EMERGING ERITREAN AGRICULTURE IN ACCORDANCE WITH GLOBAL COMPETITION: A CASE STUDY ON ELABERED ESTATE

Rena, Ravinder

Department of Business and Economics, Eritrea Institute of Technology, Mai Nefhi, Eritrea

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- RAVINDER RENA*

I. INTRODUCTION

This paper explores the Eritrean agricultural production, land and people. It also provides the Elabered Estate, how it increases agricultural yields through using varieties of grains with greater resistance to disease and pests, together with the use of improved farm management techniques and chemical inputs, such as improved pesticides and fertilizers. Thus present paper covers the success story of Elabered Estate of an important player in Eritrean agriculture sector. The paper deals with the concerted efforts made by the Estate to go with the Global Competition. It also highlights some of the problems and challenges of Eritrean agriculture sector.

Agriculture is the key sector in most developing countries. It has a key role to play in enabling them to accomplish developmental goals, including self-reliance, growth and equity. Food production is a fundamental problem is many developing countries including Eritrea. The critical need for increasing food production in developing countries like Eritrea is through modern technology.

Eritrea got its independence in 1991 after 30 years freedom struggle. It is located in the Horn of Africa, bordered in the North and West by Sudan, in the South by Ethiopia and Djibouti and in the East by the Red Sea. It has an estimated population of about 4 million. Since its independence, the country has been undertaking number of developmental programs in rebuilding its war damaged economy particularly agriculture sector.

Agriculture is the backbone of the Eritrean economy, playing a vital role in the process of economic development. Agriculture is the livelihood of the vast majority of the Eritrean people of whom more than 70 per cent of the population depend on agriculture and its allied fields for income and employment (The World Bank, 1994: 5-6). The government of Eritrea, in its Macro-Policy gave top priority: "the improved agricultural production through development of irrigated agriculture, and by enhancing productivity of peasants, pastoralists and agro- pastoralists (GSE, 1994)."

Agriculture is the mainstay of the Eritrean economy because the majority of its population is engaged in peasant farming, growing sorghum, barley, *taff*, maize, wheat, fruits and vegetables as food crops, while producing cotton, coffee, and oil seeds as

*Assistant Professor of Economics, Department of Business and Economics, Eritrea Institute of Technology, Mai Nefhi, Post Box: 7956, Asmara, The State of Eritrea, Email: ravinder_rena@yahoo.com , ravinder_rena@rediffmail.com

industrial crops. Livestock development, dairy, meat and meat products, and sea fisheries also play significant roles in the economy. The highly developed commercial agricultural sector exports cotton, coffee, sisal fruits and vegetables, fish and dairy products to the neighbouring countries. The agriculture sector therefore, is the prime mover in the economy.

Modern and commercial agriculture in Eritrea began with the advent of Italian colonialism in 1890. After independence, commercial farming is being practiced to meet the consumption demands of the urban population, to supply local industries with raw-materials, and to generate foreign exchange reserves. There are few areas in Eritrea where modern agriculture is been practiced, they are: Aligidher, Hagas, Hamalmalo, Elabered etc.

II. LAND AND POPULATION IN ERITREA

Land Types and Uses in Eritrea

Table 1.1 shows land types and current and potential land uses in Eritrea. Currently, only about 3.6 percent of the total area of the country is under cultivation. On the other hand, 57.2 percent of the country's land is devoted to browsing and grazing. About 5.5 percent of the country's land is considered to be woodland and shrub land. A mere 0.4 percent of the country's land is composed of scattered patches of forests and another 0.1 percent under forest plantation activities. It should be noted that 33.2 percent of the country is considered to be barren land.

Table – 1.1 Current and Potential Land Use Categories in Eritrea in 1994.

	Current		Potential	
Types of Land Use	Hectares	Percentage of Total	Hectares	Percentage of Total
Rainfed Cultivated land	417,000	3.4	1,500,000	12.3
Irrigated land	22,000	0.2	600,000	4.9
Disturbed Forest	53,000	0.4	53,000	0.4
Forest plantations	10,000	0.1	10,000	0.1
Woodland and scrub land	673,000	5.5	5,979,000	49.1
Browsing and Grazing land	6,967,000	57. 2		
Barren land	4,047,000	33.2	4,047,000	33.2
Total	12,189,000	100.0	12,189,000	100.0

Source : FAO (1994) Agriculture Sector Review and Project Identification Mission, p.21.
Note: Depending on the sources, the statistics cited above may not match figures in other reports.

Potentially, the consensus estimate of potential arable land is 2.1 million hectares (or 17.2 percent of the country's total land). Of the 2.1 million hectares of potential arable land, it is thought that 1.5 million hectares are suitable for rain-fed agriculture and 600,000 hectares for irrigation. Despite its small amount of cultivable land it is trying to develop the cash crops that can meet the Global standards. However, the Government of Eritrea, and particularly the Ministry of Agriculture, should take the necessary steps to bring more amount of land under cultivation and realize the potential arable land in order to meet the Global Competition.

Land and Population

As population increases, per capita cultivable land diminishes simply because arable land remains at best constant. Land can become alienated from agriculture to urbanization and road network, and some land becomes so degraded that it will be only marginally usable for cultivation. At present, with total population of about 4 million, per capita cultivable land in Eritrea is 0.12 hectare. By 2010, when the population can be expected to reach over 5 million, the per capita cultivable land may diminish to well below 0.1 hectare unless the area of cultivable land is substantially expanded.

Population density and land use density in Eritrea vary by region. Table- 1.2 shows population size, amount of cultivated land and cultivated land per rural person by zoba (the term used to refer to administrative regions in Eritrea). The zoba of Debub, with a slightly more than a million people, accounts for about one-fourth of the country's total population. Zoba Gash-Barka has the largest cultivated land, 217,600 hectares, and also the largest cultivated land per rural person, 0.29 hectare. Overall, the cultivated land per person for the country is 0.12 hectare. The average farm size in the most intensively cultivated zoba Debub is about 0.2 hectare. Farm sizes in Gash-Barka are larger with the average reaching close to 2 hectares.

It should be noted from the table 1.2 that the urban population in most of the zobas except Maakel is seems to be very low hence the land per rural person and land per person in the country seems to be almost the same. In the due course of time Eritrea could also concentrate in industrial and services sectors like Japan, Taiwan, Thailand etc., and thus increase its urban population.

It is to be noted that the greatest potential for the expansion of cultivable land in Eritrea lies in the lowland regions, particularly Gash-Barka and Anseba, where the growing season tends to be short and most variable without irrigation. Expansion in the highland regions implies intensification on sloping land where the costs and risks of erosion are most severe (Ministry of Agriculture, 2002:16).

Table –1. 2 Cultivated Land and Population Distribution in the year1999.

S. No.	Zoba	No. of Sub Zobas	Population (000's)	Rural Population (000's)	Cultivated Land(000's) Hectares	Cultivated Land per Rural Person	Cultivated Land per Person
1	Anseba	10	570.2	562,7	58.1	0.10	0.10
2	Debub	11	1014.8	976.3	128.1	0.13	0.13
3	Gash-Barka	14	790.8	754.8	217.6	0.29	0.28
4	Maekel	4	726.6	188.5	27.8	0.15	0.04
5	N.Red Sea	9	558.5	567.2	40.8	0.07	0.07
6	S.Red Sea	4	273.9	223.9	0	0.00	0.00
	Total	52	3,898.8	3,273.4	471.9	0.15	0.12

Source: Ministry of Agriculture, Government of Eritrea, Agricultural Sector Policy and Strategy Framework: Background and Context Development and Management (November 2002), Asmara, p.16.
Note: The cities of Dekemhare, Assab, Tesseney, Massawa, and Keren, have been excluded from their respective zobas. However, the capital, Asmara, is included in the figures shown for zoba Maekel.

III. AGRICULTURAL PRODUCTION IN ERITREA

As mentioned in the earlier part of the paper, the majority of Eritreas are engaged in peasant farming, growing cereals such as maize, wheat, fruits and vegetables as food crops, and producing cotton, coffee, and oil seeds as industrial crops. Livestock products such as dairy, meat, and sea fisheries also play significant roles in the economy. The developed commercial agricultural sector exports cotton, coffee, sisal, fruits and vegetables, and fish to the neighboring countries, including Djibouti, Sudan, etc. (Ravinder Rena, 2002: 5-6).

It is found that commercial farmers are using surface and drip irrigation for high value crops, mainly horticultural. Such farms are located in the southwest part of the country along the river basins of Gash, Barka and Anseba. The principal products of these farms are bananas, onions, papayas, tomatoes, peppers, eggplants, okra, mangoes and citrus fruits. Double cropping is routine. Due to the practice of irrigation, farmers can meet domestic needs for most vegetables and fruits as well as generate exports with Global Standards.

The Government established a germplasm bank on plants, three research stations, and contacts with the international research institutions. Applied research on plant pests, livestock, forestry and horticulture are in progress. The laboratories are also under preparation. However, the main constraints are shortage of research scientists and skilled technicians, and lack of proper facilities and equipment (FAO, 2000:18).

As stated earlier, there have been attempts to apply modern technology in specific areas in the country such as Elaberit, Halhale, Aligidher, Hagaz, and Amalmalo. Three agricultural sites in Eritrea in particular -- Golluj in the Gash Barka, Shi'ib in the Northern Red Sea, and Hazomo in zoba Debub -- are considered to be "breadbasket" areas of the country[1].

After Independence, some of the research institutions or sub - research centers either renovated or re-established by the Government of Eritrea such as Halhale, Hagaz, Golij, Tekeret, Shieb, Gahtelay, Shmbuko, etc., to work more closely with the farmers and other related organizations (i.e. Ministry of Agriculture, university of Asmara, Food and Agricultural Organization etc.,) engaged in agriculture, and are playing vital role in the development of this sector.

Impact of Integrated Farming Scheme on Agriculture

Currently, two farming systems, the Integrated Farming Scheme (IFS) and the traditional farming practice, exist side by side. The IFS was started by the Government of Eritrea in 1998 to develop semi-and commercial rain-fed agriculture, mainly in southern Gash-Barka, considered having the highest potential for the project. The aim of IFS is to increase crop production and incomes through the use of modern farming practices and larger land holdings. The government supports the IFS by granting land concessions and

[1] These areas are chosen as work sites where deep agricultural research is proposed in due course.

providing machinery and fertilizer at cost. Reliable data are not yet available on the performance of the IFS. But, it is known that the area of land on rain-fed crops has increased by about 27 percent between 1996 and 1998. The area under IFS has been doubled from about 44,000 hectares in 1998 to about 90,000 hectares in 1999 (FAO, 2000:13).

According to a Ministry of Agriculture report, fertilizer, quality seeds, and better land preparation can raise cereal yields by about 85 percent; the maximum would be for pearl millet (127 percent) and the minimum for barley (32 percent). Potential increases for sorghum and wheat can reach 100 percent. (MoA., 2000).

The main source of water for irrigation is underground water explored from shallow, open hand-dug wells. In the Gash and Barka river basins, the wells are dug either on the river sand bed or on its outer edges in order to maximize the water content of the deep fine silt of alluvial soils. The capacity of wells is higher along these river basins because the water catchment areas are vast and annual rainfalls are high enough to induce adequate recharge (MOA, 2002, 16-17). The Government of Eritrea has been constructing new and rehabilitating old micro-dams in many areas.

Spate irrigation is considered to be the best option or strategy to increase crop production in Eritrea. This is true particularly if resource management, effective water control, improved seed variety, good quality extension service, such as pest control, and are introduced. Adoptive research is also important for the continuous improvement of crop yield. At present, about 20, 000 hectares of land are under spate irrigation, but potentially this can be increased to about 600,000 hectares (FAO, 2000:13). The bunds are low and are allowed to overflow to irrigate nearby fields. Although, spate irrigation is cheap, it permits only minimal water control and often necessitates repairs owing to flood damage. Absence of water management can results in flood damages.

While addressing the nation on the eve of 13th Independence Day, President Isaias Afwerki disclosed that "the efforts are under way to develop the agriculture including: terracing and leveling of cultivable land; building of numerous small-medium and large-sized dams; controlling water in all regions through the building of diversionary water canals and streams. He stated that "exploiting underground water resources and using them carefully and effectively; investing heavily in agricultural machinery and farming tools." Further, the President vouched that "introducing wide usage of modern irrigational technology; improving the quality of seeds, fertilizers and pesticides; increasing the production of meat, milk, pulses and oil in quality and quantity; selecting and upgrading agricultural products for export markets etc[2]."

[2] President Isaias Afwerki's speech on the eve of 13th Eritrean National Independence Day i.e. May 24, 2004 - excerpts and see also *Eritrea Profile* (A Weekly Bulletin of News and Views) Ministry of Information and Culture, Vol. 11, No. 15, (25th May, 2004).

Challenges of Eritrean Agriculture Sector:

The agricultural sector works as an engine for growth and development of the other sectors of the economy. However, this sector has been facing many challenges in Eritrea: inadequate investment in agricultural research; war and drought; lack of irrigation, unwise irrigation practices and unregulated use of available resources; credit and market facilities; soil degradation and desertification; reduction in pastoral production; traditional methods of farming; seasonal migration of farmers; pests, diseases and weeds; land tenure systems; food shortages poor rural roads and related underdeveloped infrastructure. The constraints that the Eritrean agriculture is facing are causing low productivity in this sector and require practical and effective solutions.

IV. THE ELABERED ESTATE

Elabered Estate established in 1958 by an Italian entrepreneur and is located in the Anseba Region of Eritrea about 68 Km north-west of Asmara, the national capital of the country. The farm was heavily damaged during the war for independence and rebuilt on this foundation in 1998. From 1991 up to 1995 it was administered (under the commercial farms) under the umbrella of the Ministry of Agriculture. And from 1995, the commercial farm was begun to be administered separately till the time of its privatization on 17 February, 1998.

Since 1998 immediately following privatization, the Estate followed a dual approach to the agricultural development. These were the "improvement" and "transformation" approaches. The improvement method is meant to bring gradual improvement in farming methods in the Estate. The transformation approach aimed at rapid increase in production through modern methods.

It is to be noted that, the Estate covers a total land area of about 1,200 ha of land. Of which 300 ha is arable land, 108 ha is covered by various kinds of civil works, 22 ha is presently occupied by ponds, dams and canals, while the remaining 570 ha is topographically rough and primarily steep, covered with trees, vegetation and stones. Of the 300 ha of arable land about 84 ha is covered with perennial crops while 86 ha of the Estate is mainly under vegetable and fodder crops. Portions of the remaining irrigable land is recently been developed while the rest are being unutilized primarily for crop rotation and future expansion of fruits and vegetables. Out of the 570 ha about 100 ha is occupied by grass during the rainy seasons.

The Estate set up its base in accordance with the Global agricultural standards and thus engaged in commercial agricultural production. In the year 2003, the Estate was awarded the World Quality Commitment International Star Award it was conferred by the Paris based International Selection Committee of Business Initiative Directions. It is observed that the Estate is acting as a 'national model farm', with its innovative strategies for future agricultural development in Eritrea. It is also active in conducting farm research and training programmes and developing new variety of crops in order to cope with the Global standards. Cutting –edge experiments in horticulture and farm mechanization are

present activities and finding solutions for appropriate technology and food security. Horticulture is the fastest growing area of the Estate, keeping 15-20 different vegetables under production for the export market in the Middle East and also the local market.

The Estate is therefore working to develop international consumer awareness of Eritrea's leading agricultural export products such as lettuce, fruit etc., as the best that money can buy (see table 1.4). The Estate is expected to enjoy competitive advantages by virtue of characteristics unique to Eritrea's agricultural products. The Estate has formulated a plan dubbed "Program for Strengthening International Marketing of Agricultural Products." The Estate chief agricultural export markets are Saudi Arabia, Dubai, etc.

Table- 1.3 Forecast of Export and Domestic Market in the year 2003 and 2007

(Quantity in kg.)

Crop	2003	2007
Lettuce red rosso	15750	40000
Lettuce red Oak-leaf	13000	20000
Lettuce green biondo	9000	30000
Lettuce green frisee	13000	15000
Curled parsley	3000	10000
Radish red	2600	8000
Sweet melon	2790	20000
Pepper green hot	6750	10000
Pepper green sweet	27000	35000
Squish	2250	5000
Leek	9000	15000
Green beans	26775	40000
Eggplant	44300	50000
Celery	3000	5000

Source: Elabered Estate Central Office- Asmara, the State of Eritrea.

Further, the Estate is exerting efforts in modifying itself according to the global environmental changes. It is found that the Estate is utilizing and recycling existing resources that have a cost reducing effect. It is concentrating on the principles of: a] Sustainable farming; b] Intensive agriculture production; c] Quality production. Besides, it is exporting selected crops and processing its own raw materials, which can add value to the product.

Features of the Estate:
Its vision is to rebuild and modernize the farm, and to add value and employment to the Anseba region in Eritrea. It stays at the cutting edge of agriculture development in the country.

1] It is a profitable agriculture enterprise.
2] It process dairy, meat etc.,
3] It serves as model farm for Eritrea delivering innovative solutions to agricultural practices, appropriate technology, feasible crop programs etc.
4] It stimulates agro business in the Anseba region and enhances the quality of agro products.
5] It provides expert advice and

6] It creates and facilitates new business opportunities.

Potential for Growth in the Estate:

It is to be observed that the agro food sector of the Estate offers significant potential for expansion in the coming years. Markets are available for domestic production. It has an advantage of vegetable production year around. For instance, four harvests per year of lettuce obtained in the farm and 12-14 cuts of Alfa-Alfa are obtained per year. However, it can be suggested that introduction of modern irrigation technology and farm mechanization enables the Estate to save the water and intensify its production. Furthermore, it has the scarcity of skilled manpower therefore, highly skilled manpower is imperative for the growth of the Estate.

Existing production can be expanded by 75 – 120 ha of land within the boundaries of the Estate that is to be shared between milk/cattle, cash-crops and fruits. It is reported that the total land share between the different productions will be: fruit 100 ha, green feed 100ha, cash crops of vegetable 50-100 hectares(see tables: 1.5, 1.6, 1.7 and 1.8). Dairy cattle expansion up to 450 milking cows and swine expansion up to 2500 based on the existing stock of animals.

It is to be noted that the Estate has been making profits during the period 1998-2003 i.e. after its privatization till last year. Nevertheless, the Estate has been facing certain challenges. When the researcher conducted an interview with Morgan Hoff, General Manger of the Estate, he disclosed that the challenges are: increasing drought related problems; bureaucratic procedures; foreign currency problems; networking problems; lack of skilled manpower etc., According to the available information, the Estate exports its agricultural products (particularly lettuce) to some five star hotels in Jeddah, Riyadh and it is reported that around 250 – 500 k.g. it exports every week to those hotels.

Policy Implications:

It is to be noted that Eritrean agriculture would do well to develop competitiveness in three areas: improved seedlings, certification of quality and brand-name promotion. In order to face mounting pressure from international competition, Eritrea's agriculture must set itself apart from the crowd by focusing on high-quality, high-value products, and relatively small-scale independent farmers must integrate to form large-scale, export-oriented operations employing up-to-date corporate management techniques.

It can be suggested that Eritrean agriculture must advance its global marketing finesse and that production must become more responsive to market demand. It is to be noted that the regrettable fact many foreigners have become aware of the superiority of Eritrea's agricultural products only after visiting the country. Therefore, there is nothing keeping Eritrea agriculturists from successfully promoting these outstanding products in the international market. Hence, Eritrea should be proactive in studying international consumer habits, strengthening its global marketing capabilities and meeting international hygiene and safety standards. The International Marketing Promotion Plan is being implemented beginning from 2004.

Beyond the initial recovery period, the challenges facing agriculture would appear to be low productivity levels, widespread poverty, erratic rainfalls and a chronic food deficit in the country as a whole. Yet the very levels of productivity in Eritrea, particularly in the highlands paradoxically present the best opportunity for growth in the short to medium term. Substantial gains in agricultural production could be obtained by relieving some of the key constraints and bottlenecks impeding farmers' productivity. The following measures can improve the productivity in Eritrean agriculture.

Measures to improve the productivity in Eritrean agriculture

1. The rehabilitation of the existing irrigation schemes and the construction of additional micro-dams in appropriate areas. Irrigation facilities must be developed by constructing major, medium and minor irrigation projects, to make it possible to produce two or three crops per year;
2. The continued expansion of soil and water conservation programs but with particular attention to integrating conservation techniques into production systems, furthermore, to protect soil from degradation, use of fertilizers and crop rotation methods may be adopted; in addition, developing and disseminating of local drought resistant, fast maturing crop varieties;
3. Modern methods of production must be adopted. The farmers must be supplied with modern machinery, better quality seeds, chemical fertilizers and pesticides etc., Improved methods of cultivation must be made known to the Eritrean farmers by propaganda and practical demonstration;
4. Improving farm practices including a harmonious effort to introduce improved pest control system to reduce the incidence of crop loss due to pest infestation;
5. Farmers must be provided with adequate credit at low rates of interest through commercial banks (i.e. Commercial Bank of Eritrea, Housing and Commerce Bank of Eritrea, and Eritrean Development and Investment Bank etc.,) and other related credit societies. Establishment of sustainable rural financial services to enable farmers to gain access to the credit to purchase better seeds, fertilizers, and required implements etc.,
6. Agriculture research must be encouraged. Agriculturists must be given necessary technical skills and assistance by organizing seminars and workshops etc.,. And also the average farmers should be given extension training programs;
7. Marketing facilities must be improved in several areas and the government has to set up some regulated markets. This will enable farmers to secure better prices for their products as it eliminates the middlemen from the markets of the country.

V. CONCLUSION

It should be noted that the urban population in most of the zobas except Maakel is seems to be very low hence the land per rural person and land per person in the country seems to be almost the same. In the due course of time Eritrea could also concentrate in industrial and services sectors like Japan, Taiwan, Thailand etc., and thus increase its urban population.

Given the present Eritrean agricultural conditions, the problems and policy issues need to be critically considered by undertaking in depth studies of various aspects of the Eritrean agricultural sector. There are no ready-made policy prescriptions to deal with the complex problem of agricultural development in accordance with the Global

Competition. However, there is a need to recognize the interrelationship between various policy instruments. As such, a mechanism for integrating them must be provided. The principal challenge of successful agricultural development is to attain an efficient path of technological change that saves the relatively scarce factor of production. The critical link between farmers and research institutions is essential to foster the development and application of scientific and technical knowledge for the benefit of traditional agriculture. Further, a land-reform program, which consolidated land holdings, would facilitate the drive for increased production introducing economies of scale to farm management, with a consequential benefit to national exchequer. The irrigation problem in Eritrea can be improved if Eritrea preserves every drop of rain water that comes from the cloud and construct dams and reservoirs and use drip irrigation to grow its crops. By doing all this, Eritrean agriculture in general and Elabered Estate in particular can certainly emerge as Global level competitors and thus Eritrea can become the Grain Basket of East Africa.

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