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# MICRO-ECONOMIC PERSPECTIVES ON TUNISIA’S AGRO-EXPORT STRATEGY

Jeremy D. Foltz

## ABSTRACT

*This paper reviews Tunisia’s movement to an agricultural export strategy as a method of creating rural economic growth. Having explained the economic logic and pitfalls of agro-export production, it then evaluates the Tunisian effort to develop an agricultural export industry first in general and then using a specific case study of strawberry adoption in Cap Bon. Results show that Tunisia has been successful in increasing agro-export production, though as yet not in using it to create equitable rural growth.*

## 1. INTRODUCTION

As the former granary of the Roman Empire, Tunisia is no stranger to the production of agricultural goods for export. While some of the commodities have changed, the basic principle remains the same: trading on relatively inexpensive labor, a warm climate, favorable soils, and a central Mediterranean location. After years of inward oriented agricultural development, Tunisia under President Ben Ali now seeks to jump-start its rural economy through export-oriented agriculture. Given the country’s history, the question then is not

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Food, Agriculture, and Economic Policy in the Middle East and North Africa, Volume 5, pages 209–230.  
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ISBN: 0-7623-0992-X

1 whether Tunisia should export agricultural products, but how to do this so as  
2 to create the desired economic growth and social development in rural areas.  
3 How will an agro-export strategy change the structure of Tunisia's rural  
4 economy? Can Tunisia successfully export agricultural products without  
5 suffering adverse social, environmental, or long-term economic consequences?

6 Agricultural export promotion has been one of the fundamental development  
7 strategies of the late 1980s and early 1990s. A number of countries, such as  
8 Chile and Argentina, have created strong economic growth and raised rural  
9 incomes partially as a result of agricultural exports. In Tunisia the government  
10 of Ben Ali, which came to power in 1987, has followed a strategy of promoting  
11 private export-oriented agriculture. The government has reduced its role in the  
12 agricultural sector dramatically in the last 10 years as a part of the *Infitah*, or  
13 "opening", and a World Bank promoted structural adjustment program. State-  
14 owned farms are systematically being privatized with land going to local farmers  
15 or a budding agribusiness industry. The government no longer takes the lead  
16 in agricultural price setting, in the import and export of agricultural inputs and  
17 outputs, in promoting rural credit, or in paying for rural infrastructure.

18 This paper briefly reviews Tunisia's movement to an agricultural export strategy.  
19 It then explains the economic logic and potential pitfalls of agro-export  
20 production. The Tunisian effort to develop an agricultural export industry is then  
21 evaluated, first in general and then using a specific case study of strawberry  
22 adoption in Cap Bon.

## 23 **2. TUNISIAN RURAL DEVELOPMENT TO 1987**

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25  
26 Through a combination of colonial heritage and 1950s development philosophy,  
27 Tunisia has historically had a highly centralized economic system controlled  
28 by the government. The post-independence Bourguiba government pushed  
29 towards a centrally planned system, though one moderately open to the outside  
30 economy. The government ran the banking system, transportation, and some of  
31 the major industries. It also controlled import and export of most goods and  
32 fixed their prices at levels unrelated to either internal or world markets. The  
33 government nationalized former colonial farms and for a short period tried,  
34 unsuccessfully, to run them as collectives. As was typical of development  
35 strategies of the day, a large part of Tunisia's centralized system followed an  
36 agricultural policy designed to provide cheap foodstuffs for urban consumers.

37 Up until 1987 Tunisia focused its development strategy primarily on the urban  
38 and coastal areas. Though state led development started to change in the last  
39 decade of the Bourguiba era, the state remained the primary actor in agriculture.  
40 The nationalized former colonial farms were run, often inefficiently, by the state

1 to provide inexpensive produce for urban markets. Prices for agricultural inputs  
2 and outputs were strictly controlled by the government as part of an import  
3 substitution strategy. Field crops such as wheat and barley in particular received  
4 high subsidized prices relative to world market prices. The agricultural extension  
5 apparatus worked with private farmers as though they were part of state-run  
6 farms, often determining for them which crops to plant, determining which  
7 farmers received the inputs necessary for high-valued crops, and regulating  
8 marketing channels.

9 As amply demonstrated by such commentators as Sethom (1992) the  
10 Bourguiba policies in Tunisia resulted in a rural sector dominated by urban  
11 people: government functionaries, urban-based land owners, and urban crop  
12 marketers. Tunisian agriculture had succeeded in "modernizing" its agriculture  
13 in the sense that most of its production was commercialized and mechanization  
14 had expanded rapidly. In 1961–1962 only 18% of Tunisian farmers used tractors  
15 while by 1980 that figure had reached 57% (Gana & Khaldi, 1990, p. 191).  
16 However, this modernization did not translate into broadly-based increases in  
17 incomes for rural areas. According to Sethom (1992), mechanization displaced  
18 workers and pushed a movement toward larger farms, thereby exacerbating an  
19 already unequal distribution of land resources. In 1984, he shows that the highest  
20 levels of unemployment, of up to 50% in some *gouvernorats*, were in the  
21 northwest where mechanization had spread fastest. Some pockets of poverty  
22 worsened, especially in the northwest, leading to increased incentives for  
23 out-migration to urban areas and abroad. The communities least able to  
24 participate in the Bourguiba era agricultural development were small farmers  
25 in grain-growing areas and small-ruminant livestock farmers of the central and  
26 southwest. By the end of the era the major pockets of poverty in Tunisia  
27 remained in the rural areas, particularly concentrated in the northwest grain-  
28 growing areas and southern low-rainfall areas.

29

### 30 **3. TUNISIAN RURAL DEVELOPMENT SINCE 1987**

31

32 The change in government in 1987 ushered in a new policy regime in  
33 agricultural development. The Ben Ali government has consciously decided to  
34 promote the export of high value agricultural exports at the expense of some  
35 of its traditional agricultural products. This plays to Tunisia's strengths in  
36 agricultural production in that currently without much effort at quality, Tunisian  
37 agricultural exports are valued primarily for their specific tastes. Without a large  
38 arable area as yet uncultivated or extensive water resources to tap, Tunisia's  
39 only method of getting growth out of the agricultural sector rests in increasing  
40 efficiency and value added. The strategy of the last few agricultural development

1 plans has been to increase value added by producing higher value crops and  
2 processing more crops (Ministère de l'Agriculture, 1992). With its small land  
3 area Tunisia cannot compete with other countries that produce similar crops,  
4 such as Morocco, on quantity but its comparative advantage is in quality  
5 products.

6 The change of government in 1987 also produced a change in the rhetoric  
7 and the direction of rural development. The new government of Ben Ali signaled  
8 an increased emphasis on creating economic development in rural areas and  
9 non-coastal areas. Part of that new emphasis, along with investments in  
10 infrastructure and social services, was an expansion of new agricultural projects.  
11 New agricultural development projects were to be targeted at the poor rural  
12 areas of the northwest, central, and southwest. In the northwest the projects  
13 focused on integrated cropping systems and micro-dams to control water flow  
14 and improve yields. In the central and southwest areas irrigation schemes were  
15 initiated to turn livestock farmers into fruit and vegetable growers. New crops  
16 were brought in to increase the productivity of livestock rearing.

17 Simultaneously, as part of a World Bank supported structural adjustment  
18 program begun in 1986, the government moved away from its predominance  
19 in all sectors of the economy including agriculture. Its new position was one  
20 in which the private sector was to take the lead in investment, price setting,  
21 and savings. Thus, while the new government placed an increased emphasis on  
22 rural development, it did so in the context of a decreasing influence on the  
23 course of the economy. As part of the diminished role of the central government,  
24 the Tunisian government created and promoted private sector business groups  
25 such as the Tunisian Union of Farmers. These business groups often contained  
26 the elites of the sector and provided a way for the government to both promote  
27 and control private sector demands.

28 The government also started divesting itself of State-owned farms by giving  
29 away long-term leases on the land. The process of divestiture of government  
30 lands provides a window into the goals of Tunisian agricultural policy. These  
31 leases have been doled out in two separate ways: to agribusiness firms most  
32 often with some foreign participation, and to agricultural college graduates.  
33 The strategy of the Tunisian government has been targeted at putting land in  
34 the hands of those most likely to increase its productive and value-added  
35 potential. The agribusiness industries have been almost exclusively export-  
36 oriented, while the agricultural graduates have tended to produce more for  
37 the local market. In both cases the government provided concessionary loans  
38 along with a low land rental price. In the privatization process, the rural people  
39 of the area lost the right to work land that they considered theirs.<sup>1</sup> These were  
40 the families who had once owned the land, been dispossessed by the French,

1 worked for colonial and then Tunisian government farms. The strategy  
2 of privatization replaced what had essentially been a redistributive rural  
3 employment program with an agricultural production system making more  
4 efficient use of inputs including labor. While clearly reducing the strain on  
5 the government budget and improving growth prospects for the overall  
6 Tunisian economy, in the short-run the affected laborers were not made better  
7 off by becoming unemployed in a poor area.

8 Tunisia is now on its third World Bank agricultural sector loan since 1986.  
9 The most recent loan includes provisions to decentralize agricultural adminis-  
10 tration, privatize some of its responsibilities, and revise the subsidy policy.  
11 Agricultural production subsidies have been cut, while private investment  
12 subsidies have been increasing (World Bank, 1993). Also with World Bank  
13 support, Tunisia has restructured its agricultural bank. In particular, this project  
14 has privatized the operations of the bank by reducing the degree to which  
15 government subsidized credit has flowed through the bank.

16 Agriculture has played a central role in Tunisia's structural adjustment  
17 program. Tunisia's adjustment program had more conditions related to  
18 agriculture, 41 out of 158, than any other single sector. As part of this reform,  
19 the percentage of government expenditure on agriculture has declined. As Table  
20 1 shows, much of the slack in agricultural investment is to be taken up by  
21 private self-financing and bank credit. Table 2 shows where this investment  
22 expenditure is to be distributed between the state and private sectors. For  
23 example, while much of the financing is to be governmental or bank credit,  
24 most of the investment is to occur in privately owned firms. The current  
25 five-year plan expects the private sector to increase its importance by nearly  
26 doubling its investment level. The state still represents over half of the  
27 agricultural investment expenditure, however. This can primarily be explained  
28 by the large state expenditure on capital projects such as dams and irrigation  
29 works which alone account for one third of government outlays.

30 The World Bank sees Tunisia as one of the countries that have successfully  
31 followed the "core" structural adjustment reforms.<sup>2</sup> The World Bank (Jayarajah  
32 et al., 1996) credits Tunisia with a consistent implementation of reform  
33 measures, which has created the "right" economic outcome, better external  
34 balance of payments. In general the Tunisian economy has shown reasonable  
35 GDP growth rates of 1.2% per year during the last decade of economic reform  
36 (World Bank, 1995). Simultaneously two out of the three common measures  
37 of poverty have decreased significantly.<sup>3</sup> On a macro-economic level the overall  
38 results of Tunisia's agricultural policy over the last decade look quite good.  
39 Agriculture has been a major source of recent economic growth, growing 7.2%  
40 between 1988 and 1994 (World Bank, 1996). Agricultural exports in particular

**Table 1.** Financing for Agricultural Investment.

Financing of Investment	Plan No. V 77–81		Plan No. VI 82–86		Plan No. VII 87–91		Plan No. VIII 92–96	
	mn. Dinar	%	mn. Dinar	%	mn. Dinar	%	mn. Dinar	%
State Funds	438	75	1107	71	1216	66	1576	53
Bank Credit	96	16	310	20	304	16	800	27
Private Self-Financing	50	9	133	9	322	17	600	20
Total	584	100	1550	100	1842	100	2976	100

Sources: Sethom, (1994, p. 132); Ministère de l'Agriculture (1992, p. 81).

All values in constant Tunisian Dinars: 1 TD = \$ 1. Figures for Plan VIII are predicted values and do not match exactly the actual value for total agricultural investment in Table 2.

**Table 2.** Distribution of Investment Expenditures.

Place of Investment	Plan No. VII 87–91		Plan No. VIII 92–96	
	mn. Dinar	% of total	mn. Dinar	% of total
Public Administration	853	46.3	1569	51.9
Public Enterprises	263	14.3	102	3.4
Private Farms	726	39.4	1351	44.7
Total	1842	100	2976	100

Sources: Ministère de l'Agriculture (1992, p. 81) and Ministry of Economic Development (1997).

have expanded a significant degree moving from 2.8% of total exports during the period 1980–1984 to 5.1% for the period 1990–1993.

Structural adjustment policies enacted by the Tunisian government both helped and hindered equitable social development in rural areas. On the positive side, the relaxation of price controls and import/export restrictions opened up new markets and allowed higher prices for many fruits and vegetables. This induced higher incomes for those who could manage to grow these “new” crops. On the negative side, output prices for grains were reduced to conform more closely to world price levels. This meant that grain producers of the northwest, those most in need of help, had their income levels drop. For grain producers,

1 the new export orientation to agriculture implied that they had to either become  
 2 more efficient at growing grains, start producing another more competitive crop,  
 3 or suffer a loss of income. Most farmers unable to do the first two were forced  
 4 to suffer the income loss. In the case of more efficient production, this has  
 5 meant more mechanization and an increasing farm size, which has displaced a  
 6 number of small and poor farmers. Yields for wheat and barley have increased  
 7 moderately in the 1990s despite average rainfall years.

8 The growth in select agricultural crops and agro-exports in Tunisia is shown  
 9 in Table 3 and Fig. 1. Table 3 shows a large increase in many types of vegetable  
 10 and fruit production. Some tree crops such as apples have doubled in production,  
 11 while some traditional crops such as oranges have faltered.<sup>4</sup> Figure 1 shows a  
 12 dramatic increase (of over 100%) in agricultural exports from 1987–1997,  
 13 although 1996 was an exception due to poor production. The vast majority of  
 14 the export production value is accounted for by one traditional product, olive  
 15 oil with a 1997 value of \$230 million. Some non-traditional exports have grown  
 16 rapidly between 1987 and 1997: for example table olive exports are up 50%  
 17 to \$697,000, pistachios from not being exported are now \$217,000 in exports.  
 18 A number of the other non-traditional crops have shown spotty export quantities  
 19 and no clear trends: for example green beans, table grapes, and apples each  
 20 showed years in the decade of more than \$50,000 in export revenues and equal  
 21 numbers of years with no exports at all. Meanwhile some traditional exports  
 22 such as oranges have languished, down from \$21 million in 1987 to \$5 million  
 23 in 1997. The picture emerges of a country able to produce and export a  
 24 diversified range of agricultural goods.

25  
 26 **Table 3.** Production in Selected Vegetable and Fruit Crops in Tunisia  
 27 (1987–1997).  
 28

29 Crop	30 Production in 31 1987 ('000 tons)	32 Production in 33 1997 ('000 tons)	34 Value of 1997 35 Production at 36 producer prices 37 ('000 \$)	38 Growth in tons 39 produced, 40 1987–1997 (%)
Dates	69	85	127,500	23
Oranges	147	101	30,300	-31
Tomatoes	485	550	71,500	13
Olives	500	500	150,000	0
Watermelons	260	328	62,976	26
Artichokes	14.5	23	12,190	59
Apples	38	88	49,632	131

Source: FAO (2000), exchange rate for 1997 \$1 = 1 Tunisian Dinar.

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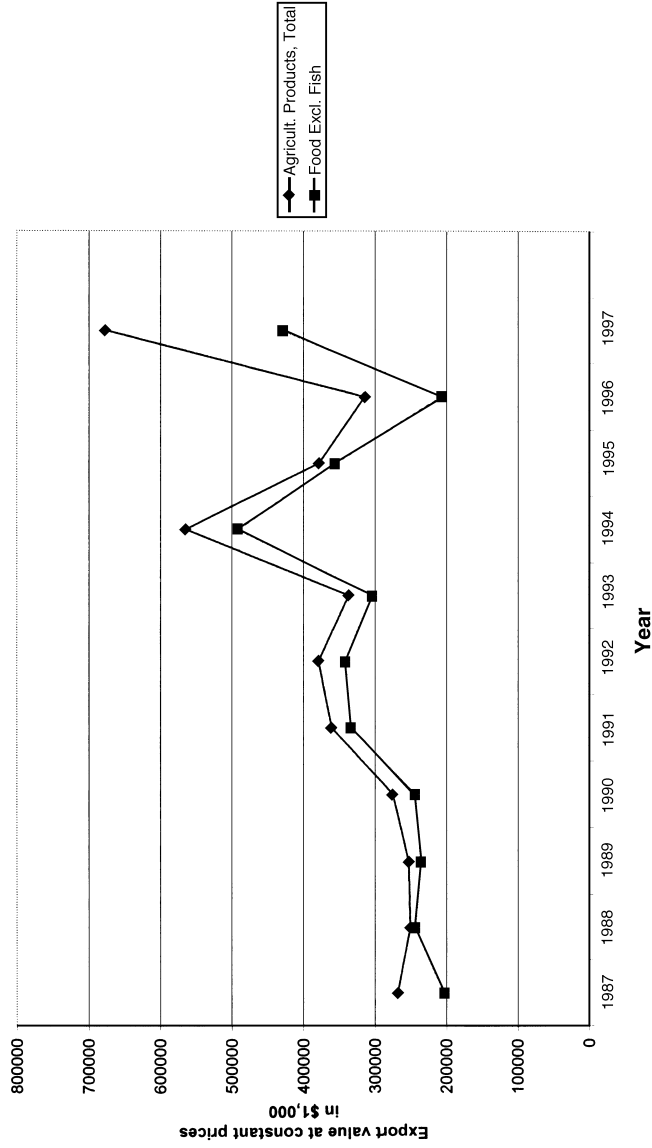


Fig. 1. Tunisian Agro Exports.

#### 4. THE LOGIC AND PITFALLS OF AGRO-EXPORTS

In order to understand the potential benefits and problems Tunisia may face in basing its rural development strategy on agro-exports, I develop some of the concepts behind them. Proponents of agro-export strategies tend to emphasize the macro-economic and trade benefits of increased foreign exchange and a more efficient agricultural sector. Four main reasons have been suggested for the promotion of agricultural export crops: (1) they tend to be labor-intensive crops that absorb an excess labor supply in rural areas; (2) they are thought to be benign to small-holder agriculture because the crops can be produced on small parcels and give high returns; (3) they can produce high returns in export markets, increasing foreign exchange earnings; and (4) they diversify the country's export portfolio, thereby reducing the risk of potential price fluctuations (Murray & Poppin, 1992).

Determining the "success" or "failure" of agro-export strategies depends on evaluating the goals of both the government and rural people involved. Often agro-export strategies are declared a success on the basis of increased exports of agricultural products. This measure of success ignores the micro-economic effects of agro-export strategies. As shown in a review of the literature on Latin American agro-exports by Barham et al. (1992), opponents often question the labor absorption of these crops, and the ability of smallholder farmers to participate in the benefits. Proponents suggest that agro-exports can raise rural incomes, diversify the crop base, and generate rural multiplier effects.

A first necessary condition for an agro-export success is the existence of an available export market. Given that one exists, one then must evaluate the social costs and benefits of such a strategy. One can group the social costs commonly thought to arise from agro-export production into the following categories:

- (1) *Exclusionary Growth*: Agro-exports can create an exclusionary growth process in which large farmers get great benefits, but small-farmers do not. As larger farms become more profitable they can buy land from smaller farms, leading to an increasingly inegalitarian land distribution. For example the cattle and cotton agro-export growth of the 1960s in Honduras led to land concentration through the eviction of tenants and those with poor property rights (Stonich, 1992).
- (2) *Environmental degradation and resource exploitation*: Agro-export crops often have more detrimental environmental characteristics than the traditional agricultural crops they replace. Many agro-export are not as well adapted to the climate as the crops previously grown. Because of this maladaptation, export crops often require high use of chemical inputs and

1 may not make best use of local soil or water conditions. A prime example  
 2 of this comes from the work of Murray and Hoppin (1992) on agro-exports  
 3 in Guatemala and the Dominican Republic. In both cases growing  
 4 nontraditional crops caused pests to thrive necessitating ever-increasing  
 5 quantities of pesticides.<sup>5</sup> In other parts of Central America, agro-export  
 6 crops have also led to decreasing soil quality, the loss of forest land, and  
 7 water pollution.

- 8 (3) *Nutritional effects:* Agro-export crops often displace local subsistence food  
 9 crops. Often growers of agro-export crops do not eat them either because  
 10 they are inedible (e.g. cotton) or not part of the local diet (e.g. snow peas).  
 11 The degree of nutritional problems is determined by whether infrastructure  
 12 and institutions allow food markets to function efficiently with low market  
 13 margins and transaction costs. If they do, the increase in incomes associated  
 14 with cash crop production will compensate for the change from food  
 15 production to non-edible production. If not, the result may be severe  
 16 nutritional problems from changing to purchased food. Evidence cited in  
 17 von Braun and Kennedy (1987), however, suggest mixed results in terms  
 18 of nutrition and income growth from cash crops. Some studies show better  
 19 nutrition in cash crop producing households due to increased income while  
 20 others show lower nutrition levels due to the displacement of subsistence  
 21 crops.

22  
 23 Agro-export production has produced a diverse set of results. Some countries  
 24 have experienced broad-based growth (e.g. Guatemala) others have seen an  
 25 exacerbation of rural inequalities and environmental degradation (e.g.  
 26 Honduras). The major determinants of which type of agro-export growth takes  
 27 place reside at the intersection of the rural institutional setting and the agronomic  
 28 and marketing characteristics of the particular crops grown. Among the  
 29 institutional features of rural areas that partially determine the social costs and  
 30 benefits of agro-export growth are:

- 31  
 32 (1) *The existence and strength of land ownership titles.* In many cases the  
 33 driving force behind the exclusionary growth trajectory of agro-export  
 34 production has been a land grab by the wealthy (Carter et al., 1995). Where  
 35 land ownership is clearly defined and strictly enforced small farmer will  
 36 not have their land expropriated by richer or better connected farmers.  
 37 (2) *The efficient operation and farmer access to rural credit markets.*<sup>6</sup> Agro-  
 38 export crops often require large capital outlays for inputs and technology.  
 39 If rural credit markets discriminate systematically against small farmers  
 40 they will not be able to borrow the necessary funds to participate in

1 agro-export production. Credit constrained farmers can be unable to adopt  
2 new crop varieties themselves and forced into land and labor contracts with  
3 wealthier operators.  
4

5 While these two institutional constraints can cause exclusionary growth in and  
6 of themselves, their influence can be augmented or mitigated by certain key  
7 crop characteristics. As Carter et al. (1995, p. 58) suggest:

8 Conceptually, the best . . . crop for the rural poor would be one that they could adopt on  
9 most of their land and grow competitively with larger-scale producers.  
10

11 The following characteristics of export crops help determine the ability of small  
12 farmers to compete effectively against large producers and influence the type  
13 of growth path that is generated:<sup>7</sup>  
14

- 15 (1) *The environmental match of the crop with the ecology of the zone.*  
16 Compared with traditional crops, agro-export crops that are not well  
17 matched to the ecology of the zone will require high levels of pesticide  
18 application. They may also use more intensively natural resources, such as  
19 soil fertility or ground water, which are in short supply in that area.
- 20 (2) *The scale bias in crop production.* Though most agricultural production  
21 exhibits constant returns to scale on a technical level, some crops can  
22 have hidden scale economies particularly in the product quality require-  
23 ments they face, the high level of capital intensity, and a high investment  
24 gestation period. The latter two can create a size bias in crop benefits  
25 when credit markets systematically ration out the smallholder farmers.  
26 Increasing returns to scale in production can directly lead to exclusionary  
27 growth by making small-scale farm operations inefficient compared to  
28 larger scale farms. Carter et al. (1995) show how agro-export growth in  
29 Paraguay and Chile led to exclusionary effects in the land market, due  
30 primarily to the crops having a minimum optimal size that was beyond  
31 the reach of small-holders.
- 32 (3) *The marketability of the crop.* Agro-exports with specialized foreign  
33 markets have high barriers to entry for small farmers. For example, highly  
34 perishable crops, such as flowers, need quick easy transport to market to  
35 be profitable. This implies that the crop requires a highly integrated  
36 marketing network that stretches from producer to consumer.
- 37 (4) *The edibility of the crop for the local population.* Export crops that are  
38 edible can provide the farm household with some insurance in case of  
39 disruption of export markets. First, the households can nourish themselves  
40 with their production; second, they can sell it on the local market.

## 5. INSTITUTIONS OF RURAL TUNISIA

Compared to most countries in the Third World, Tunisia has a fairly well developed set of agricultural institutions and agricultural infrastructure. The agricultural extension service is well established at all levels and has been at the forefront in promoting new crops and techniques. With its oversupply of workers, the extension service provides fairly regular, if not always heeded or appropriate, advice to farmers. Farm-to-market roads are paved in many cases allowing relatively easy access to market outlets for farmers.

### *Land Tenure*

Most land in Tunisia has been titled at least some time in the past, though often no one currently has clear title to the land. Although various government programs push the process of regularizing land titles, they remain quite expensive for an individual farmer to obtain. For example one Cap Bon farmer estimated the cost of lost farming time and hiring lawyers to get free and clear title for his 5 hectare farm at \$4,000. Routinely the few farmers involved in a government agricultural project such as an irrigation project do get a regularized title to land as part of the project. Even a farm with a free and clear land title, however, can lose that status as soon as the household head dies and divides his land. This leads to a fairly insecure land tenure situation in rural areas. The World Bank concurs seeing the Tunisian land tenure system as “characterized by poorly defined property rights” (World Bank, 1996, p. xviii) because of the lack of clear titles.

However, this perhaps exaggerates the severity of Tunisia’s land tenure insecurity problem. Evidence from the region of Cap Bon suggests that property rights are secure enough for farmers to maintain a claim to land and also to lease that land even without a title. But land tenure is not secure enough for land to be sold because buyers cannot be sure that sellers have full ownership rights to the land. This lack of titles among other factors, such as a cultural desire to hold farmland, leads to an inactive land sales market. Instead Tunisian farmers work out rental or sharecropping arrangements to adjust their land areas to their monetary, capital, and family labor resources, creating an active rental market. A sample of Cap Bon farmers participating in the production of agro-export crops showed that of the farms, 16% were rented, 36% sharecropped, and 8% both rented and sharecropped (Foltz, 1998). Gana and Khaldi (1990, p. 195) find that 35% of the operated land in their survey area of the northwest was rented or sharecropped.

While the insecurity of land tenure may suggest that agro-export production would lead to land concentration and exclusionary growth, the specific

1 conditions of Tunisia suggest otherwise. An inactive land sales market may in  
2 fact slow the ability for land to concentrate even when economic or agronomic  
3 forces suggest that it would. If large farmers can only rent land rather than buy  
4 it from small farms, the exclusionary aspects of an agro-export production might  
5 paradoxically be mitigated. At the same time an active rental market for land  
6 can allow small farmers to rent in the land area they need to take full advantage  
7 of new cropping opportunities. However, in order to rent in land, small farmers  
8 would need access to capital through rural credit markets.

### 9 10 *Rural Credit Markets*

11  
12 Tunisia has a long established agricultural bank (La Banque Nationale Agricole,  
13 BNA) that provides credit to farmers. Along with standard long-term loans the  
14 government gives small (up to \$200 per hectare of operated land) "credit de  
15 campagne," seasonal agricultural loans, shuttled through the BNA. Farmers also  
16 have access to loans from a number of different non-agricultural banks that  
17 have recently been privatized. Farmers can often also get seasonal loans from  
18 input suppliers and in some areas processing factories.

19 With such a myriad of possible sources for credit one might think that the  
20 credit market worked well in providing equal access to capital. The evidence  
21 from a number of different sources, however, suggests that Tunisian rural credit  
22 markets do not operate efficiently (see Sethom, 1992; Foltz, 1998). Most farmers  
23 (73%) in Cap Bon were receiving credit from the informal sector, while only  
24 11% borrowed from banks. Farmers with small land holdings, no land title, and  
25 low household incomes are often rationed out of the market for agricultural  
26 credit.<sup>8</sup> Even farmers with land titles have difficulty borrowing with land as  
27 collateral because of incomplete land markets. As Foltz (1998) shows, farmers  
28 rationed out of the credit market will invest less than others and have lower  
29 overall profitability. They are therefore less likely to be able to adopt new export  
30 crops and benefit from the increased profitability. The poor operation of the  
31 credit market in getting all farmers equal access to capital may push towards  
32 an exclusionary growth path by among other things excluding small farmers  
33 from the land rental market.

34 These imperfections in the credit market can exacerbate a number of other  
35 exclusionary aspects of agro-export crops in Tunisia. For example, poor farmers  
36 who cannot borrow out of their future income stream cannot adopt tree crops  
37 with long gestation periods. Crops with high up-front input costs such as  
38 strawberries will be the domain of only those who have the cash on hand to  
39 pay those costs. Larger, richer farmers who can borrow money may become  
40 the only ones able to afford to participate in the agro-export production. Contract

1 farming can partially circumvent the exclusionary aspects of the credit market  
2 by providing small producers with the necessary capital.  
3

## 4 **6. CROP CHARACTERISTICS OF TUNISIA'S** 5 **AGRICULTURAL EXPORTS** 6

7 The primary traditional export crops of Tunisia have been dates, olive oil, and  
8 oranges. These are slowly being supplanted by increases in the export of: melons,  
9 table grapes, table olives, and potentially tomatoes and strawberries. This switch  
10 in crops often happens on the same farm with old trees or grape vines being  
11 replace by different varieties. The question is how this cropping change may  
12 create a structural change in the rural areas. While each of these crops has its  
13 own specific agronomy, in each of the potential problem areas a number of  
14 common themes arise. Before addressing potential problems, the next section  
15 demonstrates some of the benefits to farmers of adopting these new crops.

16 *Benefits:* Benefits for farms to switching to agro-export crops can be large in  
17 terms of revenues, but the crops also require increased input costs which must  
18 be paid up front. For the individual farmer who can afford the increased input  
19 costs, agro-export crops produce much higher returns per unit of land and for  
20 most crops per unit of labor. For example, a Cap Bon farm growing typical  
21 Tunisian vegetable crops, potatoes, tomatoes, and peppers would spend about  
22 \$500–1,500 per hectare on inputs, not including household labor – and receive  
23 \$1,000 to \$3,000 in revenues. Switching to strawberries would entail an increase  
24 in input costs up to \$15,000 to \$25,000 per hectare with potential revenues  
25 rising to \$20,000 to \$60,000 depending on yields and prices.<sup>9</sup> Such a switch,  
26 however, entails added risks since the possibility of crop failure is much higher.  
27 While tomato yields in Cap Bon are reliably 20–30 tons per hectare, strawberries  
28 range from 6 to 50 tons per hectare with most farms at either end of the  
29 distribution and very few close to the mean of 26.  
30

31 *Environment:* Most of the crops that are currently pushed as export crops in  
32 Tunisia have traditionally been grown there in the past or are agronomically  
33 closely related. The possible exceptions are strawberries and melons. One can  
34 therefore expect most of them to be reasonably well suited to the Tunisian  
35 environment and climate. Much of the northern half of Tunisia also has a climate  
36 cold enough to kill off many of the pests that plague Central American  
37 non-traditional exports. Also the preponderance of perennial and tree crops in  
38 the agro-export mix should reduce worries about rapid soil degradation in the  
39 countryside. Planting oranges, grapes, or almonds may in fact help increase soil  
40 fertility.

1 The major environmental problem inherent in most Tunisian agro-export  
2 crops is their need for irrigation water. Almost all of the new fruit and vegetable  
3 crops require significantly more water than the crops they replace. For example  
4 a Cap Bon farmer switching from traditional vegetables such as onions and  
5 potatoes to strawberries will more than double his water usage. Because farmers  
6 do not pay the full environmental cost of their water use, such water-thirsty  
7 crops will increase incentives for degradation of aquifers. One need look no  
8 further than the current water shortages in the traditional orange growing area  
9 of Menzel Bouzelfa to see the effects. The water table there has increased in  
10 salinity and dropped from 10 meters to 30 meters in a decade due to over-  
11 exploitation to feed thirsty orange groves. Tunisia's agricultural strategy,  
12 which produces economic growth at the expense of water resources, seems  
13 environmentally risky for a country expected to be fully using all available  
14 water by the year 2000 (World Bank, 1996).

15 *Returns to scale.* Historically, most olives, grapes, and oranges have been  
16 produced by small farms in Tunisia. In many cases these small farms have  
17 successfully competed against large government-run farms, a fact that suggests  
18 the absence of scale economies. The new Tunisian agro-export crops also do  
19 not show significant returns to scale in their agronomic characteristics. Crops  
20 that classically show increasing returns to scale are ones that benefit from  
21 mechanization and do not need specialty labor inputs. Neither of these  
22 conditions holds true in the case of Tunisia. Both the tree crops and fruits such  
23 as strawberries, grapes, and melons are difficult to mechanize. Mechanization  
24 of such crops would only be profitable if labor costs were much higher than  
25 those current in Tunisia. Most of the crops also require specialty labor inputs;  
26 this favors small-scale producers who do not have the supervision problems of  
27 larger farms. On the other hand recent research by Zaibet and Dunn (1998)  
28 suggests that the olive sector exhibits increasing returns to scale due to  
29 increasing returns to mechanization.  
30

31 *Marketability.* One of the advantages that Tunisia has in marketing agro-export  
32 products is the large internal market for what are commonly exported agricul-  
33 tural commodities. Many of the products that Tunisia might export, it sells to  
34 European tourists spending hard currencies on its beaches. While most agro-  
35 exporting countries need to market their products in a foreign country, Tunisia  
36 instead imports the consumers. This has meant fewer marketing problems for  
37 Tunisian farmers up until now. The tourist market now seems saturated and  
38 any expansion of Tunisia's agro-exports will need to find foreign markets.

39 Whether there actually exists an adequate foreign market for Tunisia's  
40 agro-exports remains open to question. Much of Tunisia's exports are currently

1 destined for the European Community. Unfortunately for the Tunisians, they  
2 produce many of the products that are protected by EU's common agricultural  
3 policy. Two recent studies by the OECD (Chemingui & Dessus, 1999; Petri,  
4 1997) call into question the potential for EU willingness to take increases in  
5 Tunisian agricultural exports. Petri concludes that free-trade agreements with  
6 Europe by countries of the Southern Mediterranean will yield limited results  
7 since they do not have concessions on market access. Chemingui and Dessus  
8 (p. 39) conclude from simulations with a general equilibrium model that Tunisia  
9 has a comparative advantage in tree crops (especially olives), but that EU  
10 trade policy seriously impedes the possibilities of greater export sales. Their  
11 simulations further show that without EU trade liberalization, the rural areas of  
12 Tunisia would be worse off if Tunisia unilaterally lowered its trade protections.

13 Beyond the question of trade liberalization a number of other potential  
14 problems arise in the international export market. The most important problem  
15 is getting quality produce to the market in time. The world market price for  
16 improperly cured olives, rotten strawberries, wilted flowers, and bruised  
17 melons is near zero. Producing high quality agricultural perishable goods  
18 requires a fully linked commodity chain from producer to consumer or  
19 processor. This does not currently exist for many of the perishable crops in  
20 Tunisia. The two most common methods to create these commodity chains  
21 are: (1) large integrated operations that both produce and export or process  
22 the goods; and (2) contract farming operations. The first type, large-scale  
23 operations, does currently exist in Tunisia, though they do not as yet represent  
24 a major part of production. They tend to be the former government farms  
25 now given as concessions private sector firms. Contract farming as yet has  
26 not become common in Tunisia. The indications are that a number of firms  
27 will start contract farming in the near future, especially in highly perishable  
28 crops like strawberries.

29  
30 *Edibility and nutritional quality of agro-export crops.* Tunisian agro-export crops  
31 tend to be both edible and regularly eaten by Tunisians. As mentioned above, most  
32 of them are similar to crops previously grown in Tunisia. In fact the recent move  
33 to replace wine grapes with table grapes replaces a crop not regularly consumed,  
34 in processed form, with one that is consumed. The nutrition qualities of most  
35 agro-export fruits and vegetables are not especially high. However, they are not  
36 dissimilar from those crops they replace. In the relatively commercialized  
37 agriculture of Tunisia, farmers usually trade their agricultural produce for the food  
38 they need. Thus few farmers depend for their nutritional needs solely on their own  
39 farm produce. The evidence suggests that a movement toward agro-export crops  
40 will not directly create an adverse impact on the nutrition of rural Tunisians.

## 7. A CASE STUDY OF STRAWBERRY ADOPTION IN CAP BON

This section uses micro-level data to assess the validity of a number of the concerns presented above on agro-exports. Farmer decisions to adopt strawberry production (an agro-export crop) are investigated. Strawberries provides a useful example since they are a relatively labor intensive crop that can be grown on small plots. They are more lucrative than the crops they replace (potatoes, tomatoes, onions), although they use more water and are more susceptible to diseases and low water quality. They also have higher start-up costs than the crops they replace because farmers have to buy the plants, \$10,000 per hectare vs. \$50 for seeds, and more chemical inputs, \$10,000 per hectare vs. \$500. The profits per hectare from strawberries can reach \$5–10,000 while those of other crops are \$500–1,000, though there is much higher variance in strawberry revenues than other crops.

Given the above discussion of crop characteristics and the institutional characteristics of Tunisia, one would expect the following types of farmers to grow strawberries: (1) wealthier farmers or ones with better access to credit; (2) farmers with higher quality water; (3) farmers who own their own land; (4) better educated farmers. Further, one would expect that, controlling for the effects of capital access, there should be no relationship between farm-size and strawberry adoption.

Using data from a random sample of 142 irrigated farms in Cap Bon,<sup>10</sup> I estimate a probit model of the probability that a farmer grows (has adopted) strawberries. The independent variables used to describe adoption are: monthly per capita household expenditure (Expen), the amount the household was able to borrow in the previous year (Debt), the education level of the principle farm operator (Educ), the number of family members per hectare operated (Fam), the share of operated land that has a title held by the operator<sup>11</sup> (Title), the number of hectares of the operated farm (Land), and salinity measured in grams per cubic meter of the farm's irrigation water as reported by the farmer (Salt).<sup>12</sup>

The probit model estimates, presented in Table 4, show a reasonable level of accuracy with a pseudo (or McFadden)  $R^2$  of 0.27. Clearly, the financial variables have a high correlation with strawberry adoption. Wealthier farmers are more likely to be growing strawberries and those with better access to credit are also more likely to adopt. This is suggestive of an exclusivity in strawberry production in which only the wealthy and those with credit access can reap the benefits. But because of simultaneity bias one cannot discern whether this is the case or whether strawberry farmers are now wealthier and demand more credit because they grow strawberries. The data also show that larger families

**Table 4.** Probit Estimates of the Probability of Adopting Strawberries.

Variable	Definition	Hypothesized sign	Coefficient	t-statistic
Expenditure	Per capita monthly household expenditure, \$	Positive	0.0018	2.162
Debts	Amount borrowed for farm production, \$	Positive	0.9582	2.506
Education	Level measured from 1 to 5*	Positive	0.0529	0.458
Family Size	Number of family members per hectare operated	Positive	0.1488	2.557
Title	Percent of operated land that has a title held by the farmer	Positive	0.0005	0.002
Land area	Operated land area in hectares	Positive	-0.0966	-1.661
Salinity	Grams of salt per M <sup>3</sup> of water	Negative	-0.2505	-1.371
Constant			-1.441	-2.095
Number of observations	136		Log Likelihood -62.07	Pseudo R <sup>2</sup> 0.27

\* The education variable measures the highest level attained by the household head. It was coded as follows: 1 = no schooling, 2 = some Koranic schooling, 3 = grade school, 4 = high school, 5 = more than high school.

Source: FAO (2000).

relative to their operated land base are more likely to grow strawberries, suggesting that it is serving as a way to absorb labor. Strawberries also seem to be grown on smaller farms rather than large farms, although the 10% significance level of land does not allow strong conclusions. The results do not suggest that land tenure has any bearing on strawberry adoption. Sensitivity analysis using other measures of land tenure (owner operation, title as a dummy variable, etc.) did not find any significant relationship. The degree of salinity does not seem to significantly affect adoption probabilities, but it has the hypothesized negative sign. This result and results reported in Foltz (1998) suggesting that strawberry farmers are also those most likely to adopt water saving technologies, suggests that strawberries may not create as many environmental problems as might be predicted with a water hungry crop.

This case study suggests that, at least in the case of strawberry production, agro-exports production is not solely the domain of larger farms. Strawberries seem to provide opportunities for labor absorption and participation by small holders. In addition, there is no evidence that land market imperfections impinge

1 on people's ability to participate. While the results suggest that strawberry  
2 growers are wealthier and borrow more money, it is left for future research to  
3 discern if this is endogenous to the decision to grow strawberries. Thus, despite  
4 having a number of the pre-requisites for problems, strawberry production seems  
5 to have the qualities of a crop that could create inclusive rather than exclusive  
6 growth.

7

8

## 8. PROSPECTS FOR TUNISIAN AGRO-EXPORTS

9

10 On the micro level, Tunisia presents the picture of a relatively benign location  
11 for agro-export development. So far new crops and technologies have been  
12 readily adopted by those sectors of the rural Tunisia with agricultural export  
13 potential, particularly in the coastal areas. With its structural adjustment  
14 program, the decontrol of marketing, pricing, and input provision has opened  
15 up new opportunities in producing table grapes, table olives, and strawberries  
16 among other crops. The evidence suggests that rather than producing  
17 exclusionary growth in which only large farmers benefit from agro-export  
18 growth and small-scale farmers get pushed out, small-scale farms are partici-  
19 pating. This despite Tunisia having many of the pre-conditions for exclusionary  
20 growth: incomplete credit markets and an insecure land tenure system. Poverty  
21 in rural areas experiencing agro-export growth seems to be trending downward  
22 with no evidence of a division of benefits particularly favoring large farms. In  
23 the areas where export-oriented agriculture has taken hold it clearly shows some  
24 promise of providing broadly-based growth.

25 While Tunisia has managed to increase its agricultural exports, it has to  
26 contend with an increasingly competitive world agricultural market in which  
27 many countries can produce the same products. Tunisia has the climate and  
28 low labor costs necessary to produce some of the highest quality agro-exports.  
29 In order for Tunisia to compete effectively on the world markets and make full  
30 use of its comparative advantage it needs to make the effort to export quality  
31 goods. It remains to be seen whether Tunisia can develop the quality  
32 agro-exports it needs to compete effectively. It may be that the only way for  
33 it to do so would be to resort to a system of large-scale agribusiness or contract  
34 farming. A movement toward agribusiness or contract farming gives cause for  
35 concern because it may reverse the current trend of small farmer participation.

36 If Tunisia can produce quality and price competitive agricultural exports, those  
37 goods must find open markets. Unfortunately, the macro-economic and interna-  
38 tional limits to the expansion of Tunisian agricultural exports do not obey simple  
39 economic laws of supply and demand. Rather, it is Tunisia's trade negotiations,  
40 particularly with the European Union, that will determine how much Tunisia can

1 sell of its agricultural exports. Tunisia may very quickly reach the limits of its  
2 ability to grow through agricultural exports without extensive renegotiation  
3 of its international trade agreements. How much they will be able to expand  
4 agro-exports will likely depend on opening new markets, as they have in Eastern  
5 Europe, and trade negotiations, rather than any domestic policies.

6 While Tunisia's move towards an agro-export strategy has not produced much  
7 inequality within the regions that have adopted new crops, the strategy has instead  
8 created a regional disparity. Most of the growth in agro-export crops has taken  
9 place in northeastern Tunisia and along the Sahelian coast. A large part of rural  
10 Tunisia has yet to participate in the agro-export industry and does not have many  
11 of the environmental and infrastructural pre-conditions in order to participate. In  
12 particular the grain-growing areas of northwest Tunisia have not participated and  
13 do not seem likely to do so in the near future. The areas with the greatest growth  
14 of agro-export crops are already the most developed and richest rural areas. So  
15 while this strategy may provide economic growth in already relatively rich areas,  
16 it is not a solution to the problems of poverty in the less developed parts of rural  
17 Tunisia. Agro-export growth will likely exacerbate regional inequalities causing a  
18 dislocation of people. Already one sees seasonal migration from poorer rural areas  
19 to wealthier areas at harvest time, which could instead become permanent  
20 migration. Such regional inequalities and increased migration, though it might be  
21 economically efficient, would contradict the rhetoric of government policy, which  
22 seeks to maintain economically viable rural areas.

23 The environmental problems inherent in Tunisia's agro-export strategy  
24 potentially call into question the longevity and sustainability of this strategy.  
25 Evidence from strawberry production in Cap Bon suggests some reasons for  
26 optimism, but Tunisia could potentially lose more from the water resource  
27 depletion of agro-exports, and concomitant loss of future agricultural produc-  
28 tion, than they ever gained selling agricultural exports. Also the tourism  
29 industry, which provides a lot of the country's foreign exchange earnings, is  
30 very sensitive to the state of the local environment. This suggests that  
31 investments in water saving technologies (drip irrigation, raising irrigation water  
32 prices, fixing leaky pipes) are a necessary complement to agro-export policies,  
33 if they are to be long-lived and not mortgage other sectors of the economy.  
34

## 35 NOTES

36  
37 1. See King (1996) for an analysis of the politics of government farm conversions  
38 and the effects of these policies on rural people who previously had de facto permanent  
39 contracts to work the farms. Recently the World Bank has in fact suggested that land  
40 distributions to agribusinesses be limited to shorter term leases rather than outright  
land grants (World Bank, 1996).

1       2. According to Jayarajah et al. (1996), these core reforms include income tax reform,  
2       sectoral reforms in finance, industry, agriculture, and the public sector. Along with this,  
3       a country should remove entry and exit barriers, change the legal and commercial  
4       framework, increase exchange rate flexibility, create positive real interest rates, and  
5       liberalize trade.

6       3. According to statistics in Jayarajah et al. (1996), the head-count index and poverty  
7       gap index decreased 38% and 33% respectively between 1985 and 1990. However, the  
8       squared poverty gap, which places the most weight on the poorest, has remained the  
9       same in that period.

10      4. Data shows that strawberry production, a focus of the latter part of this work,  
11      has grown spectacularly fast in the last decade, 400%. Since total strawberry production  
12      represents less than \$5 million in value, it is still a small amount of the value of both  
13      agro-export and overall crop production.

14      5. For example pesticide violations on non-traditional agricultural products cited by  
15      the U.S. FDA on products shipped from the Dominican Republic grew from 5% of the  
16      tested shipments in 1985 at the beginning of the agro-export boom to 53% in 1989  
17      (Murray & Hoppin, 1992, p. 600).

18      6. See Eswaran and Kotwal (1989) for a theory of the relationship between credit  
19      market constraints and class-based outcomes in which credit constraints maintain the  
20      poor in their lower class position.

21      7. The relationship between crop characteristics and social outcomes follows from  
22      the discussion in Carter et al. (1995).

23      8. One may note the irony of a high cost for land titles and the inability to get credit  
24      without a land title. In fact the farmer mentioned above who wanted to title his land  
25      had recently been rejected for a loan he hoped to use to get title to the land.

26      9. Due to these high up-front costs and the low availability of credit, farms that  
27      grew strawberries on average planted half a hectare or less.

28      10. The data was collected by the author and an assistant in 1995 from a random  
29      sample of irrigated farms in the towns of Korba, Tazerka, Diar Hjjaj, Lebna, and  
30      Teffaloune. In addition to the variables presented here, the farmers were asked about  
31      adoption of irrigation technologies, access to credit markets, and interactions with the  
32      extension service. The sampling procedure was set up so that the data would be  
33      representative of irrigated farms in Cap Bon. A full description of the sampling  
34      methodology and a copy of the questionnaire can be found in Foltz (1998). For this  
35      analysis 6 (4%) data points were trimmed for missing data.

36      11. Sharecropped and rented land is not considered to have a title held by the operator.

37      12. Farmer reported salinity levels were triangulated with data from neighboring wells,  
38      information from extension agents who had in some cases measured the salinity in the  
39      particular wells, and in some cases tests of the salinity. Note that, because of early stages  
40      of strawberry adoption in this area, a farm's salinity level is likely a function of hydrology  
41      and cropping patterns previous to strawberry adoption.

## ACKNOWLEDGMENTS

I would like to thank Bruce Larson, Hans Lofgren, Jennifer Olmsted, and an  
anonymous referee for comments that greatly improved the quality of the paper.  
The usual disclaimer applies.

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