditional way is labor-intensive, therefore potentially capable of retaining farmers and shepherds on the territory, but its real “holding capacity” is weak for a number of causes, the most important of them are the low income, the uncertainty of the land tenure and the preference of Governments towards large farms capable of generating export. To reverse the current trend it is necessary that the many small family farms met together in cooperatives willing to implement management and technical innovations aimed at increasing the productivity of the land and the contractual capacity on internal and international markets.

This apparently simple framework risks however not to be realized if the political will of the governments to act in favor of small farms and their structuring in cooperatives and / or associations is lacking. To these last the Government must guarantee a formally sure land tenure and/or use right, and must provide credit, professional training, infrastructure and services. The countries of the Western world, on their part, could help local governments by revising their agricultural policies in order to allow Sub-Saharan family farming to play the due primary role.

The development of family farming will certainly not solve the problems associated

with migration but will provide a valuable contribution to the political stabilization of sub-Saharan Africa and consequently to the reduction of internal and external African migrations.

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