

Chapter 14

Socioeconomic features

Experience during recent decades asserted that efforts carried out to preserve natural protected areas could culminate with success when taking the human element into consideration, as well as attracting inhabitants of protected areas to effectively participate in plans undertaken for development and conservation of the natural environment of such areas. This needs to be based on raising awareness of inhabitants there, and linking their direct everyday life interests and preserving the natural elements available in the protected areas; and requires the studying of the prevailing economic and social characteristics in protected areas. In this regard, Shaker *et al.* (2000) conducted a study at Burullus Wetland, aiming at identifying the prevailing economic, social and institutional characteristics in villages and different districts of Burullus Wetland, to introduce diagnostic analysis for human-environment interface and to identify the core problems faced by inhabitants to be taken into consideration in development of area planning.

14.1. DEMOGRAPHIC ESTIMATION

Lake Burullus is located in Kafr El Sheikh Governorate, one of the largest Governorates in Nile Delta. This Governorate is located along 100 km of the Mediterranean coast in north Egypt. It borders to the west with 85 km of the Rosetta western Nile Delta arm, to the south with Gharbia Governorate and to the east with Dakahlia Governorate. Kafr El Sheikh is mainly an agricultural Governorate with a total population of 2319063 person (census of 1999): 1053173 females and 1265890 males (Table 14.1). The majority of the population (77.1 %) lives in the rural areas, which reflects the agricultural nature of the Governorate. It covers a total area of 3748 km² (892204 Feddan). The agricultural cultivated area forms 62.1% (554237 Feddan) of the total area of the

Governorate (Table 14.2). This Governorate is also leading in average production yields in comparison with the average total of Egypt. It produces rice, wheat, cotton, maize, sugar beet and potatoes. The Delta sugar beet factory in El-Hamoul is the biggest that extracts sugar from sugar beet.

Table 14.1. Human population and gender in urban and rural areas in Kafr El-Sheikh Governorate (Anonymous 1999).

Population	Male		Female		Total		Growth rate (%)
	Actual	%	Actual	%	Actual	%	
Urban	366271	50.1	164994	49.9	531265	22.9	1.8
Rural	899619	50.3	88179	49.7	1787798	77.1	3.1
Total	1265890	50.2	1053173	49.8	2319063	100	2.1

Table 14.2. Total area and population density (person km⁻²) in Kafr El-Sheikh Governorate (Anonymous 1999).

Area	km ²	Feddan	Percentage (%)	Density (person km ⁻²)
Urban	1419.7	337966.9	37.9	374.2
Rural	2328.3	554237.0	62.1	767.6
Total area	3748	892203.9	100	618.7

The human to agricultural land ratio in the Governorate is 0.24 Feddan per person, which is higher than the Egypt's average of only 0.11. This means that there are, in average, four persons per Feddan in comparison with the Egyptian average of ten persons per Feddan. This Governorate is also known for its animal husbandry projects and fish production especially from Lake Burullus. The Governorate has ten Districts with ten cities, 205 villages and 1695 single farmsteads, which reflects the rural nature of the Governorate.

The total unemployment figures in the Governorate (67200 person) equals 9.6% of the total workforce (Table 14.3). The unemployment rate of 12.0% of the workforce in the rural areas is higher than the urban areas of only 5.5%. There is a good opportunity to absorb these unemployed persons in rural areas, because of the agricultural nature of the Governorate. The cultivated area now forms 62.1 % of the total area. There is still 49200 Feddan of reclaimable land in the Governorate that can absorb the unemployed people in the rural sector.

Table 14.3. Employment conditions in Kafr El-Sheikh Governorate (Anonymous 1999).

Population	Employed person	Unemployed person	Total workforce	Unemployment rate (%)
Urban	249000	14600	263600	5.5
Rural	386000	52600	438600	12.0
Total	635000	67200	702200	9.6

A ministerial Decree Nr. 1770 in 1997 planned the creation of two industrial areas, the first covers 114 Feddans in Baltim, and the second covers 1160 Feddan along the international coastal road in Metobes.

14.2. SOCIAL CHARACTERISTICS

14.2.1. Ethnologic Morphology

14.2.1.1. Communities and Villages around Lake Burullus

Lake Burullus is located within five districts of Kafr El Sheikh Governorate. These Districts, from the east to the west, are Baltim, El-Hamoul, El-Riad, Sidi Salem and Metobes (Fig. 14.1). The main activities of the population in and around the lake are fishing, reed cutting, grazing and agriculture. The total population number in the five districts is 965220 persons which approximates 41.6 % of total population of Kafr El-Sheikh Governorate (Table 14.4).

14.2.1.2. Communities within the Burullus Protected Area

The Baltim district has the biggest population concentration especially in Baltim city which has the highest population density of 707 person km⁻² (Table 14.4); it is even higher than the Governorate average of 618 person km⁻². The biggest population concentration in Baltim District is in Baltim City and Burg El-Burullus Village (50.8%) which are close to the lake. Although the cultivated area in the five districts form 52.8% (554237 Feddan) of the total cultivated area of the Governorate, and has 42.6% of the all tenants, still the majority are fishermen in most the villages and cities surrounding the lake. Average land tenure in the five districts is about three Feddan per tenant (Table 14.5), which could mean that the agricultural activities are the principal economic activity, but in fact fishing activity is also dominant.

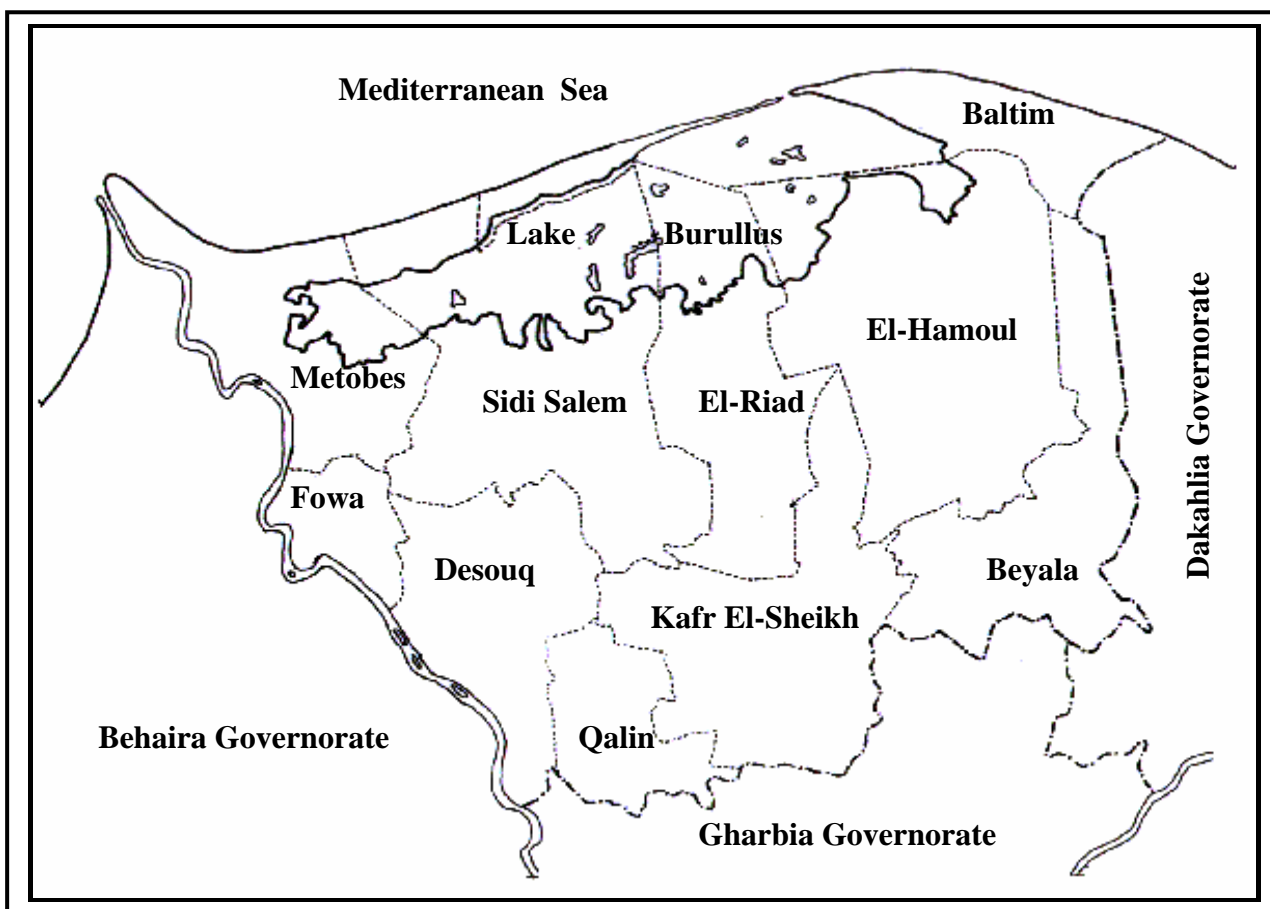


Fig. 14.1. Map showing the five districts surrounding Lake Burullus.

Table 14.4. Population distribution in the five districts around Lake Burullus (Anonymous 1999).

District	Population Count		Density (person km ⁻²)	Growth rate (%)
	Actual	%		
Metobes	195040	20.2	597	2.4
El-Hamoul	206580	21.4	254	2.1
Baltim	145270	15.1	707	2.4
El-Riad	126820	13.1	334	2.5
Sidi Salem	291510	30.2	427	2.3
Total	965220	100	--	--

Table 14.5. Agricultural area in the five districts surrounding Lake Burullus (Anonymous 2000).

District	Number of agricultural tenants	Total cultivated area (Feddan)	Land tenure (Feddan tenant ⁻¹)
Metobes	14927	40759	2.7
El-Hamoul	18570	91129	4.9
Baltim	6727	29061	4.3
El-Riad	17750	46276	2.6
Sidi-Salem	35720	58194	1.6
Total	93694	292419	3.1

14.2.2. Social Organization

The existence of the social organizations depends mainly on the conscious and educational status of the population as well as the number of problems facing the population in their main economic activity providing their income. Therefore the most important organization is the fishermen's cooperative, then agricultural cooperative and the community development organization.

One of the important indications was that 47 % of the selected sample of Burullus population were illiterate, 42% could read and write and 8% had at least a high school level (vocational school). None of the respondents had higher education. The illiteracy rate of the respondents family members was less than that of their parents, 31% of them had four years of school education, 28% had up to six years of school education, and 20% had twelve years of school education, 5% had no school education at all and the rest (16%) could read and write. Note the relatively old age of the respondents (52% over 55 years old, 43% were from 36 – 55 years old and 5% were from 25 - 35 years old).

The average family size is six to eight members (51%), and 17% have a family of nine person. The interaction of the family size and the affinity of family members towards education is significant, education improves awareness which could promote the environmental consciousness.

From the field study, it has been noticed that fishing, livestock, bird catching, cultivation in addition to cutting and marketing of reeds are the main common activities in Burullus Wetland. In applying some economic indicators, the following results could be concluded: the questionnaire revealed that 79% of the respondents were members in fishermen cooperatives and 21% were not-members. The cooperative members stated that fishermen cooperative renders some services to them such as: 1- rendering fishing requirements on credit, 2- issuing licenses for fishermen and boats, 3- solving problems of fishermen with the local authorities, and 4- collecting fees from fishermen.

14.2.3. Social Services

The social services institutions inside the protected area are very limited around the lake and concentrated mainly in Baltim District. The local infrastructure cannot provide sufficient support for the overpopulated region. In Burullus villages there are some social services such as: 1- health service unit, 2- ambulance unit, 3- police station, 4- agricultural cooperative, 5- village bank, 6- primary and preparatory schools, 7- youth centre, 8- veterinary service unit, and 9- post office. There are also drinking water and electricity. There is no hygiene canalisation system, as they use the traditional system (under ground container that is emptied periodically). There is 366 km of paved roads in the surveyed villages. There is also an international coastal road along the northern coast of the lake and the Mediterranean coast. The public transport facilities include 44 taxis (microbuses), and around 55 horse carts. There is no railway connection, but only a bus-line connection between Baltim and Kafr El-Shiekh.

14.2.4. Social Categories

Fishing is considered the main activity in the Burullus Protected Area. Most of the population consists of fishermen, farmers, fish merchants and fish brokers. Asking the fishermen who have sons practicing fishing, revealed that about 54.2 % of them have one son, 37.3 % have two sons and 8 % have three and more sons working in fishing. These results indicated that sons of some fishermen gave up fishing, the matter that may be attributed to their tendency to education and working in governmental occupations probably due to the relatively low fishing income in Lake Burullus.

14.2.5. Values and Needs Expressed by the Inhabitants

Considering that fishing is the common activity of the Burullus population, identification of problems and urgent solutions should be considered to fulfill the requirements of biodiversity conservation and protection measures. In asking the respondents about problems facing them, these can be descendently ordered as follows (after Shaker *et al.* 2000):

- 1- The profession risk, for instance illness and early old age, where they practice fishing under hard climatic conditions (85%).
- 2- Neglect of the sea inlet (Boughaz) and the Brimball Canal led to the reed growth in the lake and consequently the decrease of its productivity (83%)
- 3- The relatively low and limited daily income of fishing (80%).

- 4- Pollution of lake water due to the sewage and agricultural drainage (78%).
- 5- Low productivity of fish can be attributed to the illegal harvesting of fish fry and selling it to the fish farm owners at high price (68%).
- 6- Overcharging the taxes that are randomly estimated, and not based on real data about the fish production (67%).
- 7- Limited effectiveness of the water-surface police in enforcing laae (59%).
- 8- Spread of reeds, rats and mosquitoes (47%).
- 9- Absence of disablement pension and health insurance for fishermen (43%).
- 10- The monopolistic power of merchants under the existing marketing channels with the absence of the cooperative role in marketing fish (41%).
- 11- The retirement pension (LE 75) is too low to satisfy basic needs (35%).
- 12- Absence of a governmental authority, which seeks to solve their problems (31%).
- 13- Inability of fishermen cooperatives to perform their responsibilities, this weakens the solidarity among members and their cooperatives (21%).

No doubt that the existing role of cooperatives is confined to supply members with some fishing requirements and to renew licenses. Moreover, some members stated that prices of these requirements are high. Finally the fishermen expressed their inability to practice any other profession. By asking the fishermen about the likely means to solve the problems they mentioned the following proposals:

- 1- Cleaning the sea inlet (Boughaz) and opening Brimbil Canal to enhance the flow of seawater and to increase the fish production of the lake (33%).
- 2- Expanding the health insurance umbrella to cover fishermen (78%).
- 3- Stopping sewage and agricultural drainage into the lake, where pollution of lake water adversely affected the fish productivity and human health (65%).
- 4- Banning illegal harvesting of fish fry from the sea inlet to increase fish production of the lake and consequently increase the fishermen income (61%).
- 5- Partial removing of reeds and other water plants hindering fishing in the lake (57%).
- 6- Reconsidering the taxation system that should be based on the actual fish production, under the existing low production, taxes seem to be in too high (54%).
- 7- Necessity of insurance services on fishermen against the profession risks (47%).

- 8- Supplying fishermen with loans specially in emergencies and crisis (43%).
- 9- The role of water-surface police should be concentrated on banning illegal fishing with reference to fishing spawn and fishing gears (39%).
- 10- Reducing retirement age of fishermen to 60 year instead of 65 year (35%), and raising the retirement pension (29%).
- 11- Establishment of a police center at the opening of the sea inlet under the bridge of the international coastal road to stop fry stealing (31%).
- 12- Improving the role of fishermen cooperatives through supporting their financial status (27%), cooperatives should help their members in marketing their production.
- 13- Raising the wages of fishermen employed on boats.
- 14- Banning fishing in the lake for at least two month every year to foster the growth and reproduction of fish.
- 15- Creating alternative livelihoods for fishermen especially during the period of banning fishing.
- 16- Opening a new sea inlet at the west of the old inlet (10 km), to feed the lake with seawater.

14.3. ACTIVITIES AND IMPACTS

14.3.1. Land Use in the Catchment Area

Land use in the catchment area has notable influence on the natural status and the water quality of Lake Burullus. The drainage canals carry diverse wastes, pesticides, and fertilizers into the lake. These inflows are not filtered before entering the lake and therefore contaminate the lake. Furthermore the catchment area stretches far beyond the borders of Egypt.

14.3.2. Land Uses in the Study Area

14.3.2.1. Tourist activity

Kafr El-Sheikh Governorate has six historical sites such as the prehistoric City of Butu, known now as Tal Elpharaeen, and also some Islamic sites still to be excavated from beneath the sand dunes, beside the recreation sea resorts. In addition, 25000 Feddan on the northern Sandbar are proposed for tourism development. Nevertheless the Governorate has little touristic potentiality. Although the statistics about hotels, tourist resorts and rooms are contradictory. Even with some recreation areas as Baltim and Lake Burullus, there are a total of 164 hotel rooms in the Governorate. This number differs from one source to another and does not reflect the real touristic potentiality of the Governorate.

14.3.2.2. Agricultural activity

There are apparently little agricultural activities in a zone of 1 to 2 km south of the southern shore of the lake. The demarcation between farming and bare land (salt marshes) seems clear. In the southeast, there is a distance between the lakeshore and agricultural activities, although some scattered farms exist. In the last decade there had been development of fish farms especially along this shore, and today the main activities consist of the construction of many ponds for various fish types.

The area near Baltim is intensively cultivated, mainly with date palms. There is a tendency to create further fish farms because their economic output per Feddan is much higher than any agricultural productivity. It should be noted that a combination of the two products could raise the total economic output.

Because of new reclamation efforts in the wasteland, the Government decided to establish El-Zawia fish farm in 1980's. Since then, this fish farm is quite successful except for the fact that it has been operating at half of its capacity. The shortage of clean water in the mid Delta does not only affects El-Zawia fish farm, but also affects many of the private fish farms in the area as well as the agricultural farms.

Landsat satellite passed over Lake Burullus in 1973 and 1979 have provided images, which show the extent of natural plant cover in the lake region. No agricultural activity is apparent for some 4-5 km south of the southern shores, and the demarcation between farming and bare land in the southwest is very clear. In the southeast, there was greater distance between the lakeshore and agricultural activity, although some scattered farms exist. The area near Baltim was intensively, cultivated mainly in date palms.

The experience of El-Hamoul Scheme (a large government reclamation project in the southern and eastern regions of Burullus initiated in 1956) showed that some problems were faced by development and reclamation projects. By 1960, El-Hamoul Scheme had had reclaimed about 2500 Feddan in Helmea zone, situated between Bahr Tira and Gharbia drains. By mid 1972, a total of 70100 Feddan had been reclaimed, of which 30800 were farmed as a state farm, while 31700 Feddan were distributed to 7518 families, giving an average holding size of 4.2 Feddan per family. By 1979, 23 years after the project was begun, some 70000 Feddan had been distributed to 13412 settlers, some 8900 Feddan, had been sold at auction, and 48500 Feddan had been leased to the Delta Sugar Company at El-Hamoul.

According to El-Hamoul Scheme management, only about 50% of the distributed land had achieved marginality in 1979. One survey in the summer of 1977 in Hafr Shehab, part of the reclaimed area east of Burullus, found that settlers farmed a total of 41000 Feddan, of which only 68% was under crops.

Furthermore, they achieved about 60% of the national average yield of rice and less than 40% of the national average yield of cotton. These are poor yields for lands, which have been in the process of reclamation for 15-20 years.

Economics of agricultural crops are not very profitable. The only profitable crops are guava, berseem and dates. Net return per Feddan and net return per pound of costs have been estimated for the main crops (after Shaker *et al.* 2000). Based on the criterion of profitability per cost unit, it can be summarized that guava, berseem (alpha alpha) and dates are considered the most valuable and profitable crops in comparison with the other agricultural crop types (Table 14.6).

Table 14.6. Net return of the main crops at the sample level in Burullus Wetland (Shaker *et al.* 2000).

Crop	Sample area (Feddan)	Gross return	Total cost	Net return	Net return per Feddan	Net return per pound of cost
Winter tomatoes	1.5	6200	2500	3700	2467	1.5
Cabbage	4.8	11650	3650	8000	1053	2.2
Cauliflower	2.5	10050	3400	6650	1547	2.0
Beans	1.5	2000	1050	950	633	0.9
Berseem	3.0	3420	650	2770	923	4.3
Wheat	2.0	3550	1375	2175	1088	1.6
Rice	8.0	13300	4400	8900	1113	2.0
Maize	7.0	5900	2500	3400	486	1.4
Summer tomatoes	10.3	45400	13000	32400	3146	2.5
Dates	5.1	8900	1890	7005	1387	3.7
Guava	14.6	59750	9750	50000	3436	5.1

14.3.2.3. Fisheries

With about 31% of the area of Delta lakes, Lake Burullus produced only about 21% of the landed fish tonnage in all the Delta lakes during 1970-77 period. In 1977, Burullus produced almost 6600 ton of fish valued at about LE 3.4 million. Approximately 8500 licensed fishermen in 1977 produced an average of 772 kg each, with an average value per fisherman of about LE 398. During the period 1970-77, the average net income per fisherman was LE 368, almost twice that of Edku, but only 31% of that of Maryut and 29% of that in Manzala.

Lake Burullus had the most productive mullet fishery of the Delta lakes due to the wide lake-sea connection, which allows high recruitment of mullet fry from the sea each year. The mullet grows to be many times the size of tilapia

and are valued at several times the price of the common species. The warm, shallow waters and large amounts of organic materials available for food form ideal grounds for mullet fry to develop, particularly in the calm area, near the shores and around the islands. But due to the fact that the water of the lake is becoming increasingly fresh water, the amount of the mullet has decreased in the last decades. Throughout the 1960's and 1970's the production of mullets of Lake Burullus was higher than the other lakes.

In 1977, there were approximately 8500 licensed fishermen working on the lake, 4400 fishermen are registered in El-Burg fishermen cooperative alone. The fishermen stated that there is about double this number of illegal fishermen in the lake and they use the reed as cover from the Water Surface Police. Today there are around 3500 licensed boats on Burullus, entirely classed as third class boats. The boats on Burullus are larger than those of the other lakes. There are considerable numbers of large "markebs" and many intermediate sizes of "feloukas" as well as large size canoe-like boats. In the shallow areas the fishermen use wire traps for fishing especially in the shallow areas near some islands and along the shoreline, for this method they use various types of fishing nets.

Fishery performance in Lake Burullus is weak due to many factors. The main one is the new hydrological regime caused by the construction of High Aswan Dam, which deprived the lake of the annual flow of flood water and sediments, which were brought by the yearly floods. On the other hand, there has been an increase in the nutrient-rich drainage water flowing into the lake. Assessments of the impact of the new water regime on Lake Burullus concludes that the lake receives nutrient-rich sewage, which changes the water quality and leads to eutrophication (Reid and Rowntree 1982).

14.3.2.3.1. Fish productivity

The gross fish production fluctuated between a minimum limit of about 26600 ton in 1988 and a maximum limit of about 59400 ton in 1996. It decreased since then to 55300 tons in 1999, with a decreasing rate of about 6.9 % than that in 1996 (Table 14.7). See also chapter 9.

14.3.2.3.2. The relative importance of fish production

Fish production of Lake Burullus in 1988 accounted for about 22.3% and 8.7% of the northern lakes and national fish production, respectively. Then it accounted for 47.2 % of northern lakes in 1996, but dropped to 44.6% in 2002 (Table 14.8). Concerning the relative importance, its maximum limit of 17% of the national fish productivity was in 1990, afterwards it dropped again to about 7.4 % in 2002. As an average, Lake Burullus production accounted for 42 % and 12 % of the northern lakes and national fish production, respectively.

Generally it can be concluded that the gross production of Lake Burullus dropped in 2002.

Table 14.7. Fish production and productivity of Lake Burullus during the period 1988-2002 (Anonymous 2002).

Year	Gross production (x 1000 ton)	Area (x 1000 Feddan)	Number of boats	Productivity	
				kg/Fed.	kg/boat
1988	26.6	115.0	6612	231	4023
1989	41.9	114.3	6065	367	6908
1990	57.8	114.3	7125	506	8112
1991	51.8	114.3	7178	453	7216
1992	52.3	114.3	7323	458	7142
1993	48.0	110.0	6452	436	7440
1994	55.1	113.0	7407	488	7439
1995	59.2	116.0	7958	510	7439
1996	59.4	110.0	7971	540	7452
1997	58.7	104.0	7891	564	7439
1998	59.0	103.0	7931	573	7439
1999	55.3	103.0	6924	537	7987
2000	51.7	103.0	9624	501.9	7466
2001	59.2	103.0	8770	574.7	6750
2002	59.7	103.0	8770	579.6	6807

Table 14.8. Lake Burullus fish production (1000 ton), and its relative importance to the national gross production and production of northern lakes (1988-2002).

Year	National gross production	Production of northern lakes	Lake Burullus Production	% of gross national production	% of northern Lakes
	Per 1000 ton				
1988	306.9	119.2	26.6	8.7	22.3
1989	325.1	109.8	41.9	12.9	38.2
1990	339.4	131.5	57.8	17.0	44.0
1991	345.1	123.1	51.8	15.0	42.1
1992	347.5	122.8	52.3	15.1	42.6
1993	358.2	124.2	48.0	13.4	38.7
1994	368.4	127.6	55.1	15.0	43.2
1995	407.1	130.5	59.2	14.5	45.4
1996	431.5	125.9	59.4	13.8	47.2
1997	456.9	137.1	58.7	12.9	42.8
1998	545.6	152.1	59.0	10.8	38.8
1999	648.9	135.1	55.3	8.5	40.9
2000	724.4	141.2	51.7	7.1	36.6
2001	771.5	144.7	59.2	7.6	40.9
2002	801.5	133.8	59.7	7.4	44.6

14.3.2.3.3. Fishing income

By interviewing the fishermen (sample), it was observed that the common fishing gears were samboak, feloukas, and sailboats. The return on investment and net return had been estimated for the three fishing gears (Table 14.9). It is clear that the estimated rate of return on capital amounts to 22 %, 26 % and 30 % for samboak, felouka and sailboat, respectively.

Table 14.9. Return on investment (LE) in fishing gears in Lake Burullus (Shaker *et al.* 2000).

Item	Samboak	Felouka	Sailboat
<u>Capital cost (LE)</u>			
Fishing boat	350	1200	16000
Fishing net	325	900	2100
Total capita cost	675	2100	18100
Fishing period (day)	150	150	300
<u>Operating cost (LE)</u>			
Fishing boat	100	300	3000
Fishing net	150	350	1500
Wages	1500	4000	36750
Miscellaneous	100	250	1000
Total operating cost	1850	4900	42250
<u>Return (LE)</u>			
Total return	4247	7700	50000
Net return for owner	2397	2800	7750
Cost for owner and manager	2250	2250	2250
Net return on capital	147	550	5500
Rate return on capital (%)	22	26	30
Monthly income for owner	342	400	1107

14.3.2.4. Livestock economics

It has been observed from the field study of Shaker *et al.* (2000) that the inhabitants breed buffaloes, cows, sheep and goats. Net return per animal unit and per capita has been estimated (Table 14.10). Buffaloes came at first followed by cows, goats and sheep in a net return of about LE 2250, 1690, 989 and 865, respectively. The average net return per unit of livestock amounts to LE 1710. Therefore the per capita annual net return amounts to LE 421. Based on these results, it may be noted that the per-capita net income of livestock in this area seems to be relatively low. This may be attributed to the limited numbers of heads bred by each family on one hand, and the low productivity of these animal varieties on the other hand.

Table 14. 10. Net return (LE year⁻¹) of livestock at the sample level in Lake Burullus. *: Represents the total animal units based on the head of buffaloes, cows, sheep and goats equals 1.1, 1.0, 0.2 and 0.16 animal unit, respectively (Shaker *et al.* 2000).

Item	Buffalo	Cow	Sheep	Goat	Livestock
Herd size	8	11	17	13	25.3*
Gross return	23900	24600	35580	2695	54775
Total cost	4100	6000	640	680	11420
Net return	19800	18600	2940	2015	43255
Net return per head	2475	1691	173	155	---
Net return per animal unit	2250	1691	865	969	1710
Per family net return	---	---	---	---	2890
Per capita net return	---	---	---	---	421

14.3.2.5. Reed economics

It has been observed that reed plants grow in lake Burullus in an intensive way, the matter that adversely affects fish productivity. Therefore, the inhabitants of this area practice pasturing their animals on reed in the first stages of its growth. When the reeds reach full maturity, they will be cut and sold at a market price of about LE 0.20 – 0.60 per bundle. Reed plants are used for thatching crop protection against wind and for fishing nets and bird catching. Net return of cutting reed activities has been estimated (Table 14.11). It is indicated that per capita net return amounts to LE 118.8 in one season, on average about one Egyptian pound per day. It is apparent that these activities are not economically feasible. But if we take into consideration their importance as animal fodder over the years, reed could be refined as an important product.

Table 14.11. Net return of cutting reeds (*Phragmites australis*) in Lake Burullus. *: Estimated on the following bases: number of observations = 100 family, period of cutting reeds = 120 day year⁻¹ and average family size = 7 person (Shaker *et al.* 2000).

Item	Return (LE season ⁻¹)
Gross return	101190
Total return	18000
Net return	83190
Per family net return	831.9
Per capita net return	118.8*

14.3.2.6. Bird catching economics

Although bird catching is prohibited within the borders of Burullus Protected Area, this activity is considered one of the important sources

especially in autumn. Net return of bird catching of three common species has been estimated (Table 14.12). It can be concluded that net return per bird of quail (semman), LE 1.9, is relatively low in comparison with ghor and hamrawy (LE 9.4). This can be due to that the great number of semman catches during the season. In estimating per capita net return per day; it has been revealed that semman catching proved to be more profitable than other birds. Per capita net return gained from bird catching amounted LE 17.3 per day.

Table 14.12. Net return of bird catching of three common species in lake Burullus. *: Amounted to about 55 days in autumn.

Item	Semman (quail)	Ghor (coot)	Hamrawy (pochard)	Total
Number of birds caught	132110	23045	21175	176330
Gross return*	272195	230450	211750	714395
Total cost LE season⁻¹	20055	13910	12788	46753
Net return	252140	216540	198962	667642
Per bird net return (LE bird⁻¹)	1.9	9.4	9.4	3.8
Per family net return (LE day⁻¹)	45.8	39.4	36.2	121.4
Per capita net return (LE day⁻¹)	6.5	5.6	5.2	17.3

14.4. SUMMARY

Kafr El Sheikh Governorate as a whole has a total population of 2319063 individuals (in 1999). Lake Burullus is located within five districts of the Governorate (from east to west: Baltim, El Hamoul, El Riad, Sidi Salem and Metobes), with a total population of 965220 individuals. Baltim district has the largest population around the Lake, mostly concentrated in Baltim city. The exact population number residing inside the Protected Area and their distribution is not yet known.

Fishing is the leading economic activity in the Protectorate and in Lake Burullus at large. Fish production from the Lake increased over the past two decades from just 7273 tons in 1982 to 59400 ton in 1996. It remains high with 55300 and 51768 ton in 1999 and 2000, respectively. The data on fish production for 2002 is about 59700 ton. The dramatic increase in the catch is the result of more intensive catching effort rather than a result of improved productivity. The catch composition clearly shifted from mainly marine species to fresh water species, particularly tilapia. In 1964 approximately 45% of the catch was tilapia, 25% shrimp and crab, 20% mullet and 10% catfish. This pattern changed in 1991 into nearly 75% tilapia, <10% shrimp and crab, 10% mullet and <10% catfish. In addition, the average size of the fish caught in the

Lake has declined. In 1992, about 65% of the total catch of tilapia was categorized as small, 25% as medium and only 10% as large. Thus, although the total tonnage of fish caught in the Lake has grown over the past three decades, the value of the catch in terms of quality, size and revenue has declined.

The number of fishermen increased from about 9000 in 1963 to about 21600 in 1993. In 2000 there were approximately 28000 fishermen working on the Lake, of whom only 10266 were licensed. The number of licensed boats also increased from 2438 in 1963 to 7277 in 1993 and 9665 in 2000. Of these, only 153 are motor boats and the rest are classified as third class boats of three types: the samboak (the smallest), the felouka (medium-sized) and the sailboat (the largest).

Agriculture is probably the second most important economic activity in Burullus Wetland. There are about 19000 Feddan under cultivation within the limits of the Protectorate. Agricultural activity in land close to the Lake shores is rather limited because of poor soil and high soil salinity. However, land reclamation efforts continue to be made on the western side of the inlet (Boughaz) where the soil is predominantly sandy. Agriculture in this area is mostly rain-fed. On the eastern side of the inlet, the area near Baltim is intensively cultivated (irrigated), mainly with date palms and guava. Other crops include tomatoes, grapes, clover, cabbage, cauliflower, watermelons, broad beans, wheat, rice, and maize. In 1956, El-Hamoul Land Reclamation Project was initiated in the southern and southeastern regions of the Lake. However, land in this area is not easy to reclaim. In July 2000, the total area of farmlands in the 5 districts with parts inside the Protected Area was 292419 Feddan, of which about 19000 Feddan fell within the limits of the Protected Area.

Villagers inside the Protected Area breed buffaloes, cows, sheep and goats. The per capita net income of livestock seems to be relatively low. This can be attributed to the limited numbers of heads maintained by each family and the low productivity of the varieties involved. Inhabitants of the Burullus area regularly harvest *Phragmites australis* reeds as fodder for their livestock primarily utilizing the green shoots. Mature reeds are harvested and sold for LE 0.20 – 0.60 per bundle for a variety of uses, including mat making, wind breaks, as building material, fishing nets and bird catching.

Bird catching is a widespread activity in Burullus Wetland, and is largely concentrated in autumn (Quail catching) and winter (water bird catching). Although all forms of hunting are now illegal after the declaration of Burullus as a protected area, it still continues. Quail catching is a traditional activity along the entire Egyptian Mediterranean coast, including Burullus. A variety of nets and traps, are used to catch Quail and other small birds during the autumn season. This activity is carried out largely on the sand bar. In winter catching targets water birds, which are caught using large nets or shotguns. The catch is

usually transported to large towns and cities, such as Rosetta and even Alexandria where the birds fetch higher prices.

A modest tourist industry has existed for a long time in the Burullus area. It is based almost exclusively on Egyptian tourists attracted from the Nile Delta and Cairo during the summer months of June to mid-September. Most of this activity is concentrated in the seaside resort of Baltim. There are only about 164 hotel rooms in the entire Kafr El-Sheikh Governorate. Most of the summer holiday makers in Baltim stay in temporary rentals of chalets and apartments or in privately owned residences, which do not show in official statistics. Despite the diverse natural and cultural heritage of the region, the international tourism potential of the Burullus Wetland, and the Delta as a whole, has not been tapped. This is mostly due to the lack of awareness of the value of these resources and their potential to attract specialized tours.

Burullus Protected Area could have a good prospect as a specialized ecotourism attraction, particularly bird watching. However, the lack of suitable facilities, and the presence of extensive bird catching activities during the primary bird watching seasons (autumn and winter) are all important obstacles for the Protected Area's development as an international bird watching attraction.

14.5. REFERENCES

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