



MONITORING THE MEDITERRANEAN STRATEGY FOR SUSTAINABLE DEVELOPMENT(MSSD)

AGRICULTURAL AND RURAL DEVELOPMENT National Study Egypt

Mme Tahani ABDEL HAKIM, Institut Agronomique Méditerranéen de Montpellier

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II. PART I: CONTEXT AND TRENDS

1. INTRINSIC POTENTIAL AND CONSTRAINTS: EGYPT, A SPECIAL CASE IN THE MEDITERRANEAN

The rural environment is the outcome of the historical and geographic specificities of Egypt which, as is well known, is a gift of the Nile.

Located in the north-eastern part of the African continent, in the great Sahara zone which extends from the Atlantic Ocean to the Arabian peninsula, Egypt lies in arid zone.

Out of a total area of 1 million km², a mere 4 % is inhabited, sustained by a single water resource, the Nile. In view of these two basic data, the main characteristics/constraints of Egypt are identified, namely:

- Limited farmland and inhabitable areas, wholly concentrated in the Nile basin with its two regions, Lower Egypt (Delta) and Upper Egypt (Valley),
- A single water resource.

The Nile basin, extending over an area of 40 000 km², is surrounded by two desert plateaux. The eastern-side plateau (eastern desert, 223 000 km²) runs alongside the Red Sea under the form of a very arid mountain chain, while the western-side plateau (western desert, 681 000 km²) comprises 3 oases and 4 pans located at an altitude of 142 m below sea level. To these two deserts, there should be added that of the Sinai located between the gulf of Aqaba and the gulf of Suez, with a Mediterranean seafront of 200 km.

In spite of the large expanse of the desert areas, Egypt vaunts non negligible water surfaces: indeed, it has 1200 km of Mediterranean coast, 1220 km of Red Sea coast, 1570 km² of coastal lakes and 610 km² of inland lakes, to which there must be added over 8043 km² of fresh water represented by the Nile and its tributaries, irrigation canals, ponds, etc...

The absence of mountain zones in the northern part of the country results in a very low rainfall: the latter ranges from 18 mm per year on average to 200 mm in the northern coastal zones (Mediterranean coasts), hence an absence of pastures and forests, and a total dependence on Nile water to meet the whole water needs.

Egypt has a quota of river Nile water, which quota is set by international agreement,¹ and which amounts to 55.5 billion m³ per year. The total water resources are of **64.3 billion m³** : 55.5 billion m³ of Nile water, plus 2.6 billion m³ of groundwater and 1.4 billion m³ of rain water. Over the past twenty years or so, and thanks to a policy of collection and recovery of drainage and wastewater, the country has managed to mobilise an additional 3 to 4 billion m³. Losses due

¹ International agreement signed by the Nile basin countries in 1959.

to evapo-transpiration and discharge in the Mediterranean represent 16.5 billion m³ on average, which brings down the volume of water available to 48 billion m³. About 83.2% of the water resources are used for irrigation purposes, 9.8% for industry and 5.5% for urban consumption.

These geographic and natural characteristics are the main cause of the **major constraint**, namely the limited water and soil resources. Paradoxically enough, they also represent certain assets: arable fertile soils, significantly constant water availability throughout the year,² and a hot and sunny climate. These assets have helped towards a considerable intensification of agricultural production and a diversification of it based on Mediterranean and tropical products (in particular fruits and vegetables).

High demographic growth, rampant urbanisation and changes in living and consumption patterns have induced an increasing and continuous pressure on soil and water resources.

Public policy has, since the 1960s, set the increase of agricultural production as a priority, whether by intensification (increase of production per useful farmland space) or by increase in farmland space (desert land reclamation policies).

Indeed, one characteristic feature of Egypt is high density per km² in urban and rural areas, with an average density estimated as 1800 inhabitants/km². For some 5000 years now, rural housing has been grouped and concentrated in villages located at the heart of farmland. The irrigation system based on Nile water has led to a concentration of housing and economic activities (including agriculture), with a strong and omnipresent central power since the ancient Egypt times.

2. AGRICULTURE AND RURAL ENVIRONMENT IN EGYPT

Egyptian agriculture and peasantry are among the oldest in the world. As the granary of the ancient world, Egypt was an "agricultural" country until the early 1970s. Today still, in spite of a decline of its relative weight in the country's economy, agriculture accounted for between 16.6 % of GDP in 2001 and 14.1% in 2005, employed 5.5 million working population, that is 28.5 % of the total number of the working population in 2001, and claimed an average value of 47% of exports of raw materials, 20 % of the value of exports and 12.3% of the value of imports according to 2004 data.

² Particularly since the early 20th century when the water development works allowed control over Nile flooding and water storage; the most well-known of such works being the Aswan Dam.

Table 1- Share of agriculture in the economy (in %)

Year	Agricultural working population/ total working population (2)	Share in GDP (2)	GDP growth rate (1)	AGDP growth rate (1)	Share of agricultural investment in total investment (1)	Share of agricultural exports (raw materials) (1)
2000-2001	28.2	16.5	3.4	3.6	17.3	63.6
2001-2002	28.5	16.8	3.2	3.6	16.2	47.5
2002-2003	28.3	17	3.1	2.8	14.7	47.6

Sources:

National Bank of Egypt

CIHEAM Annual Report (2005) (CIHEAM/ ICAMAS: International Centre for Advanced Mediterranean Agronomic Studies)

Agriculture claimed in 2006 not less than 8.5% of the total public investment (whose amount is 155 billion E.L. (Egyptian Liras)), the private sector becoming the chief investor in agriculture with 7.2 billion E.L. (Ministry of Economic Development, 2007).

Table 2- Evolution of agricultural imports and exports (in current prices in million US\$)

Year	2000	2001	2002	2003	2004
Exports	613	635	798	945	1331
Imports	4208	3902	4048	3221	3647

Source: WTO statistics

The evolution of the value of agricultural exports and imports reveals a reduction of the agricultural deficit. According to 2006 data (CAPMAS, 2006), the value of agricultural exports amounts to 4.9 billion E.L. and the value of agricultural imports 12.9 billion E.L. Cotton is in the lead of exports (20% of the gross agricultural exports), followed by rice whose importance has increased since 2001 with a share in agricultural exports amounting to 40 % in 2005 (exclusive of cotton). Potatoes and oranges rank third in agricultural exports.

In 2004, **the rural population** accounted for **57.8%** of the total population, one of the highest rates in the Mediterranean, that is, 42 million inhabitants out of a total of 73 million. According to demographic projections, the Egyptian population will reach 95 million inhabitants by 2025 (mean fertility level scenario). Assuming that the share of the rural population in the total population were to remain unchanged, the rural population would be of 54 million by 2025.

As in many Southern Mediterranean countries, the Egyptian population is young, with 37 % **aged less than 15 years**, according to the Population Census of 1996. This rate amounts to **40.8% among the rural population**, which gives rise to a dependence rate of 79% among the rural population as against a 69% national average (M. ABOULATA, 2007, p. 62).

Egyptian agriculture counted 3 718 000 farms in 2000, in addition to around 800 000 “landless” tenant-farmers.³ It constitutes a significant activity in rural areas insofar as **the agricultural population accounts for 53% of the rural population**. While the rural population/ total population ratio is constant, if not slightly on the increase (the ratio being of 56% in the period 1979/1981), it is worth pointing out that the share of the agricultural population in the rural population did drop from 72% over the period 1989/91 to 53% in 2004 (FAO statistics 2004).

³ These are farmers not in possession of arable land.

According to the preliminary results of the 2006 census, the working population is of 19.9 million people of whom 11 million live in rural areas.

Yet, the definition of what is “rural” calls for certain qualifications. Indeed, unlike what prevails in many Mediterranean countries, where the “rural” is defined with respect to population density and/or by comparison with population size, in Egypt it is an administrative decision which classifies the areas and settlements into "rural" or "urban". As the classification into rural or urban implies significant stakes in terms of equipment and collective structures, it may be said that, in practice, decisions in this field obey other logics (battle of wills, power of local councillors, etc).

Public policies assign two functions to agriculture: a function of meeting the country’s domestic needs, i.e. to produce food for an increasing population, and a function of production for export, as agriculture is a significant export sector. These two functions belong in a logic of increasing agricultural production and productivity, which accelerates the pressure on the water and soil resources.

According to this viewpoint, the agricultural and rural development strategies and policies implemented for about fifty years now have channelled a highly significant part of the financial, technical and human means to hydro-agricultural development projects, as well as desert land reclamation. Increasing the arable land area is not only a means of increasing agricultural production, but is also a means:

1. To compensate for the loss of arable land caused by urbanization and the inevitable enlargement of villages and cities,
2. To readjust the population/ farmland space ratio, insofar as demographic growth induces a decrease in per capita share of farmland,
3. To **re-deploy the population on the territory** in order to ease the pressure on the Valley and the Delta. This amounts therefore to a strategy of land use planning coupled with that of land reclamation.

The main function of agriculture is clearly **a productive function, coupled with a function of "colonization" of uninhabited areas** to create a new population settlement and stimulate a dynamics of economic activities.

The successive land reforms of the 1950s and early 1960s changed the production structures by cancelling large agricultural estates and setting a limit to such estates, distribution of land to small holders, regulation of tenant farming by law,⁴ control of agricultural production by the State (control of cultivated areas, of the sale of inputs and of commercialisation of main agricultural products or so-called strategic products⁵).

Over the past 20 years, Egyptian agriculture has undergone drastic changes, it being subjected to a programme of economic reform known as the Structural Adjustment Programme (SAP) after a long period of State control.

The implementation of the SAP led to repeal of the land reform laws: removing State control over cultivated areas, cancelling the limit to agricultural property, cancelling the law on tenant

⁴ The law on tenant farming set the amount of land lease and prohibited landowners from putting an end to tenant farming.

⁵ Strategic products for staple foodstuffs, such as wheat, or for export, such as cotton.

farming (henceforth, land lease is set according to supply and demand), liberalization of the commercialisation of agricultural products. In spite of these changes, agricultural structures remain quite marked by fragmentation and a strong domination by small and micro-farms, as a result of the successive land reforms and inheritance laws.⁶

The economic reforms of economic liberalization were implemented in a gradual way. They started on a small scale in the 1980s, and then they started to gain momentum since the 1990s.

3. INSTITUTIONS AND POLICIES

3.1. Institutional environment

From the institutional point of view, the main specificity of Egypt is **a strong and ancient centralisation**, a specificity closely connected with the inherent and geographical characteristics described above. The central State in Egypt is one of the most ancient in the world, with its many and cumbersome administrative structures. Centralized management of irrigation and agriculture never ceased throughout the country's history; indeed, Egypt is one of rare countries to be provided with two ministries: a ministry for agriculture and a ministry for irrigation.

Administratively speaking, the national territory is divided into 27 Governorates⁷, 4 are urban and the other 23 are composed of urban areas (cities) and of rural areas. The Governorates as a whole are grouped into four major regions:

- Urban Governorates (Cairo, Alexandria, Port Said and Suez),
- Lower Egypt Governorates (9 in the Delta, grouping 54% of the rural population),
- Upper Egypt Governorates (9 in the Valley, grouping 44% of the rural population),
- And the frontier Governorates (5 in the Sinai and the Western desert, counting 1% of the rural population).

According to the last administrative classification of 2003, Egypt counts 1145 local rural units divided into 4577 villages and 26670 hamlets. Each village is provided with a municipal council (called "council of the people") and with a mayor.

The administrative structures have relays on the regional level (for instance, the directorate of agriculture in each Governorate). These local relays have a function of transmission and control of central decisions rather than a function of local management.

The institutional environment of rural development is characterized by:

- **Many and frequent organisational changes:** For instance, in 1972, rural development belonged under the purview of the ministry then called "Ministry of Local Governance". This ministry became in 1979, "Ministry of Local Government". In 1997, it became "Ministry of Rural Development". In 1999, it received a new appellation, becoming this time "Ministry of Local Development"; then, it was to merge with the Ministry of

⁶ Inheritance laws split the land between the direct spouses, descendants and, in certain cases, the once removed parents. To this, there must be added the absence of legal and/or financial means to promote land consolidation.

⁷ The Governorate is an administrative level equivalent to a department.

Planning in 2005, before recovering its autonomy in 2006, now as “Ministry of Local Development” (NAWAR, 2006). Beyond the changes in appellation, there were introduced each time new assignments of mandate and purview.

- **Fragmentation of powers and multiplication of institutions** in charge of rural development. Several types of institutions intervene in rural development activities, namely:
 - **Ministries: 6 ministries** intervene in the field of rural development. Three ministries intervene in a significant manner: these are the Ministry of Agriculture, the Ministry of Local Development, and the Ministry of Social Affairs. The three other ministries intervene on a ad hoc basis: these are the Ministry of Energy and Electricity, the Ministry of Housing and the Ministry of Irrigation and Water Resources. Within the Ministry of Agriculture, two departments intervene particularly in rural development: the department of extension and rural development, and the department of cooperatives.
 - **Other public institutions:** these include mainly **three national institutions**:
 - the **National Programme “SHOROUK”** which belongs under the authority of the Ministry of Local Development and whose mission is to improve living conditions in rural areas,
 - the **Development and Agricultural Credit Bank** which belongs under the authority of the Ministry of Agriculture,
 - the **Social Fund for Development**, created in 1993 to mitigate the impacts of the Structural Adjustment Programme by extending assistance and credit at low interest rates towards financing small projects and social development actions.
 - **Various rural development projects** based on national and/or international funding,
 - **National and international NGOs.**

In this context, **coordination** between the various structures concerned is the major difficulty, if not the real challenge with regard to the implementation of the rural development projects, particularly on local level. The complexity of the institutional framework and the fragmentation of purview exacerbate the effect of administrative cumbersomeness, considerably reduce efficiency and increase wastages.

In the old lands of the Valley and Delta (cf. next item), the main structure in charge of rural development is the Ministry of Local Development (formerly the Ministry of Rural Development) via the National Programme SHOROUK incepted in 1994, and the Social Fund for Development.

In the new lands, it is the Ministry of Agriculture, via a body called the Egyptian General Authority for Reconstruction, Projects and Agricultural Development, which is in charge of rural development, in addition to the intervention of several projects conducted by international organizations such as IFAD, IDA, and WFP.

The consequence of this situation is undoubtedly **the absence of an overall consistency between all these structures not only in terms of approach but also in terms of priority.**

3.2. Public policies

From the 1950s to the 1980s, the State managed the agricultural sector via control over production, production factors and commercialisation of the main crops, such as cereals, or of industrial crops (cotton and sugar cane). As already mentioned, the main objective was to increase production and productivity via two means:

- **Intensification** (increase in the production per unit of useful farmland space),
- **Extension of cultivated surfaces** (reclamation of desert land).

The public policies of intensification are of two types:

- Hydro-agricultural works policies,
- Subsidy policies to promote the use of industrial inputs (fertilisers and pesticides).

The main water works project is the Aswan dam which allowed, by regulation and storage of Nile flood waters, regular and permanent supply of irrigation water, as well as passing from a single annual crop to two or three crops per year (exclusive of permanent crops), hence **a cultivated and harvested area that doubles up the farmland area: 14 million 550 000 feddans⁸ (6 million 100 000 ha) of cultivated and harvested area for 8 million 470 000 feddans (3 million 550 000 ha) of farmland** (Agricultural Statistics, 2004). This attests to the high rate of intensification of Egyptian agriculture estimated as in the range of 1.71 to 2.00 over the period 2004/2006.

The implementation of the Structural Adjustment Programme, followed by the engagement of Egypt in the economic liberalisation process since the 1980s, have modified the conditions of agricultural production. In fact, **the main objective remains the same, namely an increase of production and productivity, whereas henceforth the means of achieving this objective further emphasise the role of the private sector and of economic efficiency as resulting from the market mechanisms**. The State has removed control over cultivated areas and over guided production, as well as a substantial part of its control over inputs and commercialisation. Henceforth, it is financial return—the major motivation of developers—which guides the allocation of resources and investments in the agricultural sector.

As for the desert land **reclamation projects**, they have become **the top priority of public policies over the past 20 years**. Public investments are mobilised, for the major part, in these projects to ensure major land use planning and infrastructure works (execution of road, water and electric networks). Public policies grant to the private sector a key role in investing in reclamation, equipment and—of course—production works. The consequences of these development policies are numerous, but we highlight just two of them:

- An increase in farmland space, thus passing from 6 million feddans in 1990 to 8 million 470 000 feddans (that is, from 2 million 500 000 ha to 3 millions 550 000 ha);
- Emergence of large capitalistic farms far different from the family model of “old lands”⁹ in terms of crop pattern (irrigation method, mechanisation, etc ...), as well as in terms of production (export-oriented crops, fruits and vegetables).

⁸ *Feddans*: national farmland measurement unit; 1 feddan = 0.42 hectares.

⁹ The term “old lands” is used in the reference documents to designate the farmland of the Valley and the Delta, as against the “new lands” reclaimed from the desert.

The land reclamation projects were incepted back in the 1950s. The reclaimed areas have fluctuated in size over the past 50 years (cf. table below) to reach a **total reclaimed area** of 3 240 000 feddans (1 million 361 344 ha), that is about a third of the total current farmland area amounting to 8 million feddans.

Table 3- Evolution of reclaimed areas

Year	52/71	71/94	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04
Number of feddans	136500 0	1620000	57000	24500	27900	40700	22000	12700	28700	18000	23500
In ha	573529	680672	23949	10294	11720	17100	9243	5336	12058	7563	9873

Source : reckoned based on:

The National Statistical Yearbook for 2004,

General Authority for Re-constructing Projects and Agricultural Development

For the two periods from 1952 to 1971 and from 1971 to 1994, this is the total area reclaimed during each period.

It is worth pointing out that the “new lands” account for about 25 % to 30 %¹⁰ of the total farmland, or 8 % of the total population dwelling there.

¹⁰ Estimates of the new lands differ according to the sources. Certain data include all reclaimed land outside of the Delta and of the Valley since the 1950s, while others include only the areas reclaimed prior to the 1970s. The latter are called the “old new lands”. Besides, several bodies intervene in the reclamation process, which results in different data according to the body concerned. For instance, the data of the National Statistical Yearbook differ from those issuing from the statistics of the Ministry of Agriculture.

III. PART II: RISKS AND OBSERVED TRENDS

1. SAFEGUARD OF NATURAL RESOURCES: A LIMITED POLICY

As a result of the absence of forests and pastures, the natural resources of Egypt are for the major part found in areas inhabited and worked by man, the natural areas being generally located outside of activity zones, i.e. in desert zones and in the lake zones to the north of the national territory.

A distinction, thus, must be made between resources protection policies in the two types of zones, insofar as, in the inhabited areas, pressure on the resources is high and protection policies are minor.

1.1. Inhabited areas

Housing concentration and economic activities areas (Valley and Delta) experience two types of problems:

- Pollution types of various origin,
- Loss of farmland.

Pollution:

With the high population density and the intensification of agricultural production, rural Egypt is experiencing serious environmental problems. Recent reports highlight the aspect of environmental degradation, and this, in spite of the absence of serious studies and of the lack of quantified information on the subject. Besides, the acuteness of certain problems calls for a qualitative description of them.

Apart from the air pollution affecting such a major city as Cairo, the rural areas of the Valley and the Delta are not spared, and certain problems are well-known not only to specialists but also to the populations. Certain observations seem to be alarming as is attested by this extract from a report on rural development in Egypt for the time frame 2025 (Alterra, 2007): "Nearly 80% of Egypt's farmland is found in the Nile Valley; yet deteriorating environmental conditions along with increasing rural population, constant demand for new urban and rural residential areas and escalating levels of domestic, industrial and agricultural related future pollution are threatening the future of Egypt's key natural assets, its biodiversity and its farming and social fabric". (KHEIR ELDIN, 2007, p. 29)

In view of this reality, the environment is experiencing a major degradation due to a diversity of causes, of which pollution. The **major pollution problems in the rural areas of the Valley and the Delta** are:

- An increase in **soil salinity**: a result of intensive land exploitation and of a poor condition of drainage networks;
- **Chemical pollution** of the soil and of the water table, as well as of Nile water: this being a result of a massive use of fertilisers and pesticides of which a substantial part is diluted in the drainage water that is disposed of in the Nile. Indeed, agricultural intensification has led to an increase in the quantities of chemical fertilisers and of pesticides used over the last decades, as the quantity of fertiliser used passed from 131.2 kg/ha in 1970/71 to 404.3kg/ha in 1989/90 (EC., 1993). All in all, the increase in **the fertiliser quantities** used never slackened, and this, for the three types of fertiliser used in Egyptian agriculture (*Egyptian Review of Agricultural Economics*, 2006). Between 1988 to 2004, one notices an increase by 45.8% for nitrogen fertilizers (from 657 000 tons to 958 000 tons), by 108% for potassium fertilisers (from 34 000 tons to 71 000 tons) and by 92.6% for phosphorus-based fertilizers (from 286 000 tons to 551 000 tons).
- Over the same period of 1988 to 2004, official data indicate that **the quantities of pesticides** used decreased by 950 tons on average per year, that is, a reduction by 16.74% of the average quantities used, thus passing from 17 000 tons to 1900 tons in 2004 (*Egyptian Review of Agricultural Economics*, June 2006). This strong reduction seems to be over-estimated, even though justified in the discourse of the public authorities by the will of the latter to limit the use of pesticides and to encourage the recourse to other methods. Besides, according to the 2005 *Human Development Report*, the quantity of pesticides used in 2004 stood at 4000 tons.
- **Pollution and water quality** in the rural environment: Several studies and reports (WORLD BANK, 2007 and RAMADAN, 2006) highlight the relation between polluted environment, water quality, poverty and public health. The origins of pollution and the causes of poor water quality are numerous, and are to be found throughout the chain: water is contaminated at source (the Nile), water treatment is insufficient, and the supply networks are deteriorated. Since the industrialisation of the Delta in the 1950s (mainly textile industry and chemical industry), there are about 4000 factories that dispose of their waste in the Nile, of which 12% treat their wastes, 14% treat them partially and 74% undertake no treatment at all (RAMADAN, 2006, p.6). To this pollution by industrial waste, there must be added that which is caused by agriculture, due to massive use of pesticides and chemical fertilisers, and to disposal of solid wastes in irrigation canals. Thus, it is noted that in January, corresponding to peak pollution period of the Rachid branch (one of the two branches forming the Nile delta), the water pollution rate is 20 times higher than the authorized rates, thus causing the death of thousands of fish. In addition, tests carried on samples of drinking water in several primary schools revealed that the rate of heavy metals in the water is 5 to 10 times higher than the authorized rates (RAMADAN, 2006, op. cit.). Poor water quality is worsened by other factors, such as some rural practices, lack of a sanitation network, and the outdated state of supply networks (cf. item 2.2).
- The last form of pollution is that produced by a lack of **solid wastes treatment** means, in particular production wastes. A well-known recurrent case in Egypt, for the past ten years or so, is the case of rice straw. With the steady increase in rice crop area in the Delta each year, very large quantities of straw are burned by the producers. Each burn out event produces a cloud of smoke (commonly called by the population and the national press "the black cloud") which covers over several days a significant area of the Delta and the city of Cairo. For over a decade now, in spite of the adverse effects on the well-being of the population and, in the longer term, on health, the public authorities

have not enforced concrete measures to stop or reduce this practice, nor have they endeavoured to seek out an alternative solution to treat rice straw or recycle it.¹¹

- In fine, one should not forget the many problems arising from domestic waste in the absence of a proper collection and treatment system, which problems are made even more serious by the high population density.

There are many studies on water in Egypt. Overall, they show that water is a limited resource, and that the quantity of water available per capita has reached a level deemed to be critical since 1997, that is, 1000 m³ per person and per year, which corresponds to the "water poverty" level. According to demographic forecasts, the Egyptian population will be of 83 million inhabitants by 2017, which will cause the quantity of water available per person to drop to a level between 720 and 500 m³, that is, a high level of scarcity. However, compared with other countries of the region, Egypt is not in a situation of structural crisis. On the other hand, the true problem is that of water quality and access by the whole population to a good quality water.

Loss of farmland:

This is a fairly old phenomenon, but which has accelerated over the past four decades under the effect of the action of man and/or of the action of nature.

Traditionally, the topsoil of farmland was used as raw material for the manufacture of dry bricks for country housing and red bricks for urban constructions. This mining of the soil had lasted for several years until it turned out to be real threat with the boom in demand on red bricks for construction caused by increasing urbanization. Many laws promulgated since regulate this exploitation in order to mitigate these devastating effects.

With the demographic growth, and since urban conurbations and rural settlements are located at the middle of farmland in the Valley and the Delta, cities and villages have been extending steadily and encroaching upon the farmland around them. Over time, hundred of hectares have been gnawed by constructions not only in urban areas but also in rural areas.

To combat this phenomenon, the public authorities resorted, as a first step, to laws prohibiting construction on farmland, except under certain very restrictive conditions. In spite of the penalties stipulated by the law, offences never ceased to increase in view of the strong demand on housing in both urban and rural areas.

As a second step, after noting the relative failure of a penalty based policy, the authorities incepted about twenty years ago a policy of land use planning aimed, on the one hand, at constructing new "satellite" cities to meet the strong demand on housing and, on the other hand, at designing a land use plan for each village, which demarcates the constructible areas for the years to come.

The area of **annual loss of farmland** is subject to debate, and several estimates are advanced in this regard. According to the World Bank Report on Human Development in Egypt (*Egypt Human Development Report*, 2004), annual loss of farmland amounts to **0.6 % of the total farmland space, whereas the National Report on the Environment estimates the same as 0.3 %** (Ministry of the Environment Report).

¹¹ Since September 2007, 10 rice straw treatment and recycling plants have been constructed on an experimental basis.

Natural action contributes to the loss of farmland by desertification, which is the result of the vulnerability of the ecosystem and the intensive exploitation of farmland beyond the capacity of this ecosystem. The areas affected by this phenomenon are located on the Mediterranean coasts, and at the outskirts of the fertile lands of the Valley and the Delta.

The agricultural space per inhabitant is dramatically small and is steadily on the decrease, in spite of the efforts made to increase the area of arable land: from 0.25 feddan per inhabitant, that is 1050 m², in 1960, down to 0.13 feddan per inhabitant, that is 546 m², in 2000, and further down to 0.118 feddan per inhabitant, that is 495 m², in 2004. It is estimated that it will still drop to as little as 0.09 feddan per inhabitant, that is 378 m², by 2017 (*Egypt Human Development Report*, 2005, p. 159).

A last factor of loss of farmland lies in the irrigation method and in the fragmentation of the old lands in the Valley and the Delta, where the area occupied by irrigation canals and separations between plots is estimated at 20% (ELSAYED, 2007. p. 49).

1.2. Natural spaces

Located mainly in the desert and partly in the lake zones (wetlands) in the northern part of the country, natural spaces in Egypt are characterized by aridity. However, there exists in these natural spaces specific and vulnerable fauna and flora. The zones of the lakes¹² represent 25% of the Mediterranean wetlands and a unique and vulnerable ecosystem (AGRAWALA, SH. et al., 2004)

These wetlands, offering habitat to several water species, are a significant natural habitat for many species of birds, as well as a corridor of migration for birds from northern Europe to Africa. Global warming will exacerbate the vulnerability of this ecosystem, insofar as it is likely to lead to a rise in water temperature inducing strong disruptions of the natural environment.

The overexploitation of the plant cover as well as the drying-up of certain wetlands, have endangered the natural spaces of Egypt. However, since the late 1980s, the public authorities have been implementing a protection policy whose main tool is the creation of natural reserves. Today, there are 24 natural reserves which encompass the **protected areas, that is, 10% of the national territory, and it is projected to raise this figure to 17% by 2017**. These natural reserves are distributed as follows:

- 10 natural reserves in wetlands,
- 10 natural reserves in desert zones,
- 4 natural reserves in geo-morphological zones (zones of rock formations).

Census works carried out over the past ten years contribute in working out an inventory of the various animal and plant species. It emerges that 850 species, classified as very rare, and 567 species, classified as rare, are endangered. Besides, these works have highlighted deficiencies with regard to knowledge about certain ecosystems, as well as the need to have information systems and data bases.

¹² These are five major lakes in northern Egypt.

Table 4- Inventoried animal species

Class	Number of species
Animal plankton	980
Arachnida	440
Insects	10000
Mammals	132
Reptiles	91
Birds	515 (of which 153 rare species and 17 endangered species)
Corals	276
Spongiforms	73
Fish	793
Molluscs	552

Source : From a report issued by the Ministry of the Environment "Report on Biodiversity and Natural Reserves in Egypt", July 2006.

Table 5- Inventoried plant varieties

Class	Number of varieties
Mediterranean aquatic plant	900
Red Sea aquatic plant	13
Nile aquatic plant	534
Desert plant	765
Sinai specific plant	527

Source : From a report issued by the Ministry of the Environment "Report on Biodiversity and Natural Reserves in Egypt", July 2006

Egypt has incepted several genetic-stock inventory and protection projects, of which the major ones are the following:

- Since 2004, a **project of protection of medicinal plants** which consists in inventorying the local medicinal plants, the practices and uses of these plants, as well as establishing a data base and an inventory of medicinal plants in Egypt;
- A project of a **gene bank**, whose objective is to inventory and safeguard the genetic stock of local and endangered plants.

According to the National Report on the Environment, the main factors of destruction of the ecosystems and of threats to biodiversity are the following: illegal hunting of several migratory birds and certain rare species of gazelles, overexploitation of plant resources, and anthropogenic pollution (air, water and soil pollution) affecting wetlands (lake zone) and certain desert zones due to tourism activities.

Egypt, via its Ministry of the Environment (established in 1997) and its National Environment Agency (established in 1982), has set out a **strategy for the safeguard of natural resources and biodiversity** in the natural spaces. It is organized around the 4 classic axes:

- To set up a natural resources management system: and this, based on scientific research programmes whose objective is to gather a better understanding of the functioning of the ecosystems and the means of preserving them;
- To build scientific, technical and institutional capacity: and this, based on the training of the staff of the scientific institutions (research centres, universities, etc ...), consolidating the means made available to these organizations (laboratories, research sites, scientific equipment, etc...) and information systems (data bases, information networks, etc...);

- To mobilise all stakeholders, in particular those of civil society: and this, based on on-going coordination between all the public bodies concerned, as well as on participation by civil society players in the design of policies and implementation of the actions. The latter aspect requires a necessary effort to inform and build awareness among the populations directly involved in the exploitation of endangered natural resources;
- To reinforce and adapt the legislative framework to local conditions in order to avoid contradictions with the development policies and programmes. So as to confer upon this legislative framework its full sense, it will be necessary to obtain the means needed for enforcing the environmental protection laws.

In addition to this national strategy, Egypt is signatory to all international conventions in the field of the environment, biodiversity and climate change.

1.3. Conclusion

There are serious threats to the environment and natural resources in Egypt, owing to a combination of natural, historical and demographic factors, on the one hand, and intensification practices required by the growth requirement, on the other hand. The two major threats are:

- The water, soil and air pollution induced by intensification of agricultural production and the lack of means of treatment and recycling of solid wastes;
- The depletion of natural resources, of which, in particular, arable land.

However, since the 1980s, the public authorities have taken measures aimed at mainstreaming the environmental dimension, in particular by the establishment of a Ministry of the Environment and of a National Environment Agency (executing agency), as well as the creation of several natural reserves and the issuing of an inventory of fauna and flora. However, an examination of these measures reveals that they relate mainly to natural spaces (sites located in desert zones, and wetlands), and that they barely relate to inhabited spaces, including rural areas, a life and production site for the population. One may, thus, conclude that this is more a "conservation policy" than a policy of mainstreaming the environmental concern in the production activities, and of promoting models of alternative practices.

Case study: Treatment of solid wastes in the village of Mustafa Agha (Delta region):

Place: village of Mustafa Agha located in the north west of the Nile Delta, in the Governorate du Beheera

Population of the village: 3000 inhabitants

Main **economic activity:** agriculture

Farmland: 300 feddans (that is, 130 ha)

Main crops: wheat, rice and cotton

Main **source of irrigation:** the Nile, Mahmoudia canal (main irrigation canal)

As part of a panel facilitated by the Egyptian researchers of CRDRS¹³ of the Faculty of Agriculture of Cairo University, within the framework of the ISIIMM project (project of local management of water resources), the population initiated in 2005, in cooperation with these researchers, a solid wastes treatment project. The choice of the village rested on the following criteria:

- Representativeness of the village from an economic, social and institutional point of view (absence of local development structures)
- The location of the village upstream of an irrigation canal which services 6 villages and about 40 000 inhabitants in total. Pollution upstream the canal is harmful to the other villages and the population as a whole.

The agricultural waste produced by the village is estimated as 740 tons per production cycle, and domestic waste is estimated at 1.5 tons per day. The absence of a treatment system for this solid waste has had a negative impact on the quality and flow of irrigation water, as well as on the population's health.

The objectives of this village project are as follows:

- To improve the quality of irrigation water,
- To improve the flow of this water,
- To improve hygiene conditions,
- To implement a sustainable and self-managed action of waste treatment.

The project consists in collecting the solid wastes and constructing a treatment and recycling plant to handle these wastes by the production of compost, which will be sold to the farmers of the neighbouring villages.

The players mobilised for this project are:

- all population groups of the village, namely the farmers, women, and young people,
- together with the local institutions, of which in particular the municipal council and the Regional Irrigation Inspectorate.

The management of the project is entrusted to a local committee on behalf of the population, composed of members representing the 9 extended families of the village. This committee is the negotiation, conflict management and decision-making authority.

¹³ Centre of Rural Development Research and Studies.

The financial arrangement of the project is as follows: the local population provided the land plot where the recycling plant was to be constructed. ISIIMM financed the initial investment for training the workers and for the purchase and installation of the machinery: namely, 2 tractors, a waste shredding machine, a trailer, 2 cars and a bulldozer (total investment of 48000 €). At project inception, the operating budget is provided by a contribution of an amount of 1 E.L. per inhabitant (that is, less than 20 cents of a €). Afterwards, it is provided by the earnings from compost sales; in other words, as the earnings increase, the population's contribution amount decreases.

The project employs 6 paid workers: 4 workmen, a driver and a guard.

Project installation process:

After a "baseline" survey of the village conducted by the CRDRS researchers within the framework of the ISIIMM project, the latter established contacts with certain people who had been elicited as "local leaders". An information and mobilisation campaign among the population, under the form of small meetings with various population groups, was accompanied by several training sessions targeted at the producers, women, and school-attending young persons. During this first phase, of a six-month duration, there developed the idea of setting up a local committee, grouping the family representatives.

This structure helped resolve the conflicts that had kept the project at a standstill over several months.

Three **impact assessment studies** were conducted: a study by the ISIIMM project and two by the Water Meda programme. The conclusions of these studies concur about the following points:

- visible positive impact on water quality and flow,
- improvement of quality of the environment,
- impact on environmental healthiness (less rodents, flies, etc ...).

The sustainability of the project is ensured by:

- the existence of an organisational framework (the local committee, which is in process of evolving into a local development association),
- self-management of the project,
- self-financing of the project (contribution plus sales earnings).

The merit of this experience lies in:

- the capacity to mobilise the immediate players on the ground without intervention by the public authorities,
- making the local population autonomous in assuming the management of a recurrent environmental problem, and
- replicability of this type of action.

It is worth pointing out that, after visits organized for the populations of neighbouring villages, three of these villages are in process of negotiation and organization to set up similar projects.

2. LIVING CONDITIONS AND POVERTY IN RURAL ENVIRONMENT

In 2005, Egypt was ranked 111th and, in 2007, it was ranked 112th, according to the HDI, with a life expectancy at birth of 70 years (56 years, in 1976), an infant mortality reporting a decrease from 108/1000 in 1961 to 22/1000 in 2004, a literacy rate of 65.7 % for men and 56% for women in the whole of the country. Even though the gap between men and women is narrowing, one notices that the latter continue to be underprivileged, and more particularly so in rural areas. Two data may be enlightening in this regard:

- The rate of women with a secondary and tertiary school level is 35.6% in urban areas and 13% in rural areas,
- The unemployment rate on national level is 10%, while it stands at 24% for women.

National sources report an improvement of schooling rate indicators between 1996 and 2006. The illiteracy rate for the whole population¹⁴ dropped from 39.4% to 29.3 % and, for the rural population, it dropped from 49.6% to 36.6% (ABOULATA, 2007, p. 65). According to these statistics, the most remarkable progress relates to the rate of access to secondary education which passes from 14.1 % to 24.6 % in rural environment.

The indicators cited in Egypt Human Development Report for 2005 are less optimistic. In spite of the progress made over the past 30 years, the overall schooling rate in rural environment remains low and, more particularly, with regard to women.

Table 6- Literacy rate and education level in rural and urban areas in 2005 (in %)

	Literacy rate		Population aged 15+ years (secondary education+ level)	
	Men	Women	Men	Women
Urban	78.6	63.6	40.2	35.6
Rural	53.2	29.6	20.2	13.5
Egypt	65.7	56.2	29.3	23.5

Source: Egypt Human Development Report, 2005

These data show clearly the persistent gap between rural and urban, as well as between men and women. There are also **big disparities** between the rural areas themselves, in particular **between the rural areas of Lower Egypt (Delta) and those of Upper Egypt (Valley)**. Detailed data indicate that the literacy rate is higher in the rural areas of Lower Egypt (exclusive of cities and urban centres) where there is a rate of 59% for men and 50% for women, whereas in Upper Egypt (exclusive of cities and urban centres), it is of 44.9% for men and 38.2% for women.

Similarly, **the infant mortality rate** is 15.8/1000 in Lower Egypt and 25.8/1000 in Upper Egypt.

As regards access to basic equipment, there is an improvement in **the national territory cover in electricity and drinking water**. In 2004, 99% of the national territory is electrified and 95% is supplied with drinking water. However, a more detailed examination calls for a qualification of this affirmation, particularly with regard to water. Indeed, the rural populations suffer **from a lack of access to a good quality water** and, more and more, even to potable water as such. During the summer 2007, Egypt experienced what the national press called "the revolt of the thirsty", that is demonstrations by the populations due to a shortage of drinking water supply

¹⁴ Population aged 10+ years.

over several days, if not weeks, in spite of a rising of the Nile that was considered to be particularly high.

All national and international reports highlight the aspect related to the quality of drinking water, especially in rural areas. **Poor water quality** gives rise to many public health problems, in particular for the most vulnerable groups, such as children. In the Egypt Human Development Report (2005), it is estimated that **20% of infant mortality cases** (children less than 5 years) are caused by diarrhoea and other infectious diseases connected with poor water quality. This poor water quality results from several combined factors: chemical and organic pollution, outdated state of the distribution network, lack of treatment, lack of hygiene, etc.

Another acute problem is that of **sanitation** in rural areas. This subject holds a significant position in the above-mentioned report which calls it a "**silent emergency**". In 2003, a mere 13% of rural housing are equipped with modern toilets, as against 67% in urban areas, and a mere 21% of rural housing is connected to the public sewerage system, as against 84 % in urban areas. The absence of a sanitation system in the overwhelming majority of rural areas strongly contributes in water contamination, hence in a degradation of its quality. **The absence of a wastewater collection and treatment system** or of a connection to the sewerage network—in spite of the high population density in rural areas—gives rise to many **public health problems** affecting both children and adults by several serious pathologies that have spread on a large scale (infectious diseases, renal diseases, etc ...). Thus, studies reveal a fall of agricultural productivity related to increasing environmental degradation in Upper Egypt (the Valley).

Public investment data confirm the significant disparity between rural areas and urban areas: over the period 1982-2002, investment per capita in urban areas was 9 times higher than in rural areas, and 7 times higher for the period 2002-2005 (Egypt Human Development Report, 2005).

Poverty reduction is one of the axes of development policy in Egypt, with a declared objective of cutting poverty down to 6% by 2022.

A IFPRI study dating back to 1997 estimates the poverty rate as 26.5% of the total population, which would amount to 15.7 million inhabitants. It also highlights a quite marked sectoral disparity between urban areas and rural areas, the latter counting about 63% of the poor population (DATI et al., 1998). Again, according to this study, the highest poverty rate is among the population employed in agriculture, building construction and services to people. In rural environment, the study indicates that "farmers" are less poor than "non farmers", and that there is an inverse relation between cultivated area and poverty level.

In 2004, according to the Ministry of Planning, the poverty rate stood at 16.7 %, while the Human Development Report estimated it as **20% of the total population**, with a rate of 4.7% for the extremely poor population.

These rates are **twice to three times as high in rural areas**:

- Poor population: 10.7% in urban areas, as against 27.4% in rural areas,
- Extremely poor population: 2.1% in urban areas, as against 6.6% in rural areas.

The causes of rural poverty are historical. First of all, it is worth recalling **a low public investment in rural areas** that lasted over very long periods, thus making the difficulties even more acute. The level of infrastructures and equipment was obviously affected by this lack of investment, inducing **an adverse impact on the attractiveness of rural areas** for the establishment of other economic activities.

In the absence of job generating economic activities, and with the demographic growth of the rural population, agriculture is no longer capable of absorbing all the labour force available, all the more so as the structures of agricultural production are very largely dominated by very small and micro farms (particularly in the Valley and the Delta).

It is estimated that **non agricultural incomes** of rural households range between 41% and 47% of their total income¹⁵ (CROPPENSTEDT, 2006 and ELLAITHY, 2007) thanks to wage work. The **informal sector**, according to the estimates, claims up to 62% of the labour force, of which two thirds are found in rural areas. Agricultural income is the second source of income, with two estimates:

- An average of 29 % of the total income of the households (this rate is estimated at 27.4% in the Delta and 31.1% in the Valley),
- An average of 40% which aggregates the two incomes generated by work in the agricultural sector, that is the income of the farmers and that of the paid labour.

Remittances represent the third source of income, with an average of 16.5%.

In spite of this situation, it is estimated that a zero agricultural growth will have adverse effects on the incomes and will cause an increase in poverty and in inequalities, insofar as agricultural growth has an impact on the demand on goods and services in the rural informal sector.

Besides, the study cited above reveals that there is an obvious relationship between access to land and poverty in rural environment, knowing that land distribution is characterized by large inequalities (the Gini coefficient is 0.69, according to FAO statistical year book for 2005). The poverty rate is estimated at 35% for landless households and those who work on small and micro farms, whereas it is 24% for other households. Certain sources of income contribute in increasing disparities, in particular agricultural income, while others reduce inequalities (paid work income, and remittances).

Other works find that the liberalisation measures implemented under SAP (Structural Adjustment Programme) have contributed in increasing the rate and exacerbating the acuteness of poverty in rural environment, particularly among the social groups already in a situation of vulnerability, i.e. the landless and the very small farmers.

For a brief overview of the various strategies adopted by rural households in combating poverty, the following are worth mentioning:

- Large families broaden the labour force (including children),
- Diversification of incomes in rural households based on paid work (seasonal or permanent, formal or informal, agricultural and non agricultural),
- Migration to major cities and, since the 1980s, to oil producing countries.

¹⁵ The study, published in 2006, is based on 1997 data.

3. RURAL DEVELOPMENT POLICIES

The history of rural development in Egypt is characterised by:

- A permanent, though fluctuating, public authority interventionism,
- Assimilating rural development with agricultural development.

The period extending from the 1950s to the early 1970s is that of direct intervention by the central State in agricultural and rural development. It is the era of **centralised planning** of agricultural and rural development, with the State as the chief financial and executing player. The whole set of policies and measures implemented are found in the three land reforms (abolition of large land property, creation of agricultural cooperatives, control over production and commercialisation).

The interest granted to rural development by the public authorities experienced fluctuations between the 1970s and the early years of 2000 (NAWAR, 2006). The approach to rural development remained **a sectoral approach**; nevertheless, the implementation of the Structural Adjustment Programme and the liberalisation process emphasized the need to conduct a policy in the field of social development. It is during the 1990s that NGOs started to act in the field of rural development with the advent of participatory approaches, sustainable development and human development. The role of public authorities did not weaken though, since in 1997 an inter-ministerial committee in charge of facilitating coordination of development actions in rural areas was set up.

Since 2005, the orientation of rural development policies has preached decentralization. However, the local authorities were still very little, if at all, involved in rural development, and the funding of projects remained centralized.

Unlike other countries of the south, Egypt does not have a rural development strategy that is independent of agricultural development. The Ministry of Agriculture has adopted an "agricultural development strategy for the time frame 2017" in which rural development holds but a minor position (NAWAR, 2006).

The question of sustainability is affirmed in the public discourse but its concrete translation into the policies is still confined to a small scope.

The main challenges of rural development today are highlighted by the weighty trend observed:

- Demographic growth coupled with increasing unemployment,
- Poverty, whose rate is higher in Upper Egypt (the Valley) than in Lower Egypt (the Delta), and among rural women more than men,
- The fairly high illiteracy rate among rural women and marginalisation of the latter as regards access to services and health care,
- Pollution and environmental degradation.

The agricultural development strategy addresses these challenges only very partially, insofar as its main objectives are:

- To boost agricultural production in order to meet the needs of an increasing population and to boost exports,
- To maximize the exploitation of the limited soil and water resources available,
- To extend the cultivated area so as to ease pressure on the Delta and the Valley,

- To improve the living conditions and to build capacity of the rural populations.

The major land use planning and reclamation projects remain a core component of the development strategy. The objective set by **the strategy 2017** is to extend the area of reclaimed land with a view to reaching 3 million feddans, that is an extra 1 million 200 000 ha. Six major projects claim the major part of the public and international funding, of which the most important are:

- The Toshka project: this project aims at creating a "new Nile Delta" to the south, in the western desert along a line running parallel to the Valley, for the planting of 540 000 feddans (that is, 226 890 ha) based on water from Lake Nasser via a 150 km long canal,
- The ELSALAM canal project: the objective of this project is the reclamation of 620 000 feddans (that is, 260 504 ha), via a canal called ELSALAM canal that passes under the Suez Canal to convey water from the Nile to the Sinai, with two thirds of the reclaimed area being located in the Sinai and a third located to the west of the Suez Canal.

The evolution of the relative weight of public investments and private investments in the agricultural sector attests the significant position held by the latter owing to private investment in the new lands.

Table 7- Share of agricultural investment in total investment, and of public and private investment in agricultural investment (in %)

Year	Agr. Investment/ Total investment	Public agr. Investment/ Total agr. investment	Private agr. Investment/ Total agr. investment
1998-1999	12.2	31.8	68.2
1999-2000	17.3	36	64
2000-2001	16.2	31	69
2002-2003	14.1	41	59

Source: AGRIMED, Report 2005

The share of the private sector in agricultural investment is more significant than its share in total investment. In 2006, whereas private investment accounted for about two thirds of total investment, it stood at 84% of agricultural investment, that is 7.2 billion E.L. out of a **total agricultural investment** of 8.6 billion.¹⁶ Besides, a decrease is observed with regard to the share of agriculture in total investment in 2006 which amounts to 9.40%.

For the same year, **agricultural GDP** stood at 81.8 billion E.L. (at current prices), that is 14.1% of GDP, and the value of agricultural production was of 107.2 billion E.L. (at current prices) or 11.4% of the total production value (Report of the Information and Decision Support Centre, February 2007).

The amount of **public investment in rural development** is difficult to estimate owing to the fragmented nature of funding sources. Nevertheless, the amount of investments of the national programme SHOROUK, the main rural development programme in old lands, is revealing: 2 billion 240 million E.L. for the year 2005/2006, which represents a rather low amount in view of the needs in matter of infrastructures and services.

¹⁶ The amount of agricultural investment includes the investment for irrigation and the reclamation of new lands.

4. WHICH ECONOMIC ALTERNATIVES?

4.1. A productive and rational agriculture?

The agriculture and development issue in Egypt is overridden by **the requirement of management of the population/ resources pressure**, a pressure resulting from the scarcity of water and land resources, combined with demographic growth. The priority of the development policies is to maximise exploitation of the resources in order to increase production with, as a main axis, the major projects of reclamation and hydro-agricultural development, coupled with a population redistribution policy. It is this strategy which monopolises the major part of the efforts of modernisation and funding, hence the concentration of the financial and technical means in the new lands, at a time when the old lands account for about 75 to 80% of the total farmland, 94 % of the farms and approximately 90 % of the rural population. The consequence of this strategy is **a marked disparity between agriculture in the new lands and agriculture in the old lands.**

Table 8- Number of farms as per class of UFS - (in thousands)

Class of UFS*	1990		2000	
	Number	% of total	Number	% of total
Less than 1 ha	2267	77.9	3014	81
2 ha	549	18.8	580	15.5
4 ha	61	2	82	2.20
8 ha	27	0.9	34	0.91
21 ha	4.52	0.15	5.65	0.15
42+ ha	1.62	0.05	2.69	0.07
Total	2910	100	3718 ¹⁷	100

*UFS : Useful Farmland Space

Source : According to the 2000 Agricultural Census

Agriculture in the old lands is a family agriculture characterized by dominant small and micro farms (81% of the farms are less than 1 ha), intensive use of family labour and traditional flood irrigation. Land property is quite fragmented by successive inheritance, and the dominant farming pattern is direct farming, with 60% of the farmland space. The crop system is focused on cash crops such as wheat, corn, sugar cane, rice and cotton. The dominant stock breeding system is small-scale "domestic" cattle breeding with a livestock of not more than one to two cows or cow buffalos per farm, same as for poultry farming which is rather of the "farmyard" type.

¹⁷ In the national statistics, this figure is topped up by 82118 "landless" farmers, which yields a total number of 4539188 agricultural farmers.

Table 9- Number of farms as per class of UFS in the new lands (area in ha)

Class of UFS	Number of farms	% of total	UFS	% of total
Less than 1 ha	78759	34.76	52811	5.79
Less than 2 ha	93248	41.16	184518	20.21
3 ha	15079	6.66	49690	5.44
7 ha	24194	10.68	125391	13.74
8 ha	7382	3.26	68022	1.45
13 ha	3804	1.68	56274	6.16
21 ha	2276	1.00	60166	6.59
42+ ha	1816	0.80	315988	34.62
Total	226 558	100	912 860	100

Source: According to the Agricultural Census of 1999/2000 (the data relate to the lands reclaimed since 1970)

The breakdown of the farms in the new lands reveals that they are of a much smaller size than those of the Valley and of the Delta:

- The farms of less than 1 ha represent 81% in the old lands as against 5.79 % in the new lands,
- The farms of 21+ ha represent 0.22 % in the old lands, as against 1.80 % in the new lands.

The production structures in the new lands are generally larger, more modern and are dedicated to export- and high value added crops (such as fruits, vegetables, medicinal and aromatic plants, etc ...).

The largest farms in terms of area and capital, property of "developers" living in the city, are in the new lands.

The farming system also attests the difference between the two types of farming.

Table 10- Crop growing system in the old and new lands

	Old and new lands	New lands
Grown area	8 411 000 feddans	1 755 000 feddans
Harvested area	14 920 000 feddans	2 640 000 feddans
Crop set ¹⁸	Area harvested as per crop set/ total harvested area	Area harvested as per crop set/ total harvested area in the new lands
Winter crops ¹⁹	41.5 %	41 %
Summer crops ²⁰	36.5 %	29 %
"Nili" crops ²¹	4 %	2.91 %
Permanent crops ²²	26 %	36.5 %
Alfalfa	3.15 %	0.6 %

Source : According to the agricultural statistics for 2006 of the Ministry of Agriculture which do not cover all new lands.

¹⁸ As already mentioned, permanent irrigation and intensification efforts have allowed cultivation of farmland between two to three times per year, which corresponds to three overlapping crop seasons: winter crops (from November to May), summer crops (from March to September) and "nili" crops (whose July to October season corresponds to the ancient Nile high waters calendar).

¹⁹ The main winter crops are: wheat, broad beans, lentils, chickpeas, beet, alfalfa, onion and garlic.

²⁰ The main summer crops are: cotton, rice, corn, potato, groundnut, vegetables.

²¹ The main "nili" crops are: nili corn, nili rice, potato, onion and vegetables.

²² The areas dedicated to permanent crops are given in ratio to the grown area and not to the harvested area.

The crop system in the old lands is focused on such crops as cotton, corn, sugar cane, and alfalfa (main fodder crop). The share of permanent crops (which include sugar cane and fruit trees) is more significant in the new lands; besides, if one were to consider the fact that sugar cane is almost exclusively grown in the old lands, this would mean that the fruit crop area is even smaller in the old lands.

In 2003, the total fruit crop area was of 1 118 911 feddans (that is, 470 130 ha). Some 54 % of this area are in the old lands and 46 % in the new lands, while the latter represent only 25 % of total farmland space (agricultural statistics of the Ministry of Agriculture, 2004).

The agriculture of the small producers of the Valley and the Delta constitutes the major part of the production structures in terms of area and population (85 % of the grown and harvested areas, 94 % of the farms). It underwent a change under the effect of the land reforms and the intensification policies over the period of the 1950s-1970s, and continues to provide most of the production intended for the domestic market. On the other hand, it hardly benefits, if at all, from the spin-offs of the economic opening onto, and integration in, the international market, and this, due to its very little contribution to exports which amounts, according to best estimates, to barely 10% of the total agricultural exports.

This agriculture is likely to be increasingly marginalised. For the time frame 2025, the prospective analysis which sustains the current trends gives the following prospects (ELLAITHY, H., 2007):

- A population of 95 million inhabitants,
- More than 80% of the farms will have an area less than 1 ha,
- Demographic growth will increase the pressure on the land and increase demand on housing, which will make land use more profitable for construction than for agricultural production. The abandonment of the farming activity by 10% of the farmers will induce a high increase in unemployment,
- A strong increase in food needs and difficulties to meet them.

The evolutions of endogenous conditions (demographic growth, urbanization, fragmentation, etc ...), as well as of exogenous conditions (globalisation, international competition, etc ...) are not congenial for this small-scale family farming of the old lands which increasingly has to grapple with serious difficulties and economic and environmental emergencies.

The avian flu crisis of 2006 revealed the weak spots of this agriculture vis-à-vis the management of a major health hazard. The characteristics of the prevailing breeding pattern, namely a very small-scale domestic animal breeding that is quite scattered and strongly integrated in the domestic activities of the population, have made it extremely difficult to combat avian flu and to quarantine the contaminated sites and breeds. Moreover, the organization of the entire sector (mode of commercialisation, slaughtering, sale to consumers, etc ...) contributed to exacerbating the difficulties, hence the heavy toll in human lives and financial means, as well as the heavy economic losses caused by the massive destruction of breeds which could not be avoided for failure to better target the intervention sites and to impose quarantine or other protection measures.

The family character of the production structures is confirmed by **the data on agricultural employment**. In 2004, family hands accounted for 68.08% of the agricultural labour force, as against 31.92% for paid work (*Egyptian Review of Agricultural Economics*, 2006). The evolution of the data indicates a total rise by 19% of agricultural work, with an annual average growth by 2.19 %, and an upturn in paid work after a slack period in the 1990s.

Table 11- Evolution of family and paid agricultural work (in thousands)

Year	Paid work		Family work		Total
	Number	% of total	Number	% of total	
1988	1171	26.31	3280	73.69	4451
1990	1220	24.58	3744	75.42	4964
2000	1604	31.85	3432	68.15	5036
2004	1691	31.92	3606	68.08	5297

Source : Egyptian Review of Agricultural Economics, June 2006

Farm-holder work (self-employment) represents approximately a half of the employment in agriculture; indeed, non paid work accounts for 34% of employment (ELLAITHY, H., 2007, p. 105). Paradoxically enough, paid work is the most significant class when it comes to non agricultural work, as it accounts for 78% of non agricultural activities, while self-employment in non agricultural activities accounts for only 19%. This low rate of self-employment in the non-agricultural sector attests to the little extent of establishment of small enterprises in rural environment.

The analysis of the data for 2005 on employment in rural environment (ELLAITHY, 2007, p.107) reveals the following points:

- 83% of rural women work in the agricultural sector, as against 43% of men,
- Unpaid agricultural work involves rural women (with 41% of female work) more than men (with 10.6 %),
- Paid non agricultural work involves men (with 40.25 %) more than women (with 7.38 %),
- 80 % of illiterate workers in agriculture, all groups considered, are as follows: self-employed (55 %), paid agricultural worker (12 %), unpaid worker (33 %),
- Seasonal agricultural workers account for 50 % of all paid agricultural work and only 11% of paid non agricultural work,
- 12 % of the workers having a university level are in the agricultural sector,
- 92 % of non agricultural work, including small developers, have a primary and secondary education level.

Agricultural work offers occupation for a large majority of illiterate people, half of paid agricultural work is seasonal work, and a third of agricultural work is unpaid. Rural women work in agriculture without remuneration and have very few opportunities to access paid non agricultural work given their low level of schooling.

Under these conditions, it may be concluded that the agricultural sector has significant—though little skilled and little productive—human resources. Knowing that well trained and skilled human resources are a prerequisite for the emergence, dissemination and adoption of innovations, it is obvious that the current state of the agricultural labour force is a true impediment to the evolution of agriculture.

Access to formal credit is another major constraint. The Development and Agricultural Credit Bank is the key player in this field. However, access to credit is conditioned by farmland property; in other words, farmers who own no land are excluded. Ownership of farmland is also a condition for the purchase of inputs on credit from agricultural cooperatives. Small farmers are thus forced to enter into agreements with the large farm owners, so that the latter would buy inputs on their behalf against half of the value. On the whole, informal credit prevails in rural environment, particularly among small farmers and landless farmers.

Established pursuant to the land reform, as an instrument of State control and management of agriculture, agricultural co-operatives cover the whole national territory, with 6000 co-operatives and 4.2 million members. In spite of the evolution of their function, which is today limited to the commercialisation of inputs together with some extension services, they are still considered by the farmers as State agencies

Egyptian agriculture suffers from a **deficit of active professional organizations** that are really representative of all agricultural producers. The existing professional organizations are rather associations established over the past few years by the large exporting producers, or as required by donors within the framework of development projects.

The experience of **Water User Associations** is probably the most advanced. Being a component of a national policy of improvement of irrigation water management, a policy implemented since the mid-1990s in the Egypt Water Use and Management Project, these associations have functions, rights and duties defined by the Ministerial Decree of 1995 (EWA, 2007)

The overarching objective of this programme is to enhance the effectiveness of water management and to optimise the use of water resources. The participatory approach is deemed to be the approach most suitable for this objective, consisting in involving the players directly concerned with water use, i.e. the farmers.

Water User Associations enjoy financial, technical and managerial autonomy. They undertake water distribution, as well as the construction works, rehabilitation and maintenance of the local irrigation network.

Evaluation of these associations is based on regional analyses. The overall assessment is quite mixed, with cases of success and of failure, according to local conditions and history.

The future of Egyptian agriculture is uncertain and is subjected to several constraints, the main being water constraint. Accordingly, studies of **the impact of global warming** on Egyptian agriculture have focused, above all, on the impacts of this warming on water. In this respect, it seems that the level of uncertainty is fairly high with regard to the impact of global warming on rainfall which provides recharge to the Nile sources (AGRAWALA et al., 2004). On the other hand, it is almost certain that the level of evapotranspiration will increase, which will have adverse impacts on river Nile water flow and on the total volume of water available. The geographical configuration of the basin and the Nile sources, with large open expanses such as Lake Victoria and of long watercourses crossing semi-arid or arid zones, makes the Nile basin quite sensitive to evapotranspiration. **A scenario** “without change in current rainfall, but with a rise in temperatures” entails an increase in evapotranspiration, which will result in a reduction in water flow and in the total quantity available, without forgetting the significant losses on the level of the Aswan Dam and Lake Nasser.

The farming system is likely to be disrupted by global warming. Currently, wheat, corn, rice and broad beans are the main crops claiming on average 80% of the cultivated areas. With a rise in temperatures, wheat and corn crops, as well as certain winter season vegetables, will be jeopardised by a fall in yields, while cotton will report an increase in yields by 29%.²³ The water

²³ The study cited uses several simulation models (General Circulation Models and CROPWAT) to analyse the relation between the following variables: rate of evapotranspiration, yield, water supply. According to the authors, the water deficit and the stress ensuing from it with regard to plants have a direct impact on evapotranspiration and the yield in the event of stability of the water supply. The application of these simulation tools on wheat, cotton and corn has revealed that the rise in temperatures will increase evapotranspiration to varying degrees (according to the crop and the production zone, as well as according to the irrigation intervals) and that it will cause a reduction in the yields of the corn and wheat

needs of several crops will increase significantly because of evapotranspiration; this increase is estimated for rice, for instance, as at least 16% (EID, ELMARSAFAWY, OUDA, 2007). The most spectacular impact of global warming is, of course, the risk of flooding of part of the Nile Delta by Mediterranean water, thus wiping out farmland stretches that are so precious in Egypt, and causing a forced displacement of over-populated cities and villages.

On international level, Egypt participates in initiatives on global warming and has signed several conventions, including the Kyoto Protocol. On national level, there are several relevant institutions, of which an inter-ministerial committee to monitor this question, a committee for integrated management of coastal areas, a capacity building programme, as well as several studies on the vulnerability of coasts. In spite of this institutional set-up, actions and measures are experiencing an implementation lag. In view of several social and economic emergencies, the issue of global warming is not yet a priority in public policies. (AGRAWALA et al., 2004)

4.2. The quality issue

As already mentioned, Egypt is blessed with favourable natural conditions (a hot and sunny climate, together with water available throughout the year) for a diversified agricultural production, with Mediterranean and tropical products, of which in particular fruits and vegetables.

Certain products are known for their tasty quality, such as Egyptian rice (a local variety that is highly prized by the population) or mango, for instance.

The quality of agricultural products is an issue that has recently emerged in the national policies, following the disqualification of certain agricultural products intended for export to the European market for failure to comply with health standards and other standards required. Besides, demand by rich urban classes on quality products is taking shape, with quality being connected with bio-products.

The relative weight of organic farming is still marginal, with a total area of 15 483 ha (36 851 feddans) that is, 0.43% of the country's total farmland space. Two thirds of the areas operated in organic farming pattern are located in the new lands.

The dynamics of labelling agricultural products is nascent; indeed, only one product currently bears a guaranteed indication of origin: it is the date of SIWA (oasis in the western desert). On the whole, it seems that the current system in place assimilates quality of the products with health safety exclusively.

Egypt has an institutional and legal framework in matter of norms and standards, with—as a main organization--the "Egyptian Organization for Standardisation and Quality Control" entrusted, in cooperation with other ministries and the Atomic Energy Agency, with the development of national standards and quality control, as well as with the promulgation of a set of ministerial decrees.

grown in southern Egypt. On the other hand, as regards cotton, changes in certain crop patterns (density of plantations, etc . . .), combined with a rise in temperatures, could increase the yields.

With regard to the agricultural sector, this organization operates in cooperation with several administrations of which the Organization for Import and Export and the Ministries of Health, of Agriculture and of Trade. The system set up for quality control, the design of standards and certification is deemed to be complex, costly and lacking in transparency (KHEIRELDIN, 1999). According to the General Organization for Import and Export, out of 130 certified products, 26 only are foodstuffs and agricultural products.

On the whole, the quality issue cannot be considered independently of the state of agricultural production structures. The very small size of the farms, the fragmentation, the level of schooling of agricultural workers, economic and social precariousness, are not conducive to a quality dynamics.

5. RURAL GOVERNANCE

The two main components of rural governance are local government and the institutions of civil society, i.e. the forms of stakeholder organization.

The organization of local government in Egypt is pyramidal, thus being in line with the scheme of territorial sectioning of the country, with the village (or the local village unit consisting of a core village and satellite villages) at the base, then the district, then the Governorate. To each territorial level, there corresponds a "council of the people"; however, **the governors and the other key positions**, including the mayors, **are appointed by the central authority**.

The powers of these councils are limited; their role is reduced to advice and proposal. On budgetary level, the system is centralized; local budgets prepared according to the model of the general budget constitute an integral part of the State budget and are subjected to Parliament approval. The budgets of the local territorial units (village and district) are integrated in the budget of the Governorate.

The councils of the people (equivalent to municipal councils) have no authority to levy taxes, nor to generate local financing resources, nor, again, to change the budget allocations. On the other hand, they decide on allocation of extra budget resources, that is the resources allotted by the various development funds and programmes, though subject to Governor approval (FOX, GHANIM, 2000).

As in many countries of the South, decentralization is stated as a public policy orientation. However, the current situation shows that the process is slow, that the case is one of a soft form of devolution more than of decentralization.

The role of civil society in rural environment seems to be less active than the data would lead one to assume. According to the statistics of the Ministry of Social Affairs and Solidarity, in 2004/05, there were twice more associations in rural areas than in urban areas (1437, as against 701). No doubt, some of these associations are really active, but the extent of the movement is appreciated differently according to the analyses, and this, in view of the fact that many of these associations are of a religious character, while others have an objective of attracting international funds.

Certain analyses point out the difficulty for NGOs to conduct action—given the control and the constraints imposed by the public authorities—and state that "most Egyptian NGOs are not

meeting the needs of their communities due to lack of autonomy, institutional capacity and resources. Overall, few NGOs in Egypt are effectively engaged in making contributions to Egypt's development" (BUSH, 2003). Rural women are the most marginalized group, experiencing the lowest schooling level, the most precarious professional status and the absence of "capacity" in the sense of SEN.

The recent history of the Egyptian rural environment is punctuated with moments of revolt, as in the 1990s following the reform of the law on tenant farming, or during the summer 2007 owing to a shortage of water. But the organization of the action of the rural players is still weak, hampered by State control and a training deficit.

IV. PART III: MSSD IMPLEMENTATION

An assessment in terms of sustainability or of non sustainability of agriculture, and of the rural environment in Egypt, can but translate the complexity of the current situation and the uncertainty looming on the future.

Let us suggest, first of all, a brief overview of the factors of **non sustainability in Egypt's rural environment and agriculture**:

- Environmental factors:
 - Increasing pressure on natural resources (soil and water)
 - Water pollution by chemical products and organic matter
 - Poor quality of consumed water
 - Water shortage risks owing to increasing demand coupled with global warming impacts
 - Deficit of solid wastes treatment and recycling.
- Socio-economic factors:
 - The fragmentation of land property and the small size of the overwhelming majority of farms represent a real impediment to modernisation efforts
 - Poverty of about a quarter of the rural population
 - Precariousness of agricultural jobs and poor working conditions (non recognised status, unpaid work ...)
 - Very low schooling level of the rural women engaged in agricultural work, often without remuneration, and deprived of any possibility of employment in other sectors
 - Deficit of truly representative professional organisations, as well as of collective training of the players to conduct action
 - Concentration of public and private investments on the new lands, and very low attractiveness of rural areas.

As for the **sustainability factors**, the following are worth mentioning:

- Policy of protection of natural spaces
- Legal and institutional framework on national level, commitment on international level via the signing of conventions
- Reclamation of desert land in order to ease the pressure on the Valley and the delta
- Water management policy (several projects, Water User Associations ...)

In view of the above, it is obvious that non sustainability factors are more numerous.

In spite of certain awareness, it is the extent of the needs that sets the priority order of public policies; the chief concern of decision-makers is to manage emergencies. The objective of maximization of an exploitation of production factors, an objective affirmed by the public authorities, translates a concern to address this constant pressure generated by the mismatch between population, space and resources.

Without minimizing the water issue, an issue that is vital for Egypt, it seems to us that the **non sustainability of the current situation depends above all on the economic and social factors.**

The structures of agricultural production of the Valley and the Delta (75 to 80% of the farmland area and 94% of the farms) do not meet the requirements for economic and social sustainability. The rural environment, being underprivileged in terms of basic infrastructures and access to services, offers poor living conditions to the populations (problems of drinking water, sanitation, roads, services ...) and does not attract other economic activities. The very small farm size and the fragmented land property preclude modernisation and the installation of a more water saving irrigation system. The agricultural labour force, both of a family character and paid labour, is mainly illiterate or consists of low schooling persons; agricultural work is non professional (very low remuneration or none at all, precariousness ...). The rural players are not, or are very little, organized; rural women are particularly affected by poverty and exclusion; and the level of "capacity" of the populations, in the sense of SEN, is very low. Under such circumstances, how can this agriculture be sustainable? The populations of the old lands do not as yet forsake agriculture, failing other alternatives, but for how long?

One may assume that liberalisation will generate spin-offs for agriculture in the new lands, where public investments, private capital and viable production structures are found, but—knowing that this agriculture occupies 20 to 25 % of the farmland area and 6 % of the farms—one is entitled to wonder about the sustainability of this situation of imbalance and duality.

Over decades, the public policies have disadvantaged these rural areas, in particular those of Upper Egypt, under the effect of structural adjustment policies, on the one hand and, on the other hand, by granting priority order to land use planning and reclamation projects. However, a sustainable development strategy cannot be based on selective policies which favour certain areas at the expense of the largest part of the national territory.

Social and economic sustainability is the main condition for environmental sustainability. Man is the ultimate objective of development and, today, we know that man is its main tool, too. All analyses, even those of a neo-liberal inspiration of the dynamics of growth in emerging countries, underline the impact and the need for efforts in matter of human development (health, training). Sustainable development must not be reduced to production techniques and consumption practices that preserve the environment, insofar as environment conservation is intrinsically connected with poverty reduction. In the Egyptian case, the improvement of the economic and social conditions of the populations and rural areas in the Delta and the Valley is more than ever the key to improving the current situation and taking steps towards a real sustainable development. This can in no case be achieved without strong public policies in the field of infrastructures and services, in particular health and education, as well as policies of institutional reform and coaching of the players via training in collective action.

V. CONCLUSION

The specific conditions of Egypt induce a situation of strong tension between the requirement of meeting the needs of an increasing population and that of management of limited soil and water resources. Over more than three decades now, and after the efforts of intensification of agricultural production, the absolute priority of public policies has been to broaden the productive base via extension of farmland space in the new reclaimed lands. The large-scale hydro-agricultural development projects have, thus, mobilised the greatest part of public and private investments, with a view to obtaining a comprehensively more modern agriculture (with less fragmented production structures, larger farms than in the old lands and more water saving irrigation methods), as well as increasing the agricultural area by about 25%.

Alongside with this evolution, the rural areas of the Valley and the Delta experienced a process of more or less strong marginalisation according to the areas. Farms experience a very high fragmentation (81% of less than 1 ha); poverty affects about ¼ of the rural population. Illiteracy, precariousness and absence of a legal and institutional framework are the overriding features of the socio-economic situation of the agricultural labour force and, more particularly, women. Rural areas have less infrastructures and less access to basic services (health, education, communication). Pollution and poor quality of water; lack of sanitation, waste collection and recycling; and ensuing un-healthiness are the main environmental challenges.

Without denying the strategic importance for Egypt of the reclamation of the new lands, it is necessary to reiterate the need for improving the living conditions in the Valley and the Delta based on policies aiming to:

- Improve the attractiveness of the rural areas (roads, railway network, services), so as to especially induce the establishment of non agricultural activities in response to unemployment particularly among young people,
- Improve the socio-economic situation of the agricultural working population (family and paid labour) based on education and training, and the establishment of a professional status,
- Improve environmental quality based on waste collection and recycling, as well as access to sanitation,
- Boost the capacity of the various local government levels to take initiatives, with further devolution of powers to and training of the players to assume their new functions.

In view of these aspects, certain **additional sustainability indicators** are worth putting forward:

- Water quality
- Existence of a waste collection system
- Existence of recycling plants
- Professional status for agricultural working population
- Training of agricultural working population²⁴ (training projects and courses).

²⁴ This point is all the more important, to our mind, given the handling of industrial inputs (in particular pesticides) by persons that have no information about health hazards and the precautions to be taken.