

Arab Republic of Egypt

**Sustainable Agricultural Development:
Business Plan Overview
(2010/2011 – 2016/2017)**

Ministry of Agriculture and Land Reclamation

Agricultural Research and Development Council

August 2010

Acronyms

ARC	Agricultural Research Center
ARDC	Agricultural Research and Development Council
ARE	Arab Republic of Egypt
CGIAR	Consultative Group on International Agricultural Research
EGP	Egyptian Pound
FAO	Food and Agriculture Organization
GFAR	Global Forum on Agricultural Research
GCARD	Global Conferences on Agricultural Research for Development
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
MALR	Ministry of Agriculture and Land Reclamation
MOLD	Ministry of Local Development
MOC	Ministry of Communication
MWRI	Ministry of Water Resources and Irrigation
OECD	Organization for Economic Cooperation and Development
SADS	Sustainable Agricultural Development Strategy
WB	World Bank

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FISCAL YEAR

July 1 – June 30

CURRENCY EQUIVALENTS

(As of June 2010)

US \$1.00 = 5.6875 Egyptian Pounds (EGP)

EGP 1.00 = US \$0.1759

WEIGHTS AND MEASURES

1 centimeter (cm)	=	0.394 inches
1 meter (m)	=	39.370 inches
1 kilometer (km)	=	0.620 miles
1 square kilometer (km ²)	=	0.386 square miles
1 feddan (fed)	=	0.420 hectares, 1.037 acres
1 hectare (ha)	=	2.470 acres
1 cubic meter (m ³)	=	35.310 cubic feet
1 cubic meter per second (m ³ /s)	=	35.310 cubic feet per second
1 liter (l)	=	1.057 quarts
1 liter per second (L/s)	=	0.035 cubic feet per second
1 kilogram (kg)	=	2.205 pounds
1 metric ton (t)	=	2,205 pounds
1 kilowatt (kW)	=	1.341 horse power
Ne or Na	=	English count (= 1.7 millimeters)

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Foreword

Egypt was among the developing countries which were affected by decreased availability of food commodities, particularly grains (from 2007 – 2008). Bidding wars between importing countries, especially for wheat, disrupted food chain supplies and led to increased prices. This necessitated undertaking a complete revision of agricultural development scenarios and adjustment measures to soften shocks in Egyptian agriculture.

Consequently, the Ministry of Agriculture and Land Reclamation (MALR) coordinated efforts to produce a comprehensive document entitled “Sustainable Agricultural Development Strategy towards 2030.” The Strategy was presented to stakeholders and partners and was considered the primary document to chart the course for future directions in agricultural development. The Strategy recommended that special attention be paid to upgrading agricultural human resources and technologies to meet future needs and ensure sustainable use of available water and land resources.

To implement the Strategy’s recommendations, MALR and teams of national and international experts embarked on preparation of the “Sustainable Agricultural Development: Business Plan (2010 – 2017).” The Plan was produced and shaped after a lengthy consultative and participatory process involving all stakeholders and private sector representatives including farmers. Lessons learned during the Strategy preparation were incorporated into the Business Plan.

It is my pleasure to thank all members of the team who were involved in the Business Plan preparations for their efforts and participation in producing the document in a timely manner. I would like also to acknowledge international agencies’ contributions and support e.g. the Food and Agriculture Organization of the United Nations, the International Fund for Agricultural Development and the World Bank.

My sincere appreciation is also extended to the Agricultural Research and Development Council for its efforts to produce the Agricultural Strategy and subsequently the Business Plan. I hope that implementing the Business Plan will improve the livelihood of rural populations and attract needed agricultural investments for a brighter future through sustainable agricultural development.

**Minister of Agriculture
and Land Reclamation**

Amin Abaza

Introduction

The Egyptian Government, as represented by the Ministry of Agriculture and Land Reclamation, was actively responsive to minimizing the impact of food supply disruption and difficulties in reacting to the subsequent world financial crisis. These shocks resulted in increased food prices and decreased availability of grains, particularly cereals, in national and international markets. Disruptions in supply and demand necessitated revising Egypt's approach to agricultural development. Subsequently, MALR produced the document "Sustainable Agricultural Development Strategy towards 2030" in 2009. To translate the Strategy objectives into action, the preparation of the "Agricultural Business Plan 2010 – 2017". The Business Plan covers the last two years of the 6th National Economic Plan and continues with the 7th National Economic Plan for five years (2012 – 2017).

The Business Plan is composed of four main parts, as follows:

1. **Main Document:** This includes the Main Plan's report.
2. **Annex 1:** This includes all technical details of the Plan, Development Programs, Principal National Projects and Projects.
3. **Annex 2:** This includes all investment tables for each program, project, sub-project and five agro-ecological regions identified in the Strategy and the Plan.
4. **Plan Overview:** This was prepared in English to provide summarized information for international partners.

The Plan encompasses nine Development Programs which include 25 Principal National Projects and 88 Projects addressing agricultural human resource needs, sustainable development of natural resources, particularly land and water, production improvement to meet food security needs and upgrading livelihood of rural populations. The Plan will lead to producing positive social and economic implications if implemented in a timely manner.

The Plan's total investments are about 107 billion Egyptian Pounds over seven years with private sector funding of nearly 54% and a government contribution of about 46%. Investments will increase production of commodities and generate additional job opportunities of about 1.6 million jobs which will sustain 8 million persons in rural areas. Farmers' incomes would increase by about 30-50%. The Plan encompasses projects which will improve the production-to-marketing chain. The Projects' implementation in both sequential and parallel modes is based on recognizing prerequisites for integrated management of identified investments. The Plan also highlights the roles of information and technology contribution to sustaining agricultural development efforts.

Cooperation between MALR and other government agencies is ensured through the formation of an active steering committee which will review the Plan's progress periodically. Securing Plan funding from the government, private sector and international organizations is in progress. In this respect, the Agricultural Research and Development Council is grateful to the active cooperation extended by the Food and Agriculture Organization, the International Fund for Agricultural Development and the World Bank. The Strategy and the Plan resulted from a bottom-up participatory and consultative process by all stakeholders, especially farmers, in all the agro-ecological regions of Egypt. The Plan discussions in special workshops in the five

regions were instrumental in shaping the document and its programs. The Plan's implementation during the next seven years will also be based on participatory consultation of beneficiaries at all levels.

The Plan's primary objectives and achievements will be reviewed periodically to assess implementation progress and adjust programs to meet the change agenda. Sustainability of natural resources will always be central to meeting plan objectives. Improving rural populations' livelihood and upgrading agricultural human resources capabilities will receive continued support of public and private sectors' efforts.

Chairman
Agricultural Research
and Development Council

Prof. Dr. Adel El-Beltagy

Overview

The Ministry of Agriculture and Land Reclamation (MALR) has coordinated efforts among the agricultural sector stakeholders to produce a comprehensive report entitled, “Sustainable Agricultural Development Strategy (SADS) towards 2030” in 2009. The Strategy was the result of an interactive participatory consultation process with stakeholders and a bottom-up assessment of development constraints and potential of Egypt’s identified five agro-ecological zones, namely: Upper Egypt, Middle Egypt, East Delta, Mid-Delta and West Delta. The overall objectives of the Strategy are:

- *Promoting sustainable use of natural agricultural resources;*
- *Increasing the productivity of both land and water units;*
- *Raising the degree of food security of the strategic food commodities;*
- *Increasing the competitiveness of agricultural products in local and international markets;*
- *Improving the climate for agricultural investment; and*
- *Improving the livelihood of the rural inhabitants, and reducing poverty rates in the rural areas.*

The main framework of the Business Plan is based on the Strategy Vision and Mission, which are as follows:

Vision

“To achieve comprehensive economic and social development based on a dynamic agricultural sector capable of sustained and rapid growth, while paying special attention to helping the underprivileged social groups and reducing rural poverty.”

Mission

“Modernizing Egyptian agriculture based on achieving food security and improving the livelihood of the rural inhabitants, through the efficient use of development resources, utilization of geopolitical and environmental comparative advantages of the different agro-ecological regions.”

Egyptian Agriculture is facing many challenges to keep up with increasing population needs, in terms of food security, increased costs of production inputs, and responding to marketing dynamics. Although agriculture’s share in the overall GDP has declined steadily from 20% in the 1980’s to about 14% in 2009, the agriculture sector remains a significant contributor to the Egyptian economy, The importance of agriculture in providing livelihood for about 55% of the population at present would continue, as it provides a primary source of

income and employment. However, off-farm employment is increasingly becoming necessary to augment rural families' incomes. Primary sources of that are remittances and associated rural development activities, e.g. providing rural transportation and agri-business activities. The primary objective of the First Business Plan is to decrease rural poverty, thus linking with the first and seventh Millennium Development Goals (i.e. eradicate extreme poverty and hunger, and ensure environmental sustainability, respectively).

The First Business Plan was prepared to implement Strategy objectives and translate it into action. Participation of concerned stakeholders in the public and private sectors was practiced in all stages of Plan preparation and discussions. The teams who prepared different parts of the Plan made sure that beneficiaries' and stakeholders' opinions and feedback were based on a bottom-up approach. In all stages of the Plan's preparation, particular emphasis on stakeholders' involvement from the five agro-ecological zones and teams of experts was followed from the outset.

International and national attention to rethink and reorient the role of agriculture in development has led to holding several international conferences. Food security issues were addressed during the "High-level Conference on World Food Security: the Challenges of Climate Change and Bio-Energy" held in Rome, June 2008. The World Bank (WB) produced two documents, "World Development Report 2008: Agriculture for Development", and the "International Assessment of Agricultural Knowledge, Science and Technology for Development" issued in 2008. In addition, several other reports call for reactivating the role of international institutions in agricultural development, including the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the Consultative Group on International Agricultural Research (CGIAR), and the Global Forum on Agricultural Research (GFAR).

The "L'Aquila" Joint Statement (July 10, 2009) on global food security confirmed agreements among the G-8 Heads of State, participants and representatives of multilateral, bilateral and government agencies to address food security issues. The statement emphasized in paragraph 5 that, "sustained and predictable funding and increased targeting investments are urgently required to enhance world food production capacity. Commitments to increase ODA [Overseas Development Assistance] must be fulfilled. The tendency of decreasing ODA and national financing to agriculture must be reversed. We are committed to increase investments in short, medium and long term agriculture development that directly benefits the poorest and makes best use of international institutions. We support public-private partnerships with adequate emphasis on the development of infrastructure aimed at increasing resources for agriculture and improving investment effectiveness." The statement's conclusion to increase commitments to agriculture and food security towards a goal of US\$ 20 billion over three year was a testimony to the G-8 determination to increase investing in sustainable agricultural development. The G-8 was also determined to improve coordination of financing mechanisms to achieve timely funding of agricultural investments. GFAR strongly endorsed and supported the L'Aquila statement and recommended taking forward the processes of change in the way agricultural research and innovation are prioritized, governed and implemented.

To bring agricultural research efforts to the forefront of the agricultural development agenda; GFAR invited about 1,000 participants to the First Global Conference on Agricultural Research for Development (GCARD) in Montpellier, France during March 28 – April 1, 2010. Participants included researchers, farmers, donors and members of civil societies around the world. The conference was instrumental in developing a focused agenda and approach to foster reshaping of agricultural development issues, especially agricultural research. The

Overview: Sustainable Agricultural Development: Business Plan (2010/2011 – 2016/2017)

aforementioned developments have triggered several changes in assessing the agricultural sector's needs and charting future directions.

The First Business Plan takes into consideration achievements and lessons learned from the implementation of previous strategies and projects. It establishes priorities for investments in the agriculture sector and fosters complementarity between the government's budget resources and private sector contributions (this includes farmers as the main contributors to private sector activities). The First Business Plan (2010-2017) fits with the 5-year economic planning process in Egypt as it incorporates achievements gained during the last 3 years and addresses future directions in the remaining 2 years of the ongoing Economic Plan. This will form the basis for completing investments in tandem with the ongoing (6th) National Economic Plan, which ends in 2012 and will be concomitant with the 7th five-year Plan (2012-2017). This will provide continuity of investments and streamline rural development activities between the two National Economic and Social Plans and the Business Plan.

The Business Plan has been prepared in four primary interrelated and complementary documents. The first is the Main Document and the second is Annex 1, which provides technical framework and details of the Business Plan. The third part (Annex 2) provides tables of estimated investments and projects in different agro-ecological regions. The fourth is an English overview to provide summarized information for international policymakers. The Business Plan contains nine Primary Programs with 25 National Projects and 88 Projects.

One question arose before developing the SADS and the Business Plan: what is the cost of maintaining the status quo, doing nothing or implementing piecemeal improvements in agricultural technology transfer and investments? The following crucial factors should be addressed to answer the aforementioned question:

- i. Human resources development;
- ii. Natural resources sustainability;
- iii. Keeping pace with population increase;
- iv. Responding to food security concerns;
- v. Increasing cost of food commodities and decreasing availability in international markets; and
- vi. Stagnating and deteriorating livelihood of rural communities.

In the last five years, all indicators pointed to a precarious and a grim scenario of agricultural development with deteriorating implications for the human and natural resources base. In this regard, it is worth mentioning that the Plan's programs and projects are designed to face agricultural development constraints, particularly water resources scarcity and deteriorating quality. This is exacerbated by negative effects of climate change and decreasing share of investments in agriculture compared to other sectors of the national economy.

If the Plan is not implemented, it would lead to setbacks in rates of agricultural growth, declining rates of self-sufficiency in primary commodities, increased dependence on imports and decreased availability of raw materials. Moreover, natural resources degradation would continue at higher rates leading to increased rural poverty and migration to urban areas.

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Unemployment in rural areas and outmigration would cause a setback to alleviate poverty and would have increased with damaging spillover effects on urban areas and cause the overall economic rate of growth to decline.

The upheaval in international financial markets and unstable food supply prompted Egyptian policy makers to enact measures necessary to safeguard declining economic growth rates. Consequently, the only solution and acceptable scenario is to provide impetus to sustainable agricultural development through knowledge and anticipatory research and extension programs, such as formulating the Agricultural Strategy towards 2030 and preparing a Business Plan to implement SADS objectives. The Plan is also dynamic and evolving and is designed to respond to change. The cost of not implementing the Plan or undertaking small increments in agricultural development will not achieve gains but on the contrary, will result in precipitous decline in agricultural output and livelihood, and will undoubtedly threaten the country's security and social stability.

Objectives

1. *Livelihood Improvement of the Rural Population:* Special consideration is devoted to increasing rural incomes by promoting both on-farm and off-farm employment generation. The Agricultural Business Plan complements efforts of other government agencies, particularly the Ministries of Local Development and Social Solidarity. Special attention will be paid to the role of women in the agriculture development process in general, and specifically how to improve their livelihood, as some of them are heads of families with migration of male workers to urban areas or abroad. The Plan recognizes women's active participation and contribution in agricultural research, extension and development (e.g. Project for Specialized Production Villages).
2. *Human Resources Development:* Following the preparation of the Strategy, stock-taking of available Human Resources at regional and national levels began. This is to identify and assess qualifications and needed skills to implement the Business Plan. Training of staff is already in progress and started with in-country and overseas programs of a new cadre of on-farm irrigation specialists.
3. *Sustainable Natural Resources Development:* The Plan's core emphasis is increasing productivity and ensuring sustainability of available water and land resources. In this context, the understanding of climate change implications is important in assessing sustainability of available resources. Regional considerations are of paramount importance, as each agro-ecological region has its own distinctive set of natural resource endowments. Hence, investments are geared towards increasing and sustaining productivity of natural resources. Although Egyptian agriculture is primarily dependent on irrigation, special attention is provided in the Business Plan to ensure development of rain-fed areas.
4. *Food Security:* Egyptian policy makers are highly cognizant of food security concerns and finding means to resolve them in all formal and informal fora. The President of Egypt has stated in his address to the Food Security Summit in Rome in January 2008, **“food security is the most dangerous link in the food crisis, not by itself, but for its consequences on livelihood and in developing countries’ efforts to achieve the Millennium Development Goals ... Food security faces difficult challenges because of increased prices of food commodities and a decrease in international inventories at its lowest levels since the 1970’s ... I renew the invitation to conduct an international dialogue as soon as possible to articulate efforts facing the current food crisis in the short-, medium- and long-term. Ongoing and future land reclamation programs will augment Egypt’s efforts in agricultural development. Similarly, increasing productivity and needed marketing infrastructure is of paramount importance. A focused dialogue should be based on critical scientific research and assessment to use fertilizers and develop high-yielding strains.”**

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The urgency to prepare a sustainable agricultural development strategy assumed great importance during the last three years, which led to the preparation of the Sustainable Agriculture Development Strategy Towards 2030, which provided the basis for the First Business Plan to translate SADS objectives into investments in the next seven years.

Resolving food security challenges is of primary importance, especially with an increasing population. Consequently, Egypt imports about 40%¹ of its food and 60% of its wheat requirements; hence, special emphasis on import substitution is an integral part of the Business Plan. Therefore, increasing self-sufficiency in selected primary strategic food crops and ensuring exports for some commodities is the main objective. The following table illustrates the current and expected self-sufficiency figures (2007 and 2017).

Table 1: Self-Sufficiency of Primary Food Products (%)

<i>Primary Food Products</i>	<i>Percentage of Self-Sufficiency (2007)</i>	<i>Expected Percentage Self-Sufficiency (2016/2017)</i>
Wheat	54.4	73.9
Maize	53.2	78.3
Sugar	76.9	81.9
Fava Beans	52.1	69.6
Rice	139.1	105.2
Tomatoes	103.5	126.1
Citrus	134.5	154.5
Dairy	90.6	98.2
Red meat	66.9	77.2
Fisheries	97	108.7

¹ Amount above 100% is for export

Source: MALR Database

The Plan places special emphasis on promoting livestock, poultry and fisheries, which represented 42% of agricultural GDP in 2008. Moreover, meeting nutritional needs is important and can be provided from these animal protein sources.

¹ Ministry of Agriculture and Land Reclamation

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5. *Marketing:* Improvement of markets, especially in the old lands is proving to be challenging due to the multiplicity of involved organizations at the village level, middlemen, land fragmentation and weak infrastructure. Post-harvest losses of main agricultural commodities e.g. cereals, legumes and horticultural crops vary between regions. The link between farms, markets and the marketing system as a whole is required. Food safety is also crucial and a draft law is under consideration to streamline standards, labeling and decrease adulteration of food products.

Pricing mechanisms for food related commodities are subjective and sometimes are fueled by misinformation spread by special interest groups and rent seekers. However, the declaration of floor prices by MALR *prior* to planting season is an important factor in farmers' decision to plant certain crops to maximize their revenues.

The Business Plan addresses production-to-marketing chain links and provides a level playing field for agriculture investments. The Plan recognizes the pull effect of perishable horticultural products and special assessment of domestic and export markets if exports of crops and products are to be promoted (e.g. fruits and vegetables, etc.). Assessing export market potential followed by targeted prioritization and increased production is the logical approach i.e. demand-driven approach.

6. *Improving Investment Climate:* Investment policies would be reviewed in the first two years of the Plan and studies would be conducted to provide a suitable framework to encourage investments. This would be attained by simplifying agriculture credit procedures and providing needed marketing infrastructure. Upgrading of information technology aspects at the village level is essential in assessing market needs. Current data does not provide accurate investment figures for agriculture only as it is usually combined with irrigation. Agro-industries data are generated through the Ministry of Industry and Commerce. Developing a reliable agricultural investment database is essential to provide accurate benchmarks. This is one of the important components of the marketing and agro-industries program of the Business Plan. Improving investments' flow to agriculture, will primarily depend on the following factors:

- i. availability of a credible data base to provide baseline studies;
- ii. accurate assessment of production to marketing chain links which varies for each commodity and stage of processing;
- iii. identifying marketing infrastructure at the domestic and international level if the commodity is to be exported;
- iv. availability of trained human resources to prepare credible feasibility studies and implementation follow-up;
- v. ensuring financial and credit sources to proposed investments;
- vi. honoring contractual systems between producers and buyers;
- vii. timely availability of inputs and outputs at prices stipulated in the contract system;
- viii. continued vigilance to changing markets based on current and future markets;
and

- ix. recognizing that provision of investments is to start a project, continuity of investments and realization of profitable returns is essential to the projects' success.

x.

The Plan's Development Goals

1. *Rationalizing Water and Land Use:* The Business Plan's main focus is to increase productivity of natural resources, particularly water and land. Efficiency of water use in agriculture should be improved, especially on-farm irrigation. The Plan's target is to increase field efficiency from 50% at present to 75% in 2017 in 3.5 million feddans of old lands. The Plan will also implement field irrigation improvement on about 2.1 million feddans in new lands with private sector efforts. The Plan will not only build on available staff and equipment, but also introduce new Advanced Remote Sensing and Ground Truthing Tools and equipment as well as upgrading staff capabilities to survey and analyze land and water information. In addition to improving land and water use, introduction of new high-yielding drought-tolerant varieties will contribute to increased productivity from 15-20%. Improved cultural practices will also be introduced to supplement land and water improvement measures. A two-pronged development approach is adopted based on changing the genetic make-up of commodities and an agricultural management technology package with modernizing on-farm irrigation as the central element of improving agricultural production systems.

2. *Human Resources Development:* The Plan's successful implementation depends on availability of qualified and trained staff and stakeholders at all levels (i.e. village, regional and national). This was recognized early-on by the Agricultural Research and Development Council (ARDC). Selection of suitable candidates, including women, to form the nucleus of on-farm irrigation advisors was launched and the first group of 25 received overseas training at the University of California – Davis, USA. After completing on-farm irrigation courses and field visits, they participated in forming a new core of extension staff which ultimately would include a proficient team in needed disciplines from production to marketing. Continued in service training and exposure to up-to-date technology information will augment their skills to keep them on the cutting edge of agricultural development. Training programs for participating scientists at the Agricultural Research Center, Research Institutes and Regional Research Centers have been planned and costed for the first two years of Plan implementation. There will be continued development and evaluation of courses, programs and skills in an ongoing effort during Plan implementation. Special attention and focus is devoted to organizations and farmers' societies at the village level. As some of the farm operations and marketing of products are performed by women, improved technology packages will pay special recognition to foster their knowledge capabilities.

3. *Increased Production and Ensuring Food Security:* The Plan's specific targets to improve and increase agricultural production are summarized as follows:

- i. Increasing wheat production from 7.4 to 12 million tons which leads to meeting 74% of local demand. Results of ongoing studies to rationalize local demand and consumption would be incorporated in Plan reviews;
- ii. Maintaining self-sufficiency in rice with a surplus for export of about 200,000 tons;

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- iii. Increasing maize production from 6.5 to 13.9 million tons, sorghum to 1.4 million tons and barley to 400,000 tons;
- iv. Reducing pre- and post-harvest losses by half;
- v. Increasing faba bean production to 183,000 tons and self-sufficiency to 75%;
- vi. Increasing green fodder production by 50%;
- vii. Increasing cotton yields by 67% to 1.6 tons/feddan;
- viii. Increasing oil crops area to 343,000 feddans;
- ix. Increasing domestic production of sugar by 52%, and self-sufficiency to 82%;
- x. Increasing overall vegetable production between 20-40%;
- xi. Increasing productivity of primary fruit crops by 40-50% through increasing area planted to 1.5 million feddans and yields by 15-20%;
- xii. Devoting resources to improve medicinal, aromatic plants and ornamentals according to domestic and export market needs;
- xiii. Increasing dairy production to 7.2 million tons and annual per capita consumption from 63 kg to 80 kg, thus reducing imports;
- xiv. Increasing poultry production of broilers to 1.1 million birds annually and egg production to about 7.2 million eggs annually; and
- xv. Increasing inland and marine fisheries by 1.5 million tons annually, thus improving annual per capita consumption from 13 to 16 kg.

A summary of yield levels based on 2007 data and estimates with the Plan in 2017 is provided in Table 2.

Table 2: Present and Anticipated Productivity of Main Crops (tons/feddan)

Crop	2007	2017	Growth (%)
Wheat	2.7	3.2	19%
Rice	4.1	4.5	10%
Maize	3.5	4.4	26%
Sugar cane	49	56.6	16%
Sugar beet	22	28	27%
Groundnut	1.4	2	43%
Fava beans	1.4	1.6	14%
Cotton	1.4	1.6	14%
Citrus	9.1	12	32%
Grapes	9.9	12	21%

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Olives	4.6	6	30%
Mango	4.6	6	30%
Tomatoes	14.5	20	38%
Beans	5.1	7	37%
Potatoes	10.7	12	12%
Medicinal plants	1	1.1	10%
Perennial clover	29.6	35	18%
Dates (kg/tree)	104	110	6%

Source: Sustainable Agricultural Development Strategy towards 2030.

4. *Promoting Competitiveness:* Despite its sizable contribution to GDP, employment and food security, the agriculture sector is facing threats notably a sharp fall in its share of investment. Moreover, the increasing demand on scarce resources must be countered by increasing productivity and efficiency from within the sector.

The increased agriculture competitiveness should include the creation of a stable macroeconomic environment, efficient legislation and institutions and regulations that achieve optimal resources allocation. Therefore, the adoption of a “Sector Transformation Strategy” by the government represents a major step towards rebuilding sector competitiveness.

The Strategy and the Business Plan seek to build on the existing strengths such as export potential, production growth and the availability of high-quality natural resources inputs by focusing on:

- i. Promoting agro-industries and the intersection of the agricultural and industrial sectors to foster growth; and
- ii. Resource optimization, which is vital for both sectors’ productivity and sustainability.

Egypt’s adoption of free-marketing, reassessing its comparative advantage vis-à-vis other producers was launched through several studies. These efforts helped Egypt to become an important member of regional and International trade organizations. Promotion of agricultural exports, particularly horticultural crops, assumed new importance with projected annual increase of about 20-30%. The centralized approach of dictating planted areas and prices of field and fiber crops has been replaced with a free-market economy where the farmer decides which crops to plant.

Estimating real production costs of different crops needs more refinement as using international prices (which includes subsidies in many cases) shows that domestic crop production costs are high compared to imports. Although demand and supply market forces primarily dictate pricing, Egyptian farmers, particularly fruit and vegetable growers have to develop a competitive and up to date approach for fast decision making based on new and improved knowledge in production and marketing. For cereal, sugar, fiber and oil crops, government floor and support prices give an early indicative price for farmers. The Business Plan fosters competitiveness and reduces monopolies, whether by public or private sectors. The situation is complex in old lands due to small land holdings (about 80% is less than 3

feddans). Therefore, crop consolidation should be promoted to attain economies of scale and streamline marketing. Agricultural extension activities should not be primarily production oriented, but also market-driven. This emphasis is fostered by the Plan with new programs and support to village and regional marketing entities.

5. *Livelihood Improvement and Decreasing Rural Poverty:* This is the primary goal and objective of the Strategy and First Business Plan. Other government agencies contribute to fostering livelihood development in rural areas and MALR is cognizant of synergies between programs. Therefore, streamlining ongoing and proposed programs is of the essence and should be tailored to agro-ecological context. The Plan's programs would contribute to activating village-based agro-industries and generate new employment opportunities. Devising effective monitoring and evaluation (M&E) capabilities to measure and assess livelihood improvement is essential and is an important function of the Plan's proposed M&E system.

Criteria for Projects' Selection and Prioritization

1. *Support of Agricultural Resources Development and Infrastructure:* This group of projects is primarily related to improving efficiency of on-farm irrigation in the Delta and Nile valley. Other activities which support this objective are also included as an integral part to implement the Business Plan. Rationalization of on-farm water use and improved efficiencies would yield a multitude of benefits, not only in water saving, but also in social and income improvement. The on-farm irrigation improvement program is currently under implementation by the Egyptian government as represented by MALR. International funding agencies are already contributing to these efforts. The International Fund for Agricultural Development (IFAD) has already signed a loan agreement with the Egyptian government. The World Bank (WB) is also participating in loan processing of the first on-farm irrigation modernization program.

2. *Development and Modernization of Agricultural Activities:* The Plan's success is dependent on:

- Ensuring available and qualified cadre from public sector agencies and private sector organizations;
- Increasing the scope of public sector involvement in providing service oriented activities based on up-to-date knowledge to beneficiaries at all levels;
- Participatory management of projects' implementation;
- Accurate identification and prioritization of needed changes of agricultural policies;
- Abolishing old regulations to combat stifling bureaucracies;
- Speedy enactment of new organizational structures to streamline the Plan's implementation; and
- Efficient M&E system with regular feedback and timely readjustment of priorities and course of action.

3. *Role of Knowledge-Based Technology in the Agricultural Development Process:* Successful implementation of the Plan is dependent on incorporation of proven technologies accepted at the farm level. Therefore pushing any premature or not thoroughly tested technologies would cause setbacks to the Agricultural Development Strategy and Investment Plan. Increasing the production base per feddan is a very challenging goal, particularly from the high yield levels already achieved. Some technologies may provide small increments in yields but may be remunerative to the farmers and the national economy. In this regard, adoption of modern on-farm irrigation systems is crucial to realizing envisaged yield increases and water saving. Evaluation of new varieties, improved cultural practices and ensuring timely availability of seeds, planting material and other needed inputs is of great importance. Updating crop water requirements for different crops under variable agro-ecological conditions is also of the essence.

Adoption of an integrated pest management approach will undoubtedly contribute to increased trust in Egyptian products, whether for export or domestic consumption. Demand for organically produced products is increasing whether from domestic or international markets and Egyptian producers are responding positively to market needs.

4. *Human Resources Development:* The Plan pays great attention to upgrading the knowledge and human resources factor in fostering sustainable agricultural development. Upgrading of agricultural and communication skills will be attained through continuous updating and introduction of new ideas. This will be based on identifying qualified staff to receive further training in program objectives and successful plan implementation at all levels. Revamping of agricultural extension objectives to be in line with the Plan's development goals starts with on-farm irrigation modernization. This includes up-to-date knowledge of modern information and communication technologies. Improved farmers' awareness and knowledge of the Plan's objectives, programs and projects is important. The development of the web-based extension information system e.g. the Rural and Agricultural Development Communication Network (RADCON) and the Virtual Extension and Communication Network (VERCON) is an integral part of modernizing the knowledge-based system. Beneficiaries' feedback is an integral part of human resources development in adjusting approaches to plan implementation.

The Plan's Investment Priorities

1. *Sustainable Water and Land Resources Management:* Modernizing the on-farm irrigation system and rationalizing water use are the primary investment components of the Plan. Other investments start at the same time or follow with an overall implementation horizon of seven years. The on-farm irrigation components focus on:

- i. Implementing the Principal National Project for modernization of on-farm irrigation in the Delta and valley areas;
- ii. Formulating necessary policies to rationalize irrigation water and fostering participatory irrigation approaches to accommodate Plan objectives and farmers' rights and responsibilities; and
- iii. Introducing and adopting needed technologies to achieve Plan objectives at regional and national levels.

2. *Responding to Regional Needs:* The five agro-ecological zones of Egypt are not only characterized by differences in natural resource endowments but also with consequential development challenges e.g. poverty alleviation, human resources skills, available infrastructure and shortage of arable land. Details of Plan investments in the five agro-ecological zones are stated in Table 4, the Main Report and Annexes.

3. *Development Focus and Results-Oriented Investments:* The projects' priorities are designed to address challenges and constraints facing Egyptian agriculture. As indicated earlier, on-farm irrigation investments are the starting point followed by implementation of technical packages and cultural practices with proven results. Farmers' acceptance and adoption of the development packages is a *sine qua non* to the Plan's successful implementation.

4. *Logical Time Sequence of Implementation Process:* Some of the investments are dependent on sequential phasing of Plan activities, e.g.:

- i. Improvement of on-farm irrigation investments precedes the implementation of National Land Reclamation in new lands as water savings from the first will be used to irrigate the second; and
- ii. Revision of irrigation and farmers' organizational policies should be resolved with necessary legislation obtained in the first two years of the Plan.

A special review for pricing of inputs and outputs is currently undertaken with a future look to gain farmers' confidence prior to the planting season. Therefore, it is essential to

introduce agro-ecological zone differences and costs in the formulation of pricing policies. Improvement in animal husbandry and dairy production should start with genetic build-up to increase their milk production. Fisheries development is dependent on increasing fishermen's awareness of income gains by introducing and adopting new in-land and marine fisheries investments.

5. *Investment Programs and Projects:* The Business Plan encompasses Nine Main Programs with 25 Principal National Projects which include 88 Projects. The Main Programs are as follows:

- I. *Sustainable Water and Land Resources Management:* This program includes five principal national projects:
 - On-farm Irrigation Development;
 - Natural Resources Development;
 - Meteorology and Climate Change
 - Land Reclamation; and
 - Rainfed Areas Development.

- II. *Field Crops Improvement:* The program includes four principal national projects:
 - Cereals Development;
 - Legumes and Fodder Crops Development;
 - Oil and Fiber Crops; and
 - Sugar Crops Development.

- III. *Horticultural Crops:* The program includes four principal national projects:
 - Vegetable Crops Development;
 - Drought Tolerant Fruits;
 - Primary Fruit Crop Development; and
 - Medicinal, Ornamentals and Forestry.

- IV. *Animal Husbandry, Dairy and Fisheries' Development:* This program includes three principal national projects:
 - Dairy Production Development;
 - Poultry Production Development; and
 - Fisheries' Development.

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- V. *Marketing and Agro-Industries*: This program includes two principal national projects:
- Marketing; and
 - Investments and Competitiveness.
- VI. *Livelihood Improvement in Rural Areas*: The program includes two principal national projects:
- Development of Specialized Production Villages; and
 - Agricultural Human Resources Development.
- VII. *Information Technology and Communication Improvement*: This program includes one principal national project in:
- Agricultural Information Technology and Communications Development.
- VIII. *Policy Reforms and Agricultural Organizations*: This program includes two principal national projects:
- Institutional Reform; and
 - Policy Reform.
- IX. *Program to Support Agricultural Research and Technology Transfer, Extension, Adoption and Feedback*: This program includes two principal national projects:
- Agriculture Research Systems Development; and
 - Applied Research to Support Development Programs.

Special attention must be given to articulate needed amendments in Agricultural Reform Policies and Institutions for:

1. The Ministry of Agriculture and Land Reclamation (MALR);
2. Cooperatives and Farmers' Organizations;
3. On-farm Irrigation Laws and Farmers' Participation.

The Plan's investments are grouped according to commodities and priority investments to ensure sustainability of the natural resource base. The commodity approach would provide measurable targets to follow-up on adoption of improved technologies. This will provide a good information base to measureable baselines and M&E indicators for productivity and yield measures.

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Technical details of projects including justification and implementation during the Business Plan period (7 years) are in Annex 1 (in Arabic). Annex 2 (in Arabic) provides tables for detailed investment by sources of investment, year and region. The Plan's estimated total investments are about EGP 107 billion with EGP 49 billion from government sources (46%) and EGP 58 billion from the private sector (54%). This is based on a regional consultative process in each region and detailed discussions with Plan stakeholders.

The following tables (3 and 4) provide detailed annual investments and share of each project. Detailed tables of projects' investments are in Annex 2.

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Table 3: Business Plan: Estimated Investment Funding from Government and Private Sector during 2010/2011 – 2016/2017 (in Millions of Egyptian Pounds)

National Project	Public Sector			Private Sector			Total
	Investment	Operational	Sub-Total	Investment	Operational	Sub-Total	
On-farm Irrigation Development	17255.00	1863.50	19118.50	29645.00	2923.00	32568.00	51686.50
National Resources Development	329.00	165.00	494.00	750.60	177.60	928.20	1422.20
Meteorology and Climate Change	64.05	31.33	95.38	3.20	1.64	4.84	100.22
Land Reclamation	21008.30	27.10	21035.40	0.50	5.00	5.50	21040.90
Rainfed Areas Development	136.90	87.50	224.40	333.70	86.00	419.70	644.10
Cereals Development	711.80	153.90	865.70	3506.00	1422.90	4928.90	5794.60
Legumes and Fodder Crops Development	2.70	84.00	86.70	0.00	85.90	85.90	172.60
Oil and Fiber Crops	4.40	144.30	148.70	0.00	746.70	746.70	895.40
Sugar Crops Development	2.00	20.00	22.00	0.00	25.90	25.90	47.90
Vegetable Crops Development	3.90	20.70	24.60	644.60	1255.60	1900.20	1924.80
Drought Tolerant Fruits	8.60	28.80	37.40	1016.20	598.80	1615.00	1652.40
Primary Fruit Crop Development	2.20	23.00	25.20	1429.10	693.20	2122.30	2147.50
Medicinal, Ornamentals and Forestry	16.00	53.00	69.00	183.60	312.80	496.40	565.40
Dairy Production	182.50	426.80	609.30	164.00	1405.00	1569.00	2178.30
Poultry Production Development	317.00	75.00	392.00	5577.00	1075.00	6652.00	7044.00
Fisheries' Development	460.00	300.00	760.00	820.00	1120.00	1940.00	2700.00
Marketing	49.00	14.00	63.00	775.00	52.00	827.00	890.00
Investments and Competitiveness	0.00	36.00	36.00	0.00	8.90	8.90	44.90
Specialized Production Villages	101.80	34.50	136.30	160.80	257.50	418.30	554.60
Agriculture Human Resources Development	52.30	372.40	424.70	0.00	16.50	16.50	441.20
Agr. IT and Communications Development	58.10	81.40	139.50	0.00	0.00	0.00	139.50
Institutional Reform	86.00	344.00	430.00	20.00	340.00	360.00	790.00
Policies Reform	15.00	85.00	100.00	0.00	0.00	0.00	100.00
Agriculture Research Systems Development	200.00	1300.00	1500.00	0.00	0.00	0.00	1500.00
App. Research to Support Dev. Programs	424.00	1287.00	1711.00	0.00	0.00	0.00	1711.00
Grand Total	41,490.55	7,058.23	48,548.78	45,029.30	12,609.94	57,639.24	106,188.02

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Table 4: Annual Distribution of Investments (in Millions of Egyptian Pounds)

National Project	Year							Total
	2011	2012	2013	2014	2015	2016	2017	
On-farm Irrigation Development	5950.90	5950.90	7402.60	7402.60	8363.80	8331.20	8331.20	51733.20
National Resources Development	226.20	203.00	211.90	218.00	189.40	186.50	187.10	1422.10
Meteorology and Climate Change	6.90	16.40	16.60	16.70	16.90	13.40	13.50	100.40
Land Reclamation	1617.50	3280.70	1799.30	1795.00	3584.80	3583.50	5374.60	21035.40
Rainfed Areas Development	61.10	127.40	124.40	111.30	99.70	81.70	37.40	643.00
Cereals Development	389.90	512.00	735.80	977.60	978.60	999.70	1201.10	5794.70
Legumes and Fodder Crops Development	23.60	23.60	24.00	24.00	25.80	25.80	25.80	172.60
Oil and Fiber Crops	200.10	201.20	111.10	111.10	90.60	90.60	90.70	895.40
Sugar Crops Development	6.85	6.85	6.47	6.47	7.10	7.10	7.10	47.94
Vegetable Crops Development	151.20	155.90	286.90	297.90	341.90	342.20	349.00	1925.00
Drought Tolerant Fruits	122.20	137.60	272.80	274.10	279.50	279.50	283.90	1649.60
Primary Fruit Crop Development	165.90	165.90	351.50	350.70	371.20	371.20	371.20	2147.60
Medicinal, Ornamentals and Forestry	87.80	88.00	77.00	76.80	78.60	78.60	78.60	565.40
Dairy Production	403.40	361.40	324.60	287.60	283.20	270.20	248.00	2178.40
Poultry Production Development	577.00	848.00	1102.50	1446.50	937.50	1138.50	1024.00	7074.00
Fisheries' Development	168.80	216.25	385.00	432.50	627.50	458.75	411.25	2700.05
Marketing	38.30	88.30	160.90	160.90	138.80	138.80	164.00	890.00
Investments and Competitiveness	7.80	7.80	5.60	5.60	6.00	6.00	6.00	44.80
Specialized Production Villages	140.10	140.10	47.80	47.80	58.10	60.30	60.30	554.50
Agriculture Human Resources Development	24.00	39.30	111.70	120.10	121.00	111.00	114.10	641.20
Agr. IT and Communications Development	11.40	10.60	23.80	23.50	30.20	21.80	18.40	139.70
Institutional Reform	61.50	105.50	119.00	154.00	152.00	156.00	142.00	890.00
Policies Reform								
Agriculture Research Systems Development	159.00	185.00	211.00	236.00	236.00	236.00	236.00	1499.00
App. Research to Support Dev. Programs	271.00	258.00	246.00	234.00	234.00	234.00	234.00	1711.00
Grand Total	10,872.45	13,129.70	14,158.27	14,810.77	17,252.20	17,222.35	19,009.25	106,454.99

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Table 5: Business Plan: Distribution of Investments by Agro-Ecological Zone (2010/2011 – 2016/2017) (in Millions of Egyptian Pounds)

Agro-ecological Zone/Region	Government			Private Sector			Total
	Investment	Operational	Sub-Total	Investment	Operational	Sub-Total	
West Delta	8984.50	744.20	9733.20	9018.80	2889.80	11908.60	21641.80
Middle Delta	6080.90	815.80	6909.00	10625.30	2639.80	13265.00	20174.00
East Delta	4049.90	448.70	4504.50	5874.60	1962.40	7837.00	12341.50
Middle Egypt	8345.70	670.60	9020.60	8233.20	2314.40	10547.60	19568.20
Upper Egypt	12732.50	673.30	13405.90	8723.60	1897.10	10620.70	24026.60
Grand Total	40193.50	3352.60	43546.10	42475.50	11703.50	54179.00	97725.10

N.B.: Totals are investments which clearly distribute funds on an agro-climatic basis. Other interdisciplinary areas are not included (e.g. Policy Reform or Agricultural Research, Extension and Transfer) which are applicable to all regions.

Cost Recovery of Plan Investments

The Plan's investments could be grouped into three categories.

- 1. Infrastructure Projects where the State will completely recover its investment costs.** This includes on-farm irrigation and land reclamation. Government contribution in this group is about 68.3% of total investments. Total investments are about 72.8 billion Egyptian Pounds and represent 78% of total Business Plan costs.
- 2. Development projects with primary funding by the private sector.** Total funding for this group of projects is about 29.6 billion Egyptian Pounds with government contribution of about 4.88 billion Egyptian Pounds (16.5% of total) and private sector's share of 27.2 billion Egyptian Pounds (83.5%).
- 3. The third group includes human resources development, technology development and transfer.** The costs of projects of this groups is about 4.1 billion EGP representing 3.8% of total Plan investments. Investments in this group of projects are low in cost but are essential to implement the Plan. The benefits to sustainability of human and natural resources development are immense. In fact, secured funding for this group should be ensured first if other investments are to be implemented in a timely manner.

Institutional and Implementation Arrangements

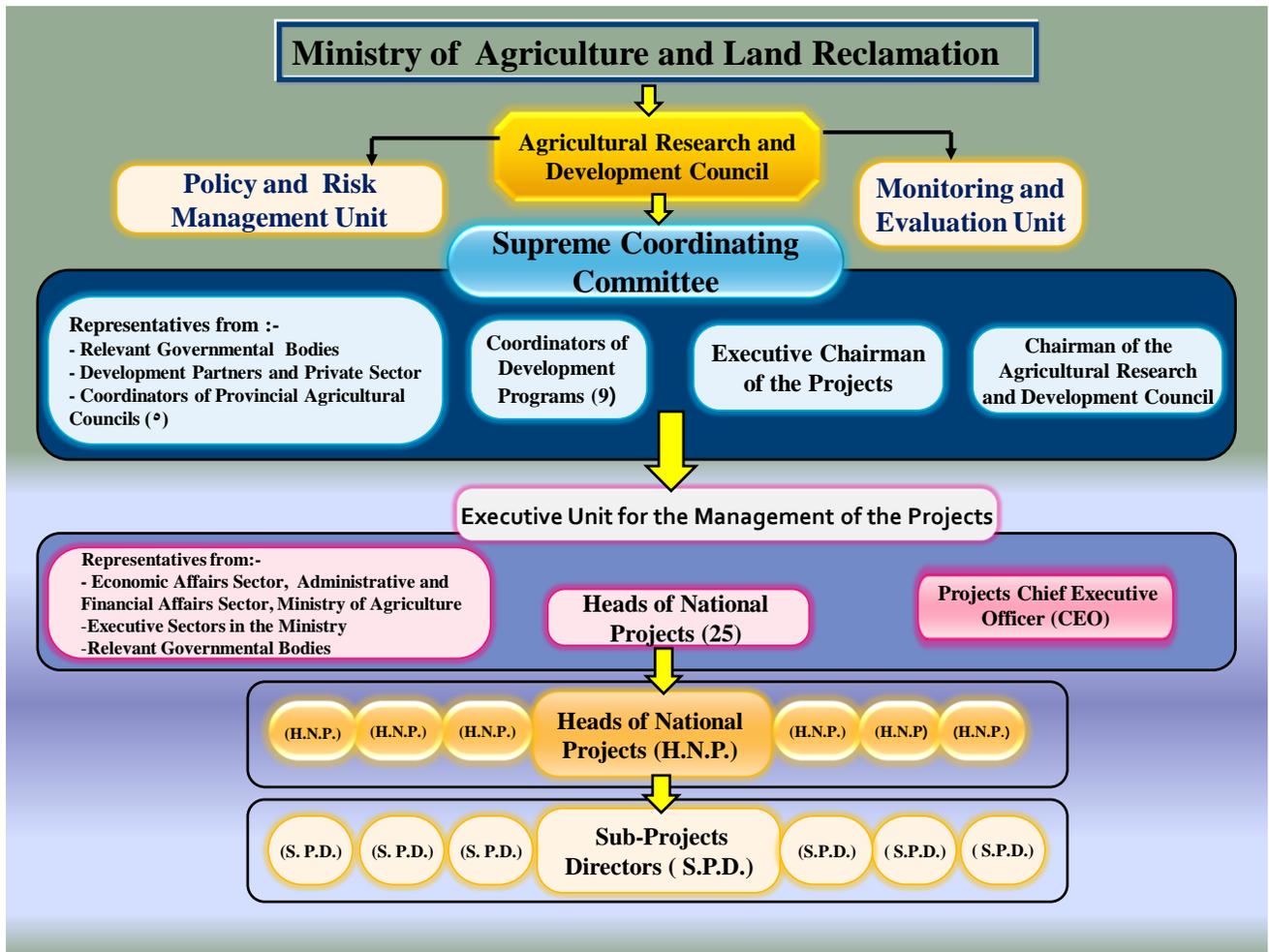
Plan Implementation

The overall implementation of the Business Plan is under the auspices of the Minister of Agriculture and Land Reclamation. MALR will organize the National steering committee where Ministries and organizations other than MALR are involved. The steering committee would provide overall policy guidance, resolve implementation issues and suggest alternative solutions. The committee will also submit quarterly and annual reports to the Minister with recommendations. A fulltime Management Unit would be established at ARDC headed by an executive who reports directly to the ARDC Chairman periodically on the Plan's implementation. The Management Unit would follow-up on financial management, collecting quarterly technical and financial reports and audits according to Egyptian rules and international funding agencies. An Organization Chart is attached.

The Strategy highlighted the need to establish two technical units; the first for monitoring and evaluation, and the second for policy development and risk management. These units have been established by ARDC with assistance from the FAO.

1. **Monitoring and Evaluation Unit:** It would be responsible for M&E functions of the Business Plan and its implementation. The baseline data and surveys would provide the basis for the Plan's benchmark values. These would be used to assess progress in the first two years (coinciding with the end of Egypt's 6th Economic Plan in 2012) and at Mid-Term Review (MTR) 2014 and completion in 2017.
2. **Agricultural Policies, Risk Management and Mitigation Unit:** The Unit would be responsible for identifying related policies to the Business Plan and suggesting needed course of action to modify, add or even abolish policies. This may involve legal clearance by other Ministries and People's Councils. Therefore, early identification of those policies related to water use and farmers' organizations should assume priority in the review process and be completed by 2012. The Unit would also be responsible for monitoring changes in the international and regional agricultural development fora and assessing future implications of Egypt's future directions. The Units will work in tandem and operate on a "Think Tank" modality, and will meet periodically to assess the recommended course of action. One prominent issue that the Unit will pay particular attention to is the implication of anticipated climate change scenarios. The unit will examine all available literature and evidence and recommend course of action to be implemented by 2012 as stated in the Business Plan.

Proposed Structure for the Management of Projects in the Implementation Plan



Plan Development Impact

1. *Social Impact:* The Strategy and the First Business Plan have primarily focused on the livelihood improvement of rural populations as a central objective to Egypt's agricultural development agenda. This prioritization has to be adhered to if poverty is to be alleviated or reduced, particularly in Upper Egypt. The Plan programs and projects focus on providing agricultural investments targeting about 55% of the population. The Plan will pay special attention to augmenting and fostering the role of women in conducting specialized activities with the view to reduce time in farm operations and drudgery. This will allow women to benefit from literacy and training programs provided by the Plan. Agricultural investments in institutional support and research projects comprise only 4% of total national investments. MALR realizes that there is high demand on investments in health, education and infrastructure. However, improvement of the rural social welfare would start with investing in agriculture. About 26.8% of the population lives below the poverty level, with 77% of that figure living in rural areas. As for the absolute poor, about 81% of them are concentrated in rural areas also. Unemployment and underemployment are high in rural areas where lack of services and health infrastructure contributes to low living standards. The range between governorates and regions varies widely in percentages of poor and absolute poor as indicated in Table 6. Therefore, Egyptian policymakers and the society as a whole cannot afford to maintain the status quo as it will get worse with increased population.

The Plan's vision and mission are focused on improved livelihood in rural areas with agriculture development as the engine of growth and poverty reduction. As an example, the On-farm Irrigation Modernization Program will empower 80% of land holders (who hold less than 3 feddans) to improve their incomes and decrease crop production costs, particularly for energy.

Table 6: Egypt's Poverty Indices and Human Development in Each Governorate

Region and Governorate	% of poor population	% of extremely poor population	Ranking
Middle Delta	11.4	0.7	
Al-Qalubeyya	11.2	1.0	12
Al-Menofiya	17.5	0.4	13
Al-Gharbiya	6.1	0.8	8
Al-Daqaliya	7.0	0.5	10
Kafr Al-Sheikh	12.3	0.9	18
Demyat	2.6	0.2	5
East Delta	22.0	2.3	
Al-Sharqiya	28.2	2.9	14
Port Said	7.6	0.9	2
Al-Ismailia	6.4	0.5	7
Al-Suez	2.4	0.7	3
North Sinai			11
South Sinai			1
West Delta	14.7	2.1	
Al-Beheira	20.5	2.8	15
Alexandria	8.0	1.2	6
Matrouh			16
Middle Egypt	28.0	6.2	
Al-Giza	13.1	1.4	17
Bani Sueif	45.4	11.8	20
Al-Fayoum	12.0	1.1	24
Al-Minya	39.4	9.8	22
Upper Egypt	43.1	12.2	
Asyout	60.6	22.7	23
Sohag	40.7	9.8	21
Qena	33.7	6.0	19
Aswan	23.9	4.8	9
New Valley			4
Average	23.8	4.7	

Source: Egypt Human Development Report N.B.: Calculated as average for each governorate and region.

2. *Economic Impact:* Early estimates of rates of return calculations for the on-farm irrigation program are about 17% and may be higher in areas where irrigation infrastructure at the mesqa level have been improved and tile drainage is implemented.

There will be also an increase in agricultural growth rates from about 3% in 2007 to 4.5% in 2017. The Egyptian National Economic and Social Plan combines agriculture and water resources together and more work is needed to assess their roles separately in relation to Plan implementation.

3. *Employment Generation:* The Plan will reclaim 1.05 million feddans. To provide agricultural infrastructure and services for newly reclaimed area, about 1.6 million job opportunities would be created to effect Plan implementation. This will improve livelihood of 8 million rural people (based on the average family size of five).

4. *Improving Farmers' Income:* The Plan's central objective to increase yield levels will ultimately lead to increased farmers' incomes. Decreasing production costs, particularly in energy, would also have positive results on farmers' incomes. Of course, this would depend on streamlining markets and farmers' obtaining fair prices for their products. It is estimated that farmers' incomes will increase 54% per feddan compared to 2007 prices i.e. from EGP 13,200 to EGP 20,300 (using constant 2006 prices). With an average land holding of 2.3 feddans, the agricultural income per holding is estimated to increase from EGP 30,000 in 2007 to EGP 47,000 by 2017.

5. *Increased Productivity of Export Crops and Agro-Industries:* The Plan objective of promoting increased cropped areas for fruits (by about 14%), vegetables (by about 13%) and medicinal and ornamentals and cut flowers (by about 55%). The increase in area will subsequently lead to increased rates of production ranging between 15 – 50%. Export promotion campaigns and improved quality of Egyptian produce based on high standards should be an integral part of improving farmers' linkages to domestic and international markets. In this respect, the Plan includes a Program focused on marketing and agro-industries with two Principal National Projects to improve marketing and competitiveness for agricultural products.

6. *Increased Productivity of Water and Land:* The Strategy and the Plan place great emphasis on sustainability of natural resources particularly water and land. All the Plan's Program and Projects are designed to maximize water and land unit productivity. In this respect, benefits per cubic meter of water are estimated to improve by 68% in 2017, compared to 2007. Benefits per feddan would also improve by 54% during the Plan implementation period and crop intensity will increase from 177% at present to 200% in 2017.

7. *Financial Returns:* On-farm irrigation and land reclamation Programs and Projects' financing comprise about 68% of total plan funding. Rates of return are estimated to be 17% which identifies Projects that would attract domestic and international investments. In fact, the Egyptian Government has concluded a financial package of about US\$ 50 million on loan from IFAD and processing of a US\$ 100 million loan from the World Bank is in progress. Additional investments in linking farmers to markets are in the pipeline.

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8. *Energy Saving:*

Implementation of on-farm water management will save around 30% of the energy used now in irrigation pumps. Improving utilization of agricultural mechanization will save more energy which will add up 590 million LE by the year 2017.

9. *Environmental Impact:* Following the construction of the High Dam in the 1960's and conversion from basin to permanent irrigation, several environmental side effects became apparent. Among these were increased water logging and salinity levels, particularly in the Delta. Hence drainage projects, especially tile drainage, were implemented. This led to a decreasing high water table, which was affecting crop production, particularly deep-rooted horticultural crops e.g. mango, citrus and grapes. Gradual dependence on agro-chemicals e.g. fertilizers, have resulted in increasing production costs and increased levels of chemicals and pesticides in ground water.

The impact of the aforementioned agricultural practices and lessons learned provided the knowledge core to articulate sustainability objectives through the Strategy and Business Plan. It is a great challenge to try to halt environmental degradation of land and water resources, and steer it in a positive direction by implementing specific Plan Programs and Projects. The Plan recognizes that productive capacity of natural resources should not be degraded by increased intensification. Environmental impact assessment studies conducted in cooperation with international agencies point to the positive impact of the Plan's Programs and Projects on:

- i. Protection and sustainability of natural resources, particularly land and water;
- ii. Recognition of climate change studies and impact assessment of risks and developing workable mitigation measures based on cutting-edge technologies of remote sensing;
- iii. Promotion of organic agriculture, integrated pest management practices, and decrease in use of agro-chemicals;
- iv. Recognition of knowledge-based agricultural technologies, particularly in emerging areas like carbon sequestration and nanotechnology;
- v. Highlighting food safety measures and adherence to international standards if exports are to be increased;
- vi. Developing programs to effectively improve water harvesting interventions in rainfed areas and improving livelihood of nomadic and rural populations; and
- vii. Improved cooperation and coordination with private sector investors and concerned agencies in improving water quality of drinking and irrigation water, and maintaining vigilance to health and social impacts on the rural population.

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List of Participants in the preparation of the Business Plan

General Coordinator: Prof. Dr. Adel El-Beltagy

Nucleus group

- . Dr. Adel Aboul-Naga (**Coordinator**)
- . Dr. Hamdi Salem
- Dr. Ibrahim Sidik
- Dr. Wahid Megahid
- Dr. Ayman Abu Hadid
- Dr. Abdul Ghani El-Gendi
- Dr. Magdy Madkour

Natural Resources Development Group

- Dr. Ayman Abu Hadid (**Coordinator**)
- Dr. Abdel Ghani El-Gendi
- Dr. Sobhi El-Nagar
- Dr. Abdel Aziz Sheta
- Dr. Ahmed Taher
- Dr. Youssef Hamdi
- Dr. Samir Abo Suleman
- Dr. Adel El Ghandour

Field Crop Group

- Dr. Mohammed El-Nahrawy (**Coordinator**)
- Dr. Abdel-Salam Gomaa
- Dr. Fawzi Naim Mahrous
- Dr. Abdel Wahab Alam
- Dr. Mohammed Abdel Majeed
- Dr. Mohamed El-Borai
- Dr. Sami Sabri
- Mr. Hassan Marei

Horticultural Crops Group

- Dr. Assem Shaltout (**Coordinator**)
- Dr. Ibrahim Desouki
- Dr. Salah Mohammady
- Dr. Hamdi Salem
- Dr. Ahmad Abdel Majid
- Dr. Adel El Ghandour

Marketing and Agro-industry Group

- Dr. Wahid Megahid (**Coordinator**)
- Dr. Ahmad Khorshid
- Mr. Hamid Alcheaty
- Mr. Tarek Tawfik
- Mr. Ayman Qura

Livestock, Poultry and Fish production

- Dr. Adel Aboul-Naga (**Coordinator**)
- Dr. Ibrahim Sidik
- Dr. Farouk El-Desouki
- Dr. Ashraf Barkawi
- Dr. Ali Nigm
- Dr. Mohsen Shoukry
- Dr. Mohamed Fathy
- Dr. Hussein Soliman
- Dr. Mohammed El-Nahrawy
- Dr. Tawfik Shalaby
- Dr. Ali Bekir
- Dr. Faten Fahmy
- Dr. Kameel Matthews

Research and Technology Transfer Group

- Dr. Magdy Madkour (**Coordinator**)
- Dr. Adel Aboul-Naga
- Dr. Abdel Ghani El-Gendi
- Dr. Assem Shaltout
- Dr. Mohammed El-Nahrawy
- Dr. Ahmed Rafi
- Dr. Mohammed Abdel Majeed

Institutions and Human Development Group

- Dr. Ibrahim Rehan (**Coordinator**)
- Dr. Emad El-Shafei
- Dr. Ibrahim Sidik
- Dr. Kamla Mansour
- Dr. Omayma Elsawan
- Dr. Ahmed Gamal El Din
- Dr. Haniya El-Etribi

Policy Group

- Dr. Hamdi Salem (**Coordinator**)
- Dr. Ibrahim Sidik
- Dr. Wahid Megahid

Communications and Information

Technology Group

- Dr. Ahmed Rafi(**Coordinator**)
- Dr. Mahmoud Rafi
- Dr. Said Mabrouk
- Dr. Ayman Desouki
- Dr. Hisham El Deeb
- Dr. Sayed El- Azhari
- Mr. Tarek Heggy
- Mrs. Manal Issa

Technical Support Group

- Dr. Malak George
- Dr. Mohammed Ali Fahim
- Mrs. Aida Ghazi
- Mr. Mahmoud Kamel
- Mr. Mohie Kadah

Participants from international organizations

- Dr. Hamdi Issa – Former Senior agricultural expert - World Bank
- Dr. Nasrelddin Al-Amin - Food and Agriculture Organization
- Dr. Diya Abdo - Food and Agriculture Organization
- Dr. Mohammed Iraqi - International Fund for Agricultural Development
- Mr. Morris Saada - World Bank

Participants from other institutions

Governors of central governorates.

Undersecretary of Ministry of Agriculture and Irrigation and Veterinary in various governorates.

Deans of Colleges of Agriculture and Veterinary in Egyptian Universities.

Ministry of Water Resources and Irrigation

Ministry of Higher Education and Scientific Research.

Ministry of Local Development

Ministry of Administrative Development

Ministry of Communications and Information Technology.

Representatives of private sector, agricultural unions, and civil society organizations for rural development and agriculture.