Strategy Options for Angola's Agricultural Sector After 27 Years of War:
A Perception Based Field Study
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ABSTRACT

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The decline in agricultural output over the years and the subsequent pervasive food crisis in most of Africa have motivated governments and international organizations to develop a variety of strategies, policy alternatives and programs aimed at promoting agricultural production and food security. Many of these strategies have been conceived and implemented by international organizations, and in some cases the strategies have fail to address the root cause of failure of the agricultural sector to perform to its potential.

Therefore, this field study uses scenario analysis to engage key players in the agriculture industry to identify causes of Angola's loss of production capacity over the years, the factors needed to revitalize the agricultural-led economy, factors that can help stabilize the agricultural sector and conditions required for the development and coordination of the food supply chain in Angola.

The framework provided in the paper was based on an evaluation of perceptions of future demand for locally produced agricultural products; the country's supply response capability; the role of the informal and formal markets; infrastructure needs; and the development of formal supply chains for domestic and export markets.

The methodology used was an adaptation of a methodology used in Industry Strategic Planning and Coordination, and the Technological Demands Determination by Prospective Analysis.

The study revealed that in spite of its high resource endowment, Angola will first need to address institutional and structural agricultural development constraints and develop systems that allow better coordination of development efforts among institutions, before it is able to produce food for export markets. The development priority for the next five years includes creating conditions that stimulate local production, help the country produce enough to become food self sufficient, and gradually reduce food imports. Nevertheless, the production for import substitution should not preclude efforts towards targeting export niche markets.

DEDICATION

I dedicate this work to my wife, Margarida and my little son, Leandro "Ken", for

allowing me to be away for two years, accept the sacrifice and still give me words of

encouragement to move forward until the target is met.

ACKNOWLEDGEMENTS

Finally, I would like to extend my word of appreciation to the many others who shared their knowledge and experience with us, but for confidentiality reasons their names are not mentioned here.

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ADRA: Acçao para o Desenvolvimento Rural e Ambiente

AFPLAN: The Regional Plan for Africa

BDA: Banco de Desenvolvimento de Angola

BPD: Barrels per day

CLUSA: Cooperative League of the United States of America

ECP : Estrategia de Combate à Pobreza

EMBRAPA: Empresa Brazileira para Pesquisa Agrícola

ENDIAMA: Empresa de Diamantes de Angola

ESAP's: Economic Structural Adjustment Programs

FAO: United Nations Organization for Food and Agriculture

FCA: Faculdade de Ciências Agrárias

FDES: Fundo de Apoio ao Desenvolvimneto Económico e Social

GDP: Gross Domestic Product

GSA: Gabinete de Segurança Alimentar

ICM: Instituto de Cereais de Moçambique

ISPC: Industry Strategic Planning and Coordination

LPA: Lagos Plan of Action

MINADER: Ministério da Agriculture e do Desenvolvimento Rural

MT: Metric ton

NACB: Nigerian Agricultural and Cooperative Bank

NGO's: Non-Governmental Organizations

OAU: Organization of African Unity

OPEC: Oil Producer Economic Community

ODA: Official Development Program

USAID: United States Agency for International Development

USDA: United States Department of Agriculture

SONANGOL: Sociedade Angolana de Combustíveis

WFP: World Food Prog

CHAPTER ONE

INTRODUCTION

1.1 Background

Angola, with its broad natural resource base, has the potential to become the
bread basket of Southern Africa and one of the richest countries in Africa. The broad
resource base accounted for the agricultural development of the pre-independence period
and in the late 1960's and early 1970's agriculture led Angolan exports and was the main
source of revenues into the Angolan economy. In spite of its rich resource base, the war
drove the country into a depleted inventory of consumption goods and depleted
productivity in the agricultural sector. Farmers and other potential economic private
investors are eager to see changes that lead to more prosperous economic activities. They
are psychologically prepared to welcome government programs that trigger changes.
However, as a result of the long exhausting war, a large part of the economically active
population is completely disillusioned and has reverted to economic activities that require
less long term strategic planning. Prices of domestically produced goods are above world
market prices as a result of high production costs, low output levels and high
transportation costs.

The civil war ended in April 2002 and signs of a quick agricultural sector
recovery include: increased land area under cultivation; increased private investment in
agriculture; increased aggregate agricultural output per harvesting season; and less
dependence on international food aid. Despite these promising signs of recovery that has

emerged, transforming agriculture into a sustainable productive sector and profitable businesses remains a major challenge. The challenge results from two main reasons: (i) for more than a decade, Angola was a centrally planned economy, hence most Angolan agri-food managers have not been exposed to the challenges of creating supply chains to respond to demand factors; (ii) food production trends in Africa have been marked by short periods of rises, followed by repeated cycles of decline. Therefore, inadequate investment towards agricultural development may drive Angola into the same cycle many African countries have experienced post independence.

Angola is in dire need of a strategy that addresses all three forms of capital constraints: human, financial and physical. Heidhues et al. (2004) indicate that food production in Africa increased at 2.3% per year in the 1960s, yet it increased only at 1.5% per year in the 1970s. When the government of Angola drafted the 2005-2006 General Program *"Programa Geral do Governo Para o Biénio 2005-2006",* it was noted that between 2001 and 2003, the agricultural share of the GDP did not grow beyond 8.2% per year. Therefore, the sector was considered to be fragile and vulnerable to unfavorable conditions such as bad weather, lack of quality agricultural inputs, and farmers with weak technical skills. The government program recognizes that there is an urgent need to address those constraints, and elevate the agricultural sector to a favorable and stable position in the Angolan economy[1]. The program, therefore, reaffirms the government's commitment to make major investments in rural infrastructure and macroeconomic conditions that will lead to the re-establishment of sustainable farming systems, the development of a vibrant agricultural sector and the establishment of viable food supply chains in Angola.

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[1] Programa Geral do Governo Para o Biénio 2005-2006

Agriculture is crucial to the future of Angola, particularly for the rural poor, even though the Angolan economy is dominated by the oil industry which accounts for approximately 51.7% of the GDP. Together with the diamond industry, they both account for 57% of the GDP. Furthermore, the oil industry makes up approximately 95% of Angolan exports and 80% of all government revenues. Current production levels average 1.4 million barrels per day (bpd), making Angola second to Nigeria on the African continent. Future projections indicate that in 2008, production will reach 2 million bpd[2], which shows an enormous growth potential. The issue is that internally the oil sector has only had marginal impact on employment creation because it is a capital intensive industry. Creating an economy that utilizes the financial resources from the oil and diamond industries to address the constraints of the agricultural sector is key to developing a balanced and sustainable growth oriented economy that addresses the issue of excess labor.

The wholesale sector and other services account each for approximately 15% of the GDP, while the construction and public works, and the processing industries account for 4% each. The shift in exports from agriculture and manufacturing to oil, resulted in a smaller agricultural sector and larger services sector. Despite their higher contribution to the GDP relative to agriculture, these sectors have limited capacity to generate employment. For instance, the Fund for Economic and Social Development [Fundo de Desenvolvimento Economico e Social (FDES)] was created by the government in 2003. After one year of activity, it disbursed a total of $30 million in loans. These loans resulted in the creation of 4,500 jobs outside of the agricultural sector. The aggregate job creation effect by these four sectors is estimated at 341,000 job posts. The informal sector is

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[2] http://www.angolaacontece.com/full.php?id=1496 (accessed December 2006)

believed to be the single largest employment creator. However, statistics on the exact number of jobs created by the informal sector are unreliable (Angola: Perspectivas Economicas na Africa 2004/2005).

Approximately 71 percent of the estimated 14 million Angolans rely on agriculture for their livelihoods (FAOSTAT Database). In spite of its low output levels relative to population growth, agriculture remains the second most important economic sector. In addition to the sector comprising of approximately 10 million of the estimated 14 million inhabitants (FAOSTAT Database), it is also comprised of approximately 4.5 million economically active people, or approximately 71% of the economically active population which has been fairly stable over time (see figure 1). Since agriculture constitutes a large share of national output and employs a large proportion of the labor force, the sector is critical to any development strategy.

Fig. 1: Economically active population in agriculture
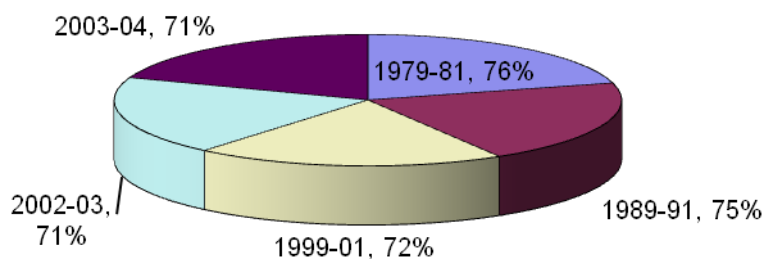
Source: FAOSTAT Database

Miracle (2006), emphasizes the role of agricultural development in the establishment of economic development programs because it affects the development in other sectors of the economy in several ways: through provision of goods and

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services needed elsewhere in the economy and for exports; through generation of rural purchasing power which can be a critical component for the stimuli needed to evoke satisfactory rates of development of other sectors; and through the generation of savings, investment and manpower needed elsewhere. The need for agricultural growth is due in part to its potential to generate both agricultural and non-agricultural employment.

1.2 Research Objectives

The main objective of this paper is to create development strategy options that lead to a quick recovery and the development of a vibrant agriculture sector in Angola. The main objective is supported by the following specific objectives:

i.   identify the factors that have contributed to the loss of the country's agricultural production capacity;

ii.   understand the agricultural sector's perceptions about the future of Angolan agriculture

iii.   identify the factors needed to revitalize an agricultural-led economy;

iv.   identify the factors that can help stabilize the agricultural sector, and

v.   identify the conditions required for the development and coordination of the food supply chain.

This paper provides a conceptual framework for agricultural development strategies based on a multitude of strategies and approaches pursued by other countries, which yielded a wide range of outcomes. The framework provided in the paper is based on an evaluation of perceptions of future demand for locally produced agricultural products; the country's supply response capability; the role of the informal and formal markets;

infrastructure needs; and the development of formal supply chains for domestic and export markets. A review of previous literature shows that African countries in general and mineral rich countries in particular, have pursued a variety of strategies to promote agricultural based economic development, but with marginal results.

CHAPTER TWO

LITERATURE REVIEW

The literature reviewed assesses the interaction of factors that have the potential to either promote or hinder the development of the agricultural sector, and draw lessons from prior agricultural development strategies pursued by other countries, particularly Mozambique and Nigeria. In this section the study focuses on a review of the overall African development strategies and draws a comparison between Angola and Mozambique and between Angola and Nigeria. Two different typologies are used to compare Angola and Mozambique, and Angola and Nigeria. Given that there are no clearly defined common indicators for each typology, the analysis will be conducted on the basis of results accomplished by each country towards stabilizing food security through local production and the contribution of the agricultural sector towards reducing poverty.

2.1 African Agriculture Development Strategies in Perspective

The decline in agricultural output over the years and the subsequent pervasive food crisis in most of Africa have motivated governments and international organizations to develop a variety of strategies, policy alternatives and programs aimed at promoting agricultural production and food security. Many of those strategies have been conceived and implemented by international organizations, and in some cases the strategies do not address the root cause of failure of the agricultural sector to perform to its potential. Heidhues et al. (2004) state that on average, a typical developing country in Africa is assisted by 30 aid institutions to develop and implement strategies, yet Africa is still far from achieving food and nutrition security. They further elaborate that the

implementation of a strategy requires a clear formulation of: a conducive policy and institutional environment, a widely shared consensus about the strategy and its measures, the human capacity, and sufficient financial resources.

Hughes (1988) establishes a link between strategies conceived and implemented by international organizations on behalf of recipient countries and their failure to accomplish the intended results. She states that since farmers are the central figures of agricultural development, ignoring the role of the farming families as entrepreneurs, risk-takers, managers, innovators and workers, leads to the failure of development strategies and stagnation. Heidhues et al. and Hughes' assessment leads to the assertion that African governments and donors face a joint challenge of rethinking future agricultural development strategies and making them more in line with the specific natural resource endowments, the socio-economic, political and institutional conditions of each recipient country. Agricultural development strategies must be seen as inextricably linked with the identification of needs, priorities, and constraints; with the creation of action plans; and finally with the implementation of those plans (Heidhues et al. 2004).

According to Lele (1987), donors have been heavily involved in the African economic development processes. Lele supports this statement by indicating that following the 1973-74 drought, commitments for official development assistance (ODA)[3] rose from $3.9 billion to $10.9 billion in 1980 and then declined slightly to $10.3 billion in 1982. Lele estimates that approximately 25 agencies gave ODA to Africa and a plethora of private voluntary agencies were involved in relief aid programs and have been reorienting their assistance towards longer-term development. In addition, the World

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[3] ODA is defined as those resource flows to developing countries by multilateral institutions and government aid agencies with a grant element of at least 25 percent and with the objective of promoting economic development.

Bank, the African Development Bank and some Oil Producer Economic Community

(OPEC) sponsored agencies provided concessionary loans to African countries. Mellor et

al. (1987) reiterates Lele's view and affirms that recent foreign assistance to Africa has

been massive in quantity and therefore, highly influential on national governments ability

to make policy choices. Mellor also states that efforts by donors to develop food security

strategies for African nations have very seldom produced tangible results or lasting

impacts. Mellor et al. (1987) further suggests that donor's pressure on recipient

governments for attention to national-level policy issues is correct. However, they use the

analogy of donor assistance to Asia and indicate that when donors applied similar

pressure in Asia, in the mid-1960s, it was in the context of government support to

institutions that could translate broad national directives into detailed policies. Therefore,

national governments were staffed with a substantial number of highly skilled people

who could collect data, do research and conduct detailed policy analysis. Mellor et al.

conclude that in the case of agricultural research it is clear that priority must be given to

the support of African institutional capacity to diagnose needs and to monitor experiences

with agricultural investment. Abrahamsson & Nilsson (1995) suggest that when

evaluating the performance of past development strategies in post-independence Africa it

is important to note that development strategies were never perceived as a free choice in

the sense that at the time of a country's political independence it did not have

development alternatives to choose from. Therefore, the implementation of a

development strategy outcome is always affected by the power of social and economic

structures of international players.

Many African nations attained their independence between 1960 and1980. After

independence was attained, the nations had high expectations of rapid development. The

first generation of African leaders, influenced by prominent economists of that time from

the United Nations Economic Commission for Latin America, adopted strategies focused

on industrialization as the engine of economic growth and the key to transforming

traditional economies (Heidhues et al. 2004). It was believed that the prospects for

commodity exports were poor, and the desire to reduce dependence on manufactured

imports was widespread on the continent. Agriculture was neglected to the secondary role

of supplying raw materials and providing tax revenues that could finance fast growing

economic sectors (Heidhues et al. 2004). Heidhues explains that Africa's poor

performance between 1970 and 1980 was reflected in the weak growth of the productive

sector, poor exports performance, mounting debt, deteriorating social conditions,

environmental degradation, and increasing decay of institutional capacity. The crisis

prompted responses from organizations, resulting in a few initiatives of development

plans such as the Lagos Plan of Action (LPA), in 1980-85 and the Regional Plan for

Africa (AFPLAN), 1978-1990. These two plans were African domestic policies designed

under the auspices of the Organization of African Unity (OAU). They were then followed

by a set of policy initiatives, the Economic Adjustment Programs (ESAPs), based on the

neo-liberal understanding of economic development held by the World Bank and the

International Monetary Fund. These initiatives formed the framework within which

agriculture and food security programs were developed (Heidhues et al. 2004). They

observed also that the gap between food production and population growth was widening.

Timmer (1991) clarifies that farm incomes are low in the developing countries not

because peasants are irrational or lack knowledge of how to farm efficiently with the resources at their disposal, but because they lack the technology that would generate higher outputs and raise incomes.

Hughes (1988) states that agricultural development only takes place when increased productivity and output are reflected in the raising of real incomes, and hence in raising rural standards of living. These immediate gains result in the deepening of the countryside's economic activity, increasing off farm employment and increasing availability of building materials, furniture and household utensils. Diao et al. (2006) strengthens Hughes' argument and indicates that in order to fully mobilize a country's social capability during the early stages of development, it is important to acknowledge the role of the agricultural sector and the farmers' entrepreneurial potential. Diao et al. also explains that once the agricultural sector catches up with development, the growth effect emanating from agricultural development can lead to broader economic growth because agricultural outputs can be supplied into non-agricultural production processes such as agro-processing.

2.2 Overview of the Angolan Agricultural Economy

Angola is endowed with abundant fertile land, diverse climate with plentiful water, and natural conditions that offer the country an enormous potential to produce a wide range of crops all year round and become the bread basket of Southern Africa. However, these resources have not thus far been used to their potential. According to the Ministry of Agriculture and Rural Development (MINADER), the country has approximately 57.4 million hectares of arable land, but only approximately 3.2 million hectares (5%) was cultivated in the 2004/05 cropping season. Prior to independence, the

country was self sufficient in all food commodities with the exception of wheat. Between the late 1960's and the early 1970's, Angola was a net exporter of coffee, maize, tobacco, sisal, beans, sugar, palm oil and rice. Walker (1990) and Hodges (1987) estimate that in 1972/73 Angola exported approximately 242,000 tons of coffee which earned the country approximately US$206 million, and became the world's fourth largest coffee exporter only after Brazil, Colombia, and the Ivory Coast.

The agricultural sector of the pre-independence period was characterized by a dual system, in which the commercial sector grew mostly cash crops, while the peasantry sector grew primarily staple food crops. Despite their low yields, peasants produced enough for household consumption and had surplus food crops, livestock, or coffee which they marketed to Portuguese rural settlers, because these settlers managed the rural trade system and had access to export markets. In spite of considerable progress towards promoting more commercial activities from the peasantry, which stimulated more production surplus, support for agricultural activities was directed primarily to commercial farming with the aim of encouraging Portuguese settlement in the rural Angola. Nonetheless, access of peasants to consumer goods, fertilizer, seeds, and implements such as hoes and machetes was ensured through a quasi-barter system. The settlers also provided credit for consumer goods to the peasants, and that credit was redeemed at harvest time.

The major contributing factors to Angola becoming an agricultural export country in the pre-independence period included its: favorable climatic conditions; abundance of surface as well as undersurface water; abundant rainfall; fertile soils with varying texture and composition; establishment of irrigation schemes and mechanized agriculture; the

existence of research and extension services responsive to farmers needs; availability of agricultural credit and market incentives; the post World War II period of high demand for food and the coffee boom; and an efficient rural trading system. The combination of these factors determined the success of the agricultural sector in the pre-independence Angola and prompted an impetus for quick economic growth.

Upon independence from Portugal, in 1975, the country merged into a civil war that lasted for 27 years and caused more than 1 million deaths. During the war, millions of rural families fled their villages in search of safe refuge. Some of the consequences of the prolonged civil war were: a) loss of rural families' productive assets; b) completely devastated rural infrastructure; c) completely disrupted farming and production support systems; and d) the disappearance of all formal supply chains. The war also resulted in the reversal of the country's agricultural production trends. Between 1960 and 1974 agriculture contributed the largest share to GDP (led by coffee export), followed by diamonds and oil. However, the war resulted in a dramatic decline in agricultural output which rendered the country dependent on food aid to meet its internal food requirements. At independence eve, the Portuguese rural traders abandoned the country. The sudden departure of rural traders who ensured the connectivity between peasants and the suppliers of industrial goods and agricultural input suppliers, disrupted the rural trade network and in turn, the production systems. In response to the post-independence agricultural sector crisis, the pro-socialist Angolan government resorted to confiscation of all formally Portuguese owned farms and converted them into state owned enterprises, created state owned companies that delivered inputs to farmers (including access to farm machinery), purchased agricultural output, and farmers were organized into cooperatives.

In addition, the government established trading companies in an attempt to remedy the collapse of rural trade. However, all of the following led to the breakdown of the agricultural sector in the post-independence period: the severity of the civil conflict which resulted in massive influx of rural families into urban centers; the overall neglect of the agricultural sector resulting from a wholly inadequate planning; institutional inefficiencies of the trading companies; and weak managerial and technical skills of the post-independence agricultural development planners.

In summary, the collapse of the Angolan agricultural sector is blamed primarily on the abrupt abandonment of Portuguese settlers, who were in charge of the: commercial farming sector; food processing industry; and the systems of rural trade and distribution of agricultural inputs. However, the complete devastation of production and support systems which led to a continuous decline of agricultural output was exacerbated by the complete disappearance of rural trade systems and the prolonged civil war which forced massive influx of rural families into urban centers.

According to USAID, approximately 68 percent of the population lives below the poverty line, living on less than $1.70 per day, of whom 28 percent live in extreme poverty that is on less than $0.70 per day. Poverty level is estimated to be around 97% among rural families primarily due to the lack of production incentives and difficult access to markets[4]. Furthermore, the extractive industry is capital intensive; hence it does not have the capacity to absorb the large numbers of demobilized soldiers and ex-combatants who constitute a great mass of unskilled work force that need to be transformed into peace-time economic pursuits. Although Angola's current oil production levels average 1.4 million bpd, making the country the second-largest oil

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[4] http://www.oecd.org/dataoecd/29/58/35350793.pdf (accessed on 12/18/06)

producer in sub-Saharan Africa and the seventh-largest supplier to the United States, the revenues have not contributed to the increased social or economic welfare of the majority of Angolan citizens.

According to Diao et al. (2006), since almost all rural households depend directly or indirectly on agriculture, and given the large contribution of this sector to the overall economy, it is obvious that agriculture should be a key component of growth and development. Diao et al. notes that both the green revolution and the induced innovation model introduced by Hayami and Rutan, in 1985, revealed that agricultural productivity growth requires fostering the linkages between the agricultural and nonagricultural sectors.

2.2.1 Angolan Agricultural Production Trends for Main Food Crops, Between 1971 and 2006

The objective of this section is to analyze production trends of crops that constitute the main diet of Angolan rural families, before and after independence. The analysis focuses on production levels of two cropping seasons. That is, prior to independence, in 1975, and approximately ten cropping seasons after independence.

Table 1 shows that from 1971 to 1973, the Angola food crop production systems achieved stable levels that ensured domestic supplies as well as exports. The political crisis of the aftermath of independence and the subsequent widespread civil conflict drove production below subsistence levels.

The approximately four years of peace and gradual political stability (from 2001 to 2006) has shown promising agricultural recovery signals, with all crops showing continuous output increases, except for rice (fig.4). Nonetheless, the increases in

production levels have not matched population growth. Therefore, in spite of higher

production levels in the post-independence period than they were before independence,

Angola has not been able to produce adequate surplus to meet its consumption needs.

Table 1: Agricultural Production of Main Staple Crops Between 1971 and 2005-2006

Cropping Season	Crop Type and Production (in MT)					
	Maize	Beans	Peanuts	Potatoes	Cassava	Rice
1971-72	709,750	65,479	26,936	138,757	1,134,262	57,604
1972-73	853,847	53,742	26,679	59,941	1,408,593	53,000
1986-87	287,853	41,288	13,862	31,454	1,314,270	2,966
1987-88	270,000	-	-	-	796,000	2,000
1988-89	204,000	-	-	-	764,000	3,000
1989-90	180,000	-	-	-	740,000	3,000
1990-91	299,000	-	-	-	871,000	4,000
1991-92	369,000	-	-	-	1,024,000	4,000
2001-02	426,300	57,895	29,966	-	5,620,419	-
2002-03	545,150	66,121	60,190	301,804	5,699,331	15,607
2003-04	576,917	75,965	54,732	331,551	6,637,623	20,620
2004-05	720,275	108,116	66,003	307,293	8,806,208	8,648
2005-06	565,000	100,000	67,000	593,000	8,809,000	9,000

Source: Ministry of Agriculture and Rural Development 2004-05 Cropping Season Report;
FAO-WFP 2001/02 & 2003/04 Crop and Food Supply Assessment Missions to Angola;
FAOSTAT Database; Angola to 2000: Prospects for Recovery; Angola: The Promise of
Riches.

Fig. 2 shows steady increases in maize production trends, from 2001-02 to 2004-

05 cropping seasons, with a slight decrease in 2005-06. However, despite production

increases from 2001 to 2006, the overall output has remained below pre-independence
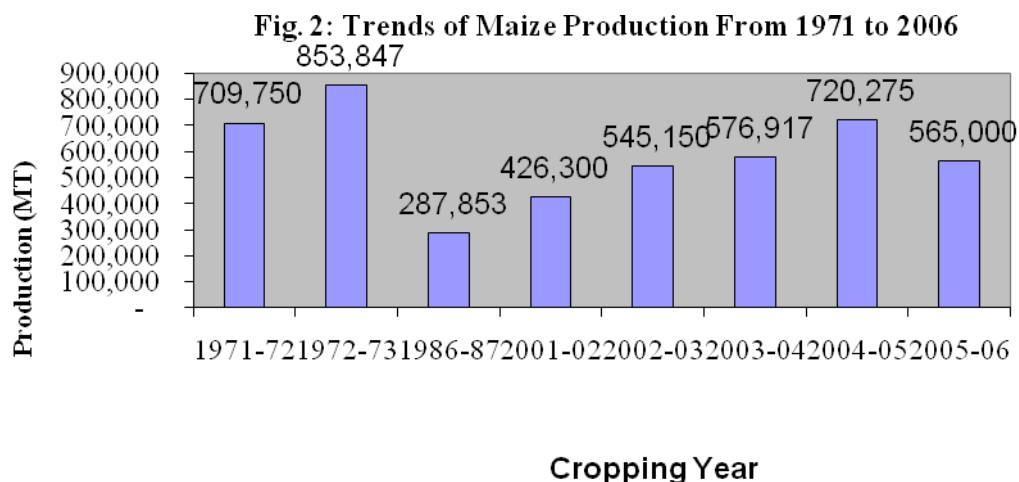
period.

Fig. 2: Trends of Maize Production From 1971 to 2006

Source: Ministry of Agriculture and Rural Development 2004-05 Cropping Season Report; FAO-WFP 2001/02 & 2003/04 Crop and Food Supply Assessment Missions to Angola; FAOSTAT Database; Angola to 2000: Prospects for Recovery; Angola: The Promise of Riches.

Figure 3, shows that in spite of a relative decrease in production level of beans, in 1972 – 73 and 1986 – 87 cropping seasons, the overall production trend of that crop between 1971 and 2006 was upward facing. The figure shows that production of beans reached its highest in the cropping season 2004 – 05.

Fig. 3: Trend of Beans Production From 1971 to 2006
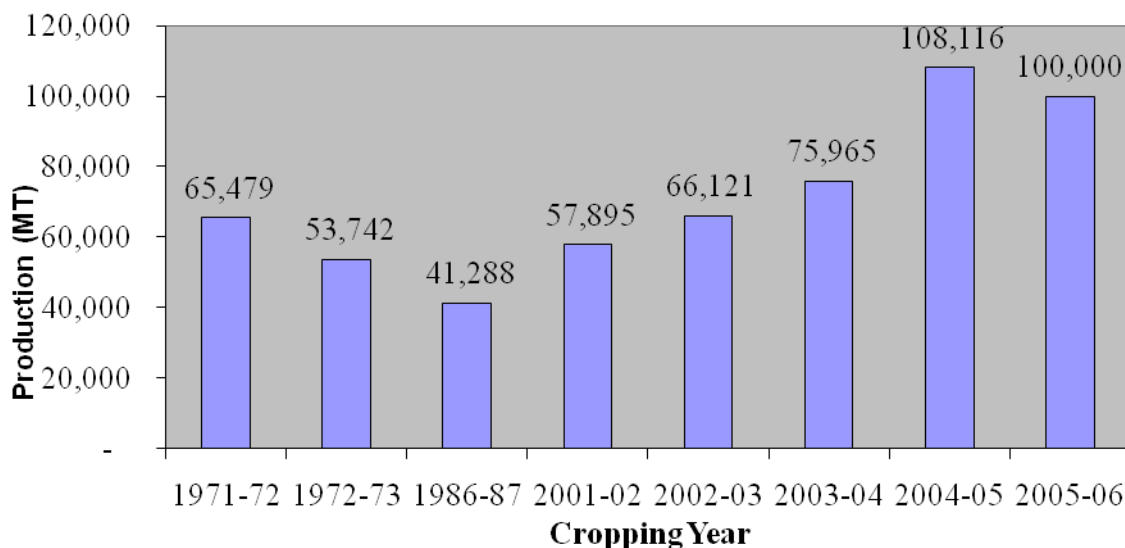
Source: Ministry of Agriculture and Rural Development 2004-05 Cropping Season Report; FAO-WFP 2001/02 & 2003/04 Crop and Food Supply Assessment Missions to Angola; FAOSTAT Database; Angola to 2000: Prospects for Recovery; Angola: The Promise of Riches.

Figure 4, shows that contrary to the beans production, over the years between 1971 and 2006 the production of rice was continuously decreasing.

Fig. 4: Trend of Rice Production From 1971 to 2006
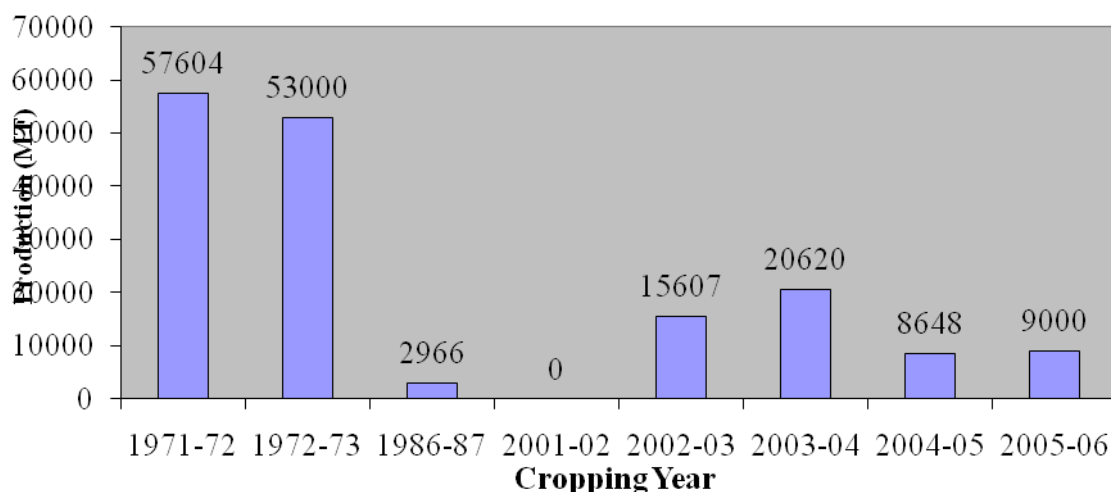
Source: Ministry of Agriculture and Rural Development 2004-05 Cropping Season Report; FAO-WFP 2001/02 & 2003/04 Crop and Food Supply Assessment Missions to Angola; FAOSTAT Database; Angola to 2000: Prospects for Recovery; Angola: The Promise of Riches.

Figure 5, shows that similar to the production of beans (fig.3) the production of peanuts has more than doubled over the period under review. It also shows that the production of peanuts reached its highest in the cropping season 2005 – 06.
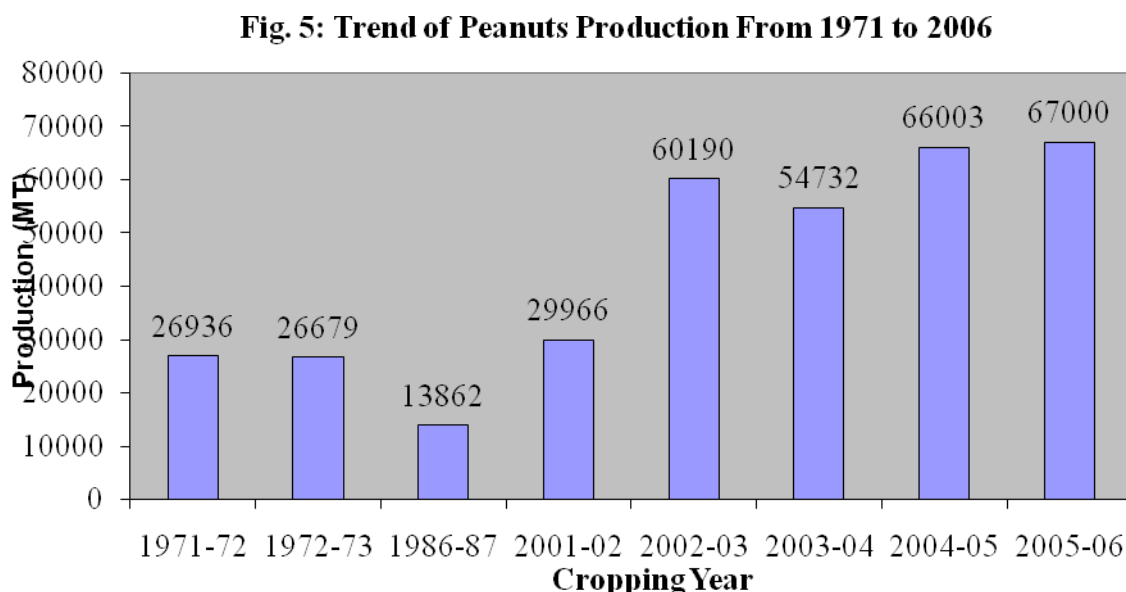
Fig. 5: Trend of Peanuts Production From 1971 to 2006

Source: Ministry of Agriculture and Rural Development 2004-05 Cropping Season Report; FAO-WFP 2001/02 & 2003/04 Crop and Food Supply Assessment Missions to Angola; FAOSTAT Database; Angola to 2000: Prospects for Recovery; Angola: The Promise of Riches.

Figure 6, shows that the production of potatoes faced a down ward trend in the years following independence, but the cropping season 2002 – 03 witnessed a reversal of the down ward trend and production begun to increase, reaching its maximum in the cropping season 2005 – 06.

Fig. 6: Trend of Potato Production From 1971 to 2006
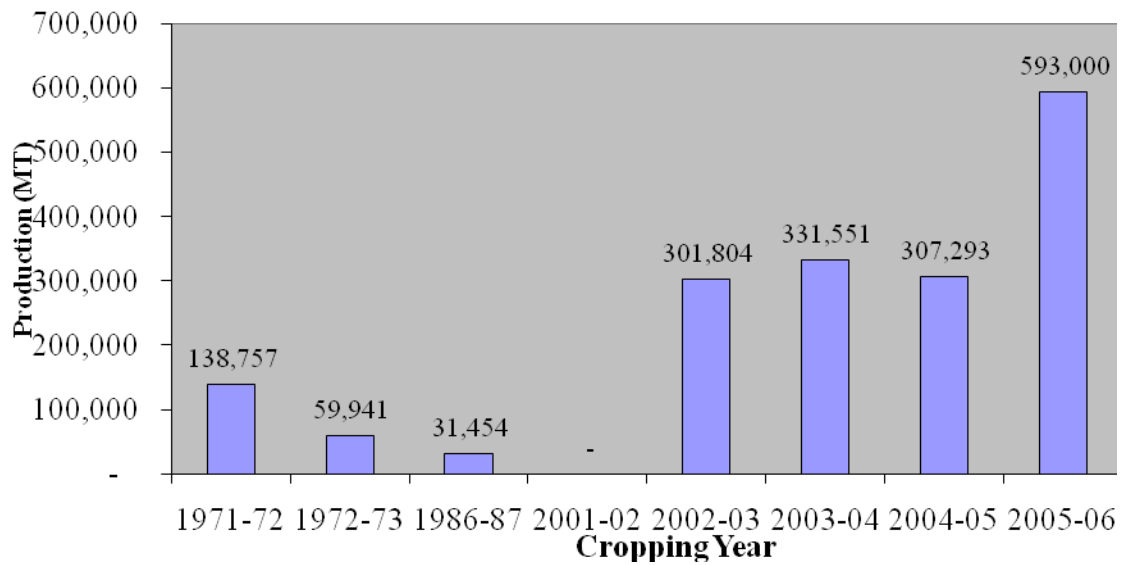
Source: Ministry of Agriculture and Rural Development 2004-05 Cropping Season Report; FAO-WFP 2001/02 & 2003/04 Crop and Food Supply Assessment Missions to Angola; FAOSTAT Database; Angola to 2000: Prospects for Recovery; Angola: The Promise of Riches.

Figure 7, shows an approximately eight fold increasing in production levels, in the period under review. The high production levels in cassava can be attributed, to some degree, to the fact that cassava production levels may reflect a cumulative of two to three years because unlike other crops that are harvested at the end of each cropping season, cassava production is carried over from one season to the next and it is harvested as needed.

Fig. 7: Trend of Cassava ProductionFrom 1971 to 2006
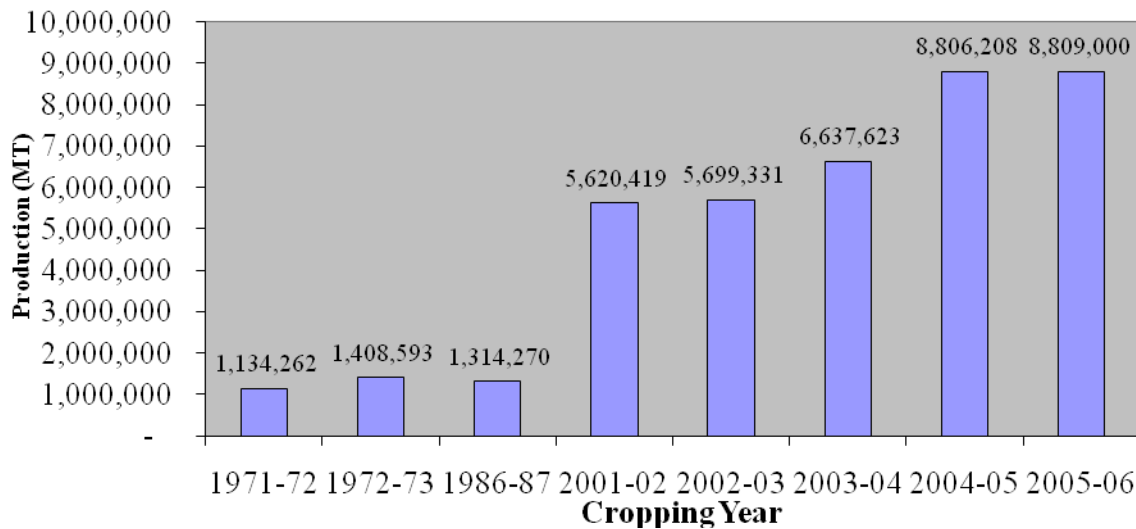
Source: Ministry of Agriculture and Rural Development 2004-05 Cropping Season Report; FAO-WFP 2001/02 & 2003/04 Crop and Food Supply Assessment Missions to Angola; FAOSTAT Database; Angola to 2000: Prospects for Recovery; Angola: The Promise of Riches.

According to the USDA-Foreign agricultural service report, in 2005 the overall Angolan agricultural production increased by 28 percent. The report attributes the production increase to a combination of factors such as favorable weather conditions, expansion of cultivated area following resettlement of the internally displaced people, and distribution of agricultural inputs as part of the resettlement process. This assessment coincides with the MINADER 2004-05 cropping season report which indicates that productivity levels remained very low across the country, ranging between 0.4 and 0.7 MT/ha for maize, between 0.3 and 0.4 MT/ha for beans, between 1.5 and 2.5 MT/ha for potatoes while for rice the productivity averaged 0.7 MT/ha. Therefore, overall production levels do not reflect efficient allocation and utilization of productive resources.

The fact that Angola is at an embryonic development stage, an increase in production that is not a result of increasing productivity of the land, labor and other resources merits attention, to avoid production declines and stagnation of the sector in years following production increases.

2.2.2 Angola's Current Food Supply Response Capability

Table 2 provides a summary of food requirements and the country supply response capability. In spite of an overall agricultural production increase of 28 percent in 2005, Angola remained a food deficit country. Therefore the country has resorted to food imports, both commercial and food aid, to meet the short fall.

Table 2: Food Balance Levels Estimated at the 2005-06 Marketing Season

Description	Type of Commodity (in metric tones)					
	Maize	Rice	Beans	Peanuts	Potatoes	Wheat
A. Domestic availability	744,372	13,005	111,284	68,003	331,875	5,000
A.1 Opening stock	10,000	4,355	2,000	2,000	5,000	5,000
* Commercial sector	4,000	4,000	1,000	1,000	3,000	5,000
* Retained by farmers	6,000	355	1,000	1,000	2,000	0
A.2 Total production (2004-05)	720,275	8,648	108,116	66,003	307,293	0
B. Total requirements	748,062	293,452	330,986	72,374	389,151	265,345
B.1 Human consumption	667,413	288,411	308,980	62,280	286,917	260,345
B.2 Other uses	80,649	1,041	22,006	8,094	102,234	0
* Seed	21,899	868	17,635	5,453	62,080	0
* Feed	7,344	0	0	0	15,444	0
* Losses	51,406	175	4,371	2,640	24,710	0
B.3 Closing stock	24,097	4,375	3,168	2,000	24,582	5,000
C. Import requirements	3,690	280,447	219,702	0	57,276	260,345

Source: Gabinete de Segurança Alimentar-MINADER, 2004-05 Cropping Season Report

Fig. 8 illustrates an upward trend in food commercial imports from 1979 to 2002. The increasing food import levels over time tends to reiterate the idea that the increases

that have been registered in production levels of key food crops are still inadequate to

match food demand resulting from population growth over the past two decades.

Fig. 8: Trend of agricultural imports from 1979 to 2002
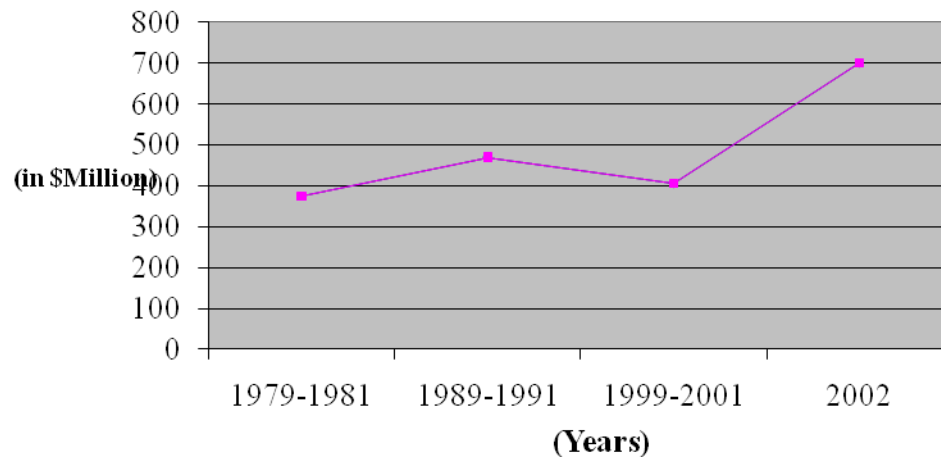
Source: FAOSTAT Data base (accessed Dec. 2006)

Fig. 9, on the other hand, shows that in 2004 Angola imported approximately

US$ 688,169,854 worth of food commodities, to cover the short fall and meet total food

requirements. Seven countries constituted the 2004 top exporters of food to Angola, of

which Portugal led with 28 percent share, followed by South Africa, Brazil and the USA,

with 25, 18 and 9 percent respectively.

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Fig. 9: The 2004 Top Seven Food Exporters to Angola

$49,733,668 , 7%

$34,874,505 , 5%

$57,403,170 , 8%

$65,324,630 , 10%

$188,794,625 , 27%

$120,832,164 , 18%

$171,207,092 , 25%

Portugal   South Africa   Brazil   U.S.A.
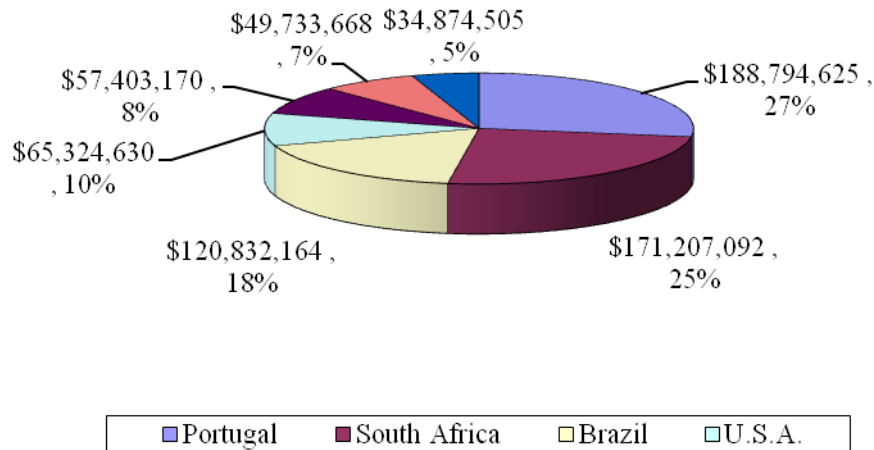
Source: USDA Foreign Agricultural Service, Global agriculture information network; Angola export guide, Angola's import regulations and customs 2006

Diao et al. (2006) state that the issue of meeting domestic demand for food implies that agricultural growth should at least match population growth in order to avoid stagnant development. Angola has the opportunity to take advantage of its being at an early stage of development and can pursue agricultural-led development strategies that stimulate broad based economic growth. Diao et al. reiterate that without efficient agricultural productivity, the traditional economy cannot overcome the fixed supply of natural resources and thus over time it cannot generate adequate supply of food nor can it promote sustained economic growth.

Timmer (1991) establishes a symbiotic relationship between agriculture and other sectors of the economy and indicates that close integration of agricultural policy with overall macroeconomic and trade policies is essential for rapid economic growth which is essential to have sustained reductions in poverty.

2.3 The Role of Mineral Revenues in Pursuit of Agricultural Development

There is a large body of empirical work that establishes a negative relationship between resource abundance and economic performance (Stevens 2003). Zafar (2004) states that Gabon's growth performance since independence has been respectable, depending significantly on the performance of the oil sector. Its rich petroleum reserves have historically accounted for close to half of the GDP, more than 80% of its export receipts and 65% of its tax revenues. For many years, Gabon was Africa's third largest oil producer after Nigeria and Angola, and had the third largest reserves with close to two billion barrels. However, a major consequence of the oil boom in Gabon has been what is commonly referred to by economists as the "Dutch disease" (Zafar, 2004). According to Zafar, the deindustrialization of a country's economy when natural resources are discovered results in a large inflow of foreign currency, inducing an export boom and causing an appreciation in the country's currency. The adverse affects are that the competitiveness of the manufacturing and agricultural sectors is greatly reduced. According to Rosser (2004), mineral booms have strong effects on the labor force; yet little is known about their ultimate impact on the distribution of income and poverty alleviation. He further explains that in general, scholars suggest that economically successful resource rich countries have been able to break the resource curse because they have adopted radical and well coordinated economic policies, particularly in the macroeconomic and fiscal realms.

Contrary to Stevens' and Zafar's argument, Ramkissoon (2002) argues that abundant natural resources have played an important role in the economic development of many states, large and small. Rosser supports Ramkissoon's point and argues that

Botswana (a mineral-rich country that at independence, in 1966, was one of the 25th poorest countries in the world, and that grew to become an upper middle income country by late 1990) was able to break the resource curse because its government adopted sound economic policies and provided good management of windfall gains. Rosser (2004) makes an assertion that in addition to Botswana, high rates of economic growth and poverty reduction accomplished by mineral-rich countries also includes Chile, Malaysia and Indonesia. To further investigate the role of mineral in economic development, the Nigeria and Indonesia cases are reviewed due to their similarities with Angola.

2.3.1 The Role of Oil Revenues in Promoting Sustainable Economic Development: The Case of Nigeria and Indonesia

Angola and Nigeria are both sub-Saharan African oil-rich countries (the two largest oil producers in sub-Saharan Africa). Angola and Nigeria are located along the Atlantic coast, they have enormous agricultural potential to become food self-sufficient, yet both are heavily dependent on food imports with a significant component of food aid. The fact that Abdullahi (1985), Ijere (1986), Kyle (1997) and Ross (2003) consider Nigeria an example of an oil-rich country that has failed to promote sustainable economic development, albeit its enormous natural resource base prompts an opportunity for this study to draw lessons that Angola may consider before pursuing economic development strategies.

The contrasting experiences of two oil exporters, Nigeria and Indonesia, provide strong support for an emphasis on agricultural investment coupled with an exchange rate policy designed to avoid over-appreciation (Kyle 1997). Zafar (2004) suggests that although governments can do much to offset the effects of the "Dutch disease", too

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frequently they do not. Ross (2003) argues that a sharp rise in Nigeria's petroleum exports in the 1960s and early 1970s led to an appreciation of the exchange rate. The higher exchange rate made it virtually impossible for firms in the agricultural and manufacturing sectors to sell their goods profitably abroad. Instead of devaluating the currency, the government kept the currency overvalued for fear of inflation. Ross states that the result was that booming oil exports crowded out agricultural and manufacturing exports, and hence, the jobs in those sectors. In 2000, Nigeria received 99.6 percent of its export income from oil, making it the world's most oil-dependent country (Ross 2003). Ross suggests that in general, the more that states depend on mineral exports, the more likely they are to suffer the effects of the "Dutch disease". Since Nigeria is remarkably dependent on oil, it has been highly susceptible to those economic shocks.

The Indonesian government adopted different strategies than Nigeria. Ross argues that in the 1960s and 1970s, the Indonesian government adopted many programs targeted at the poor, including universal primary education, price controls on food and kerosene, and rural pubic works projects; the Nigerian government did nothing comparable. Contrary to Nigeria, the Indonesian government also took measures to enhance agricultural production and to devaluate the exchange rate, allowing exports to remain competitive, and avoiding the collapse of agricultural exports.

According to Kyle (1997), Indonesia followed a policy of emphasizing agricultural infrastructure and technological improvement with modern high yielding varieties, as part of an overall economic policy which resulted in high non-oil growth rates over sustained periods. Kyle explains that in the case of Indonesia, agriculture received a large share of public investment, more than 20% in the initial years of the oil

boom and he concludes that Nigeria's example is in many ways the opposite of

Indonesia's. However, despite the fact that Nigeria is considered to have failed to

promote and sustain a broad-based economic development, it offers important lessons

that may help countries, such as Angola, that are at the beginning of the development

path to view economic development in light of its multiple sectors. According to

Donaldson (1991), Agricultural development must involve mobilization of resources,

expansion of output, increased production efficiency of resources, technological

innovation and an adequate balance between and within sectors. Timmer (1991) urges

that inappropriate policies are the major constraint limiting the pace of agricultural

development in the developing world. The role of the government is central to the

alignment of all these development factors to promote sustainable economic

development. The government creates an enabling environment that encourages

smallholder farmers to respond to expanded growth opportunities as they arise.

Successive Nigerian Governments maintained that commercial banks should not

neglect agriculture and related activities because agriculture and its related activities were

the chief agents for the mobilization of savings (Ijere 1986). However, traditional

commercial lending requirements rendered government initiatives fruitless. In response to

the failed government policies that mandated commercial banks to provide agricultural

loans, in the mid 1970s the Nigerian Federal Government established the Nigerian

Agricultural Bank Ltd. which later changed name to the Nigerian Agricultural and

Cooperative Bank (NACB). The objective of the bank was to promote "rapid

transformation, expansion and modernization of agriculture in all facets" (Ijere 1986).

This objective was to be achieved with massive, yet efficient injections of funds into

agricultural enterprises in the country. The bank had a smallholder direct loan scheme designed to provide loans to smallholder farmers who did not otherwise have access to finances. In 1977, the government established a credit guarantee fund which was intended to be an incentive for commercial banks to finance agricultural activities as a complement to the NACB (Ijere 1986). In addition, the government established concessional tariffs for foreign investments into the agricultural sector, adopted monetary policy guidelines with prescribed lending ratios for loans and advances to different activities and because agriculture was the preferred sector, it received 6-8% of all commercial bank loans (Ijere 1986). In 1985 Nigeria launched its own "green revolution" which targeted a 4% annual growth rate. However, the sector grew only at 1% versus the estimated 6.6% required growth rate for Nigeria to become food self-sufficient (Abdullahi 1985). Abdullahi states that conversely, in the early stages of economic development, the agricultural sector produced adequate volumes to meet Nigeria's domestic demand, earned the country most of its foreign currency and encouraged the establishment of pioneer agro-processing industries. The success of early stages of economic development was not maintained because the planning process ignored the essential links between agriculture and other sectors of the economy and instead, focused on compartmentalization of individual sectors of the economy (Abdullahi 1985).

Similar to Nigeria, shortly after independence Angola adopted agricultural development strategies with a strong credit component. In addition to the "Banco de Poupanças e Crédito, formerly Banco Popular de Angola" (approximately from 1978 to 1994), the Angolan government established the "Caixa de Agro-pecuária e Pescas (CAP)" and the "Fundo de Apoio ao Desenvolvimento Agrário (FADA)" to revitalize the

agricultural sector. However, similar to Nigeria, those initiatives failed because of a lack of appropriate development strategies.

2.3.2 The Impact of Post-war Agricultural-led Economic Development in Promoting Sustainable Development: The Case of Mozambique

Angola and Mozambique are both former Portuguese colonies, both attained independence in 1975, and then both opted for a political and economic socialist orientation and both countries merged into prolonged civil wars. When analyzed purely from an agricultural productivity potential stand point, both Angola and Mozambique have adequate potential to become food self-sufficient. However, they have both been heavily dependent on food imports with a significant portion from food aid. The key factor to consider when comparing Angola and Mozambique is that the civil war in Mozambique ended in 1992 (ten years earlier than the war in Angola). Therefore, Mozambique has gone through development stages that can offer lessons to Angola.

Mozambique experienced almost 17 years of civil war which affected all sectors of the economy, especially agriculture. Mozambique suffered a complete devastation of its rural infrastructure including its road network. Therefore, the already fragile market structure became non-functional and production and marketing activities were marginal at best. After the signing of the general peace agreement in 1992 and democratic elections in 1994, the government established development policies that freed the agricultural sector from centrally planned state intervention. The reforms targeted agricultural management, pricing, market allocation of agricultural resources, liberalization of pricing systems and privatization of state assets. Economic reform, initial rehabilitation of rural infrastructure, and the rapid post-conflict expansion in agricultural

production also stimulated a small agribusiness sector (Pitcher, M. 1999). Agricultural inputs such as fertilizer and agrochemicals were declared not subject to any tariff. All of these factors have played a role in stimulating production increases.

Although many factors may have played a role in reducing rural poverty in Mozambique, agriculture is regarded to have played a leading role. There is a consensus among various researchers, however, that current results have been accounted for by increases in production through expansion of cultivated areas, as opposed to more efficient use of productive resources. According to World Bank (2000), researchers raise concerns that unless Mozambique adopts policies that promote increased adoption of modern agricultural techniques and inputs, the sector risks stagnation.

Similarly to Mozambique, with the end of civil war in Angola, the government designed a resettlement program for internally displaced people and families of ex combatants. Allocation of land for agriculture production and the distribution of seeds and tools were the main components of the program. As a result of the resettlement program, there have been production increases and the subsequent reduction of food imports, as reported by the MINADER the USDA. However, both the MINADER and the USDA have made it clear that production increases have resulted from expansion of the cultivated land, as opposed to adoption of improved agricultural techniques.

Similar to the MINADER and USDA reports, participants in this study cautioned that the government, the NGOs and the private sector will need to promote investment that lead to more efficient agricultural production systems in order to avoid decline in yields and the stagnation of the agricultural sector in the next few years, following few years of production increases.

2.4 Conclusions and Lessons Learned

Strategies conceived and implemented by international organizations on behalf of recipient countries have very seldom produced tangible results or lasting impacts. Inappropriate policies are the major constraint limiting the pace of agricultural development in the developing world. Donor development programs in Africa would be more effective if they focused on building capacity of national institutions to diagnose needs and monitor experiences with agricultural investments.

Contrary to Indonesia, Nigeria failed to promote an agricultural based economic development, not because it did not want to, but because it used inefficient development strategies. Similar to Mozambique, Angola has been experiencing increased aggregate levels of agricultural output after the end of civil war. However, the increases are a result of expanded cultivated area, with no improved agricultural practices.

CHAPTER THREE

RESEARCH METHODOLOGY

Prior researchers have used primarily surveys, case studies and analysis of secondary data to analyze agricultural development strategies in developing countries. Kyle (1997) did an analysis of secondary data to compare the economic development of Angola and Mozambique, and Indonesia and Nigeria. Ross (2003) and Zafar (2004) did an analysis of secondary data to compare the impact of mineral resources use in promoting economic development in Indonesia and Nigeria. EMBRAPA used surveys to evaluate people's perceptions regarding agricultural and industrial development prospects. Lyford et al. used scenario analysis to assess industry leaders' perceptions regarding the future of industries.

Because there are no reliable data on Angola and there is a limited number of studies conducted on Angola, this study will be based on information derived from field work conducted using scenario analysis. The use of scenario analysis was evaluated to be the most suitable approach for Angola because it creates an environment for vigorous debate and exchange of ideas, thereby creating an appropriate atmosphere for eliciting problems and identifying solutions. The study will be conducted through a combination of key informant interviews and scenario analysis. The key informant interviews will be conducted using semi-structured questionnaires, while the scenario analysis will be conducted in group discussions. Key informants will include people from the Ministry of Agriculture and Rural Development (MINADER), Angolan Development Bank (BDA), the diamond company ENDIAMA, the Angolan oil exploration company "Sonangol". The scenario analysis participants, on the other hand, will include people from

MINADER, Faculty of Agronomic Sciences of Agostinho Neto University (FCA), the food/feed processing sector, the farming community, input suppliers, formal and informal agricultural commodity market operators, Non-governmental organizations (NGOs), and financial institutions.

The scenario analysis will be preceded by a pre-test to assess current perceptions about future development prospects of the agricultural sector. Approximately three weeks later, a post-test will be administered to individuals who participated in the scenario analysis exercise to assess changes in their perceptions about the future of the agricultural sector in Angola.

The pre-test instrument was designed to assess each participant's perceptions regarding the factors that have contributed to the loss of the country's production capacity, the factors needed to revitalize the agricultural-led economy, to identify the factors that will help to stabilize the agricultural sector and determine the conditions required for the development and coordination of the food supply chain. The post-test, on the other hand, was designed to assess changes in each participant's perceptions after their participation in scenario analysis.

The scenario analysis was designed to create an enabling environment for the exchange of ideas, generate intense debate among participants, and effect changes in participants' perceptions. Contrary to the pre and post-test which will give a measure of changes in individual's perceptions, the scenario analysis will give a measure of collective opinion, which will reflect groups' perceptions. The assumption that encouraged the use of scenario analysis was that the participation in the scenario analysis will cause significant changes in participants' perceptions.

The scenario analysis will start with a discussion of objectives and the importance of the study by the facilitator. After clarifying the objectives, the facilitator will read the scenarios to the participants, followed by break out groups to allow in depth analysis of each scenario. Each group will be given copies of the scenario to be analyzed (see fig. 10).
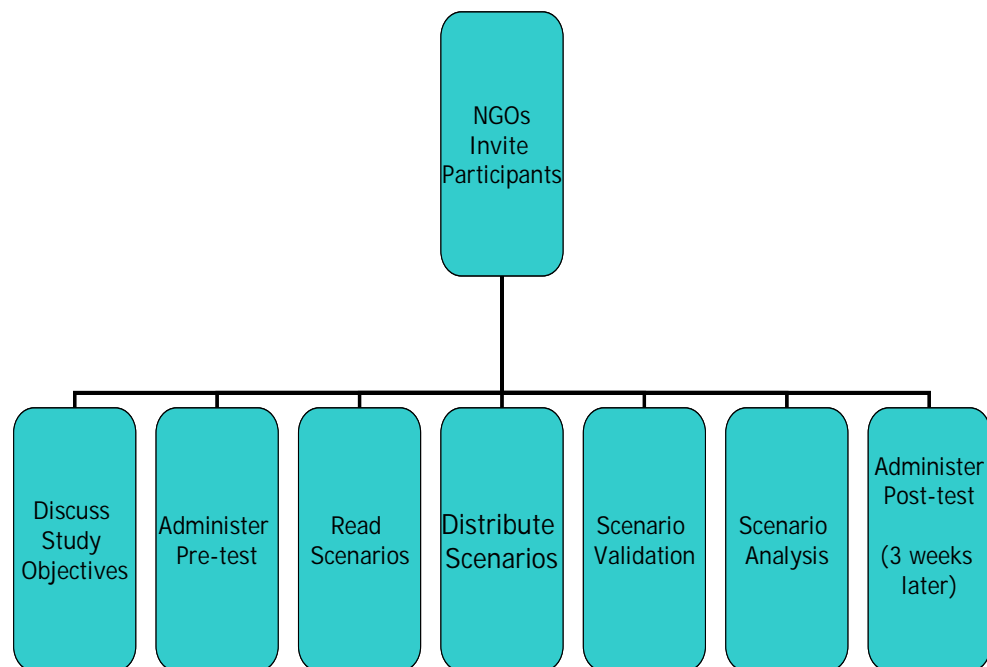
Figure 10: Time line for Data Collection

The subgroups will consist of no more than five people. In situations where there are more than 20 participants, additional groups will be formed starting with scenario 4. The group discussions results will be collected by the facilitator and each group will report their key points and main recommendations to the larger audience in a plenary session. The proposed methodology emphasizes the pre-assessment of current perceptions about future development prospects of the agricultural sector and post-assessment after the scenario analysis. The pre and post-test will help assess attitude

changes as a result of the scenario analysis. The scenario analysis will be based on a

modified framework that results from a combination of Lyford et al. (2002), "A

Framework for Industry Strategic Planning and Coordination (ISPC) (see figure 11)" and

"The Technological Demands Determination by Prospective Analysis", by The Brazilian

Agricultural Research Cooperation (EMBRAPA)[5]. The resulting hybrid framework will

comprise of five stages, as indicated in fig. 11.A.

3.1 The Modified Lyford's Framework for Industry Strategic Planning and Coordination

Figure 11.A illustrates that the modified Lyford's framework pre-test and scenario

validation is equivalent to the "process initiation" in the original Lyford's framework

(fig. 11). This modification is in line with the framework for industry strategic planning

and coordination which emphasizes "process initiation" as a logical first phase because it

fosters agreement among industry leaders of the ISPC which is based on some level of

commonalities, shared problem areas, and the possibility of shared benefits from industry

actions that facilitate improved industry performance. The scenario validation is a key

starting point for this study because it will elicit major constraints and uncertainties to the

development of the agricultural sector and the potential development opportunities,

which in turn will help to envisage possible structural changes based on perceptions and

realities. This modification is also in line with EMBRAPA's Technological Demands

Determination by Prospective Analysis framework in that they both start with

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[5] A conceptual and methodological framework, as well as strategy for setting agricultural R&D priorities based on client demands, in a large public agricultural research organization in Brazil, EMBRAPA (Brazilian Agricultural Research Corporation). It is a result of a five year project aiming to develop strategy, conceptual framework and methodology for determining R&D client demands using technological demands prospective analysis in agricultural production chains (APC).

brainstorming sessions with a group of experts to either formulate or validate scenarios prior to the analysis.

Phase 2

Strategic Planning

Situation Analysis

Vision Statement

(Feedback)

(Feedback)

Phase 1

Phase 3

Phase 4

Process Initiation

Growth Positioning

Implementation and Coordination of Strategies

Strategy Review & Reevaluation

(Feedback)

Major Industry Improvement Objectives

(Feedback)

Specific Strategy
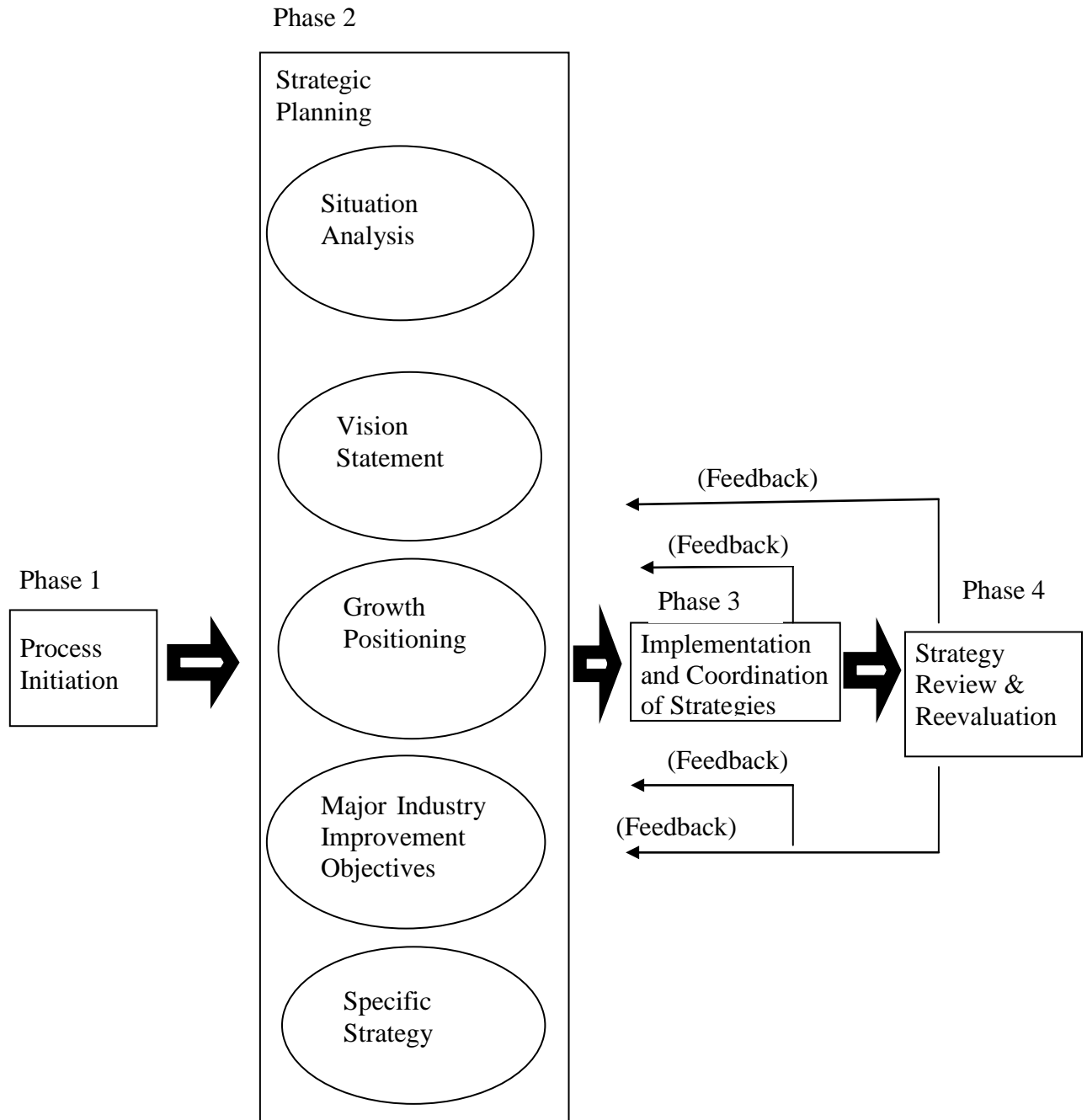
Figure 11: Lyford's Framework for Industry Strategic Planning and Coordination

Analysis of
prospective
scenarios

Choice of
strategy
options

Strategy
review and
validation

Pre-test
&
scenario
validatio

Interviews
with key
informants

Post-test
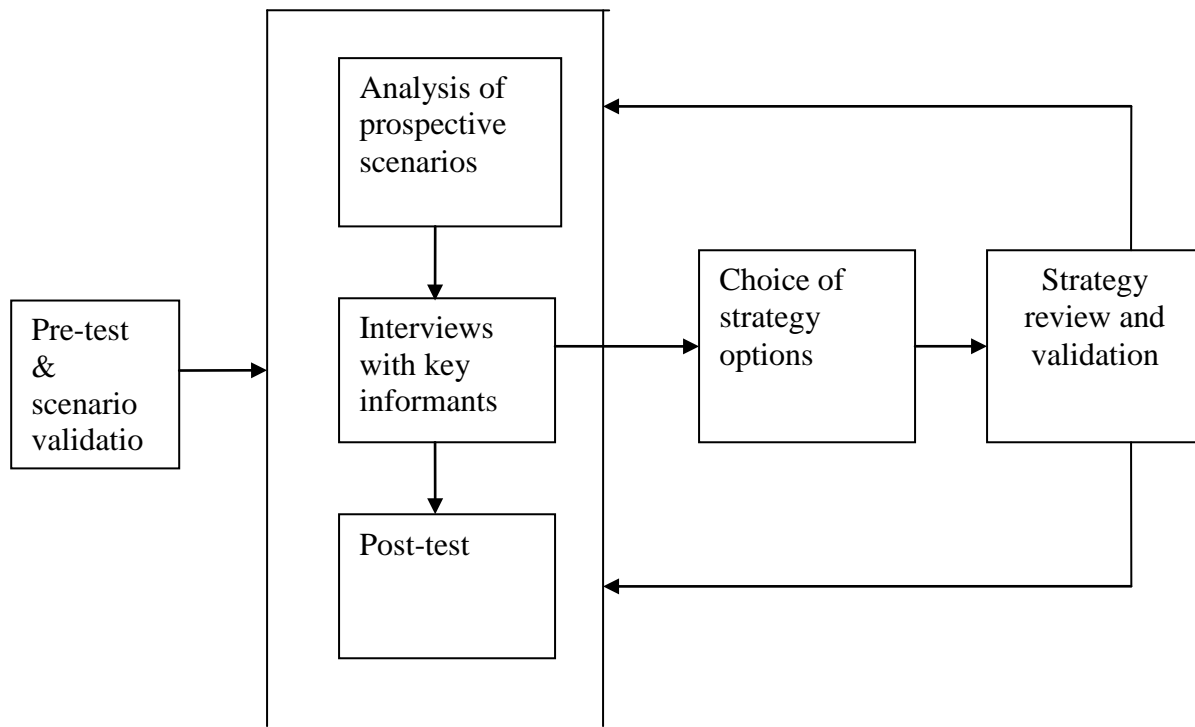
Figure 11.A: The modified Lyford's Framework for Industry Strategic Planning and Coordination

The analysis of prospective scenarios in the modified framework (figure 11-A) is equivalent to the Lyford's "situational analysis" because the analysis of prospective scenarios will help to update existing information to create changes in currently held perceptions about the future of the development of the agricultural sector in Angola, whereas the Lyford's situational analysis focuses on developing a comprehensive, up-to-date understanding of the evolving industry. The interviews with key informants from sectors other than agriculture, complements and gives more validity to the information gathered during the scenario analysis.

The post-test in the modified framework is equivalent to the overall phase 2 "Strategic planning" in the Lyford's framework. The strategic planning in the original

Lyford's framework is pursued by an industry, to ensure the best overall industry strategies are selected based upon the knowledge developed and the choices made in the strategizing process. The post-test, on the other hand, allows the assessment of patterns of changes in participants' perceptions. The assessment of changes in participants' perceptions guide strategy choices because those changes give a measure of shared understanding of the agricultural sector's situation developed in the course of scenario analysis.

The choice of strategy options in the modified framework is equivalent to the "implementation and coordination of strategy options" in the Lyford's framework. It is a stage where the researcher formulates alternative development strategies using the information gathered in the course of the study.

The strategy review and validation in the modified framework is similar to the "strategy review and reevaluation" from the original Lyford's framework. This phase involves sharing the recommended strategy options with key policy makers within the Angolan Ministry of Agriculture and Rural Development, Chevron and the sectors represented in the study for reactions and adoptions of the most feasible strategy option.

The choice of this methodology was based on the fact that the scenario analysis will help engage key players from different economic sectors in an interactive discussion to identify the factors that have contributed to the loss of the country's production capacity, the factors needed to revitalize the agricultural-led economy, to identify the factors that will help to stabilize the agricultural sector and identify the conditions required for the development and coordination of the food supply chain. In addition, the scenario analysis will help participants to identify common problem areas, potential

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development opportunities and possible solutions to the agricultural industry problems. Lastly, because the scenario analysis will engage key players in an interactive dialogue, they will be better able to initiate the process of identification of each sub-sector's complementary role in the process of revitalizing the agricultural sector, building trust among the various sub-sectors of the industry, building relationships and establishing an efficient food supply chain.

3.2 Design of Development Scenarios

The design of the hypothetical development scenario was based on a projection of 4 possible and equally likely development situations that Angola could be in within the next 5 years (2007 to 2012). Each scenario can be found in Appendix 2. The scenarios included scenario 1 which depicts a situation in which investments are made to stimulate more medium and large scale farming to promote the revitalization of an agricultural-led economy. Scenario 2, which depicts a situation whereby the development of the agricultural sector is built on production oriented for export markets. Scenario 3 depicts a situation where the smallholder farming sector is considered to be key in promoting the development of the agricultural sector and the creation of conditions for easy access to agricultural credit is the cornerstone of the strategy. Lastly, scenario 4 illustrates a situation where the government does disregard the Angolan agricultural potential and no investment is made to stimulate development of the agricultural sector.

3.3 Selection of Geographic Target and Identification of Participants

The study will be conducted in five provinces of Angola, namely: Bengo (Luanda-green belt), Cabinda, Huambo, Kwanza Sul and Malanje. The selection of these provinces was based primarily on three criteria: the agricultural potential; the distance to

primary markets; and the road conditions to access the main markets. According to Yin (1994), the use of multiple sources of data in case studies allows investigators to address a broader range of historical, attitudinal, and behavioral issues. Yin further clarifies that the most important advantage presented by using multiple sources of data is the development of converging lines of enquiry. Yin concludes that any finding or conclusion in a case study is likely to be more convincing and accurate if it is based on several different sources of information. Therefore, the choice of five provinces for this study will help draw more accurate conclusions regarding the agricultural sector in Angola than if the study was conducted in one province. Below is a brief description of each province selected for the study.

3.3.1 Bengo (Luanda green belt)

Bengo is also known as the Luanda green belt because some of the Bengo agricultural production takes place along the Bengo/Luanda border and the production areas are considered part of the Luanda green belt. The inclusion of Bengo is essential because of its production potential for vegetables and fruits, particularly banana, and more importantly, because of its proximity to the Luanda market (see map, appendix 1), which is the largest market in Angola.

3.3.2 Cabinda

Cabinda, the far North West province of Angola (see map, appendix 1) offers great potential for production of tropical fruits and vegetables. In spite of its limited access to the Luanda market, it has the advantage of easy cross-border trade with the Democratic Republic of Congo and the Republic of Congo. In addition, the local market includes a major oil production area which demands fresh fruits and vegetables, meats and other

agricultural products for its cafeteria which serves approximately 3,000 meals three times

a day, year round.

3.3.3 Huambo

Huambo and Huila, both provinces in the central plateau (see map, appendix 1) have

some common cropping systems and production characteristics, particularly with respect

to maize, fruits of temperate climate and vegetables. Since both provinces have difficulty

accessing the Luanda market, the fact that Huambo hosts the faculty of agronomic

sciences of the state university "Universidade Agostinho Neto" gave Huambo a

comparative advantage to be included in the study over Huila.

3.3.4 Kwanza Sul

Kwanza Sul, a province located in Southwest Angola (see map, appendix 1) is in the

transition zone between the northern and the southern regions. Its agricultural production

systems represent a hybrid between the northern and southern cropping systems. It has a

strong potential for production of coffee, tropical fruits and vegetables, and can support a

vibrant dairy industry. In addition, it is located at a relatively short distance

(approximately 350 km) from the Luanda market.

3.3.5 Malanje

Malanje is located in the northern part of Angola (see map, appendix 1). It has an

enormous potential for production of cotton, cassava, beans and cattle. Malanje has been

the center for the dissemination of roots and tubers into the northern region and it hosts

the recently built soil and plant pathology laboratory. Therefore, the office of food

security "Gabinete de Segurança Alimentar- Ministerio da Agricultura e do

Desenvolvimento Rural" (GSA-MINADER) suggested the inclusion of Malanje in this

study. Given the limited amount of time to conduct the study, Malanje replaced Kuando Kubango, which was initially selected for its potential for agriculture production and its potential for boarder trade with Namibia and Botswana.

3.3.6 Identification of Participants

The key informants and participants for the scenario analysis will include people from the: Angolan Development Bank (BDA), diamond company ENDIAMA, Angolan oil exploration company "SONANGOL", MINADER, Faculty of Agronomic Sciences of Agostinho Neto University (FCA), farming community, food/feed processors, input suppliers, formal and informal agricultural commodity market operators, Non-governmental organizations (NGOs), and financial institutions, as stated at the beginning of this chapter. Chevron and the United States Agency for International Development (USAID) partner NGOs will assist in the identification and invitation of participants for the study. The intended numbers for each province to be invited are as follows: approximately 30 Angolan agricultural development practitioners; 4-6 supermarkets and commercial bankers, 4-6 input suppliers and food/feed processors; 12-15 farmers; and 3-5 Professors from the Faculty of Agronomic Sciences of Agostinho Neto University and the Agricultural Technical College (Instituto Medio Agrario do Tchivinguiro).

3.4 Procedures Summary

Participants will be identified and invited to participate in a day long roundtable session in each of the five provinces. Figure 10 shows that at the beginning of each session, the facilitator will discuss the objectives of the study and answer questions from participants. The session will be divided into eight stages, as follows: i) administration of the pre-test to participants, to assess their perceptions about the agricultural sector development, prior

to the scenario analysis; ii) announcement of scenarios; (iii) formation of sub-groups for individual scenario analysis; (iv) distribution of copies of individual scenarios to each group; (v) scenario validation; (vi) scenario analysis.

In situations where there are more than 20 participants, additional groups will be formed starting with scenario 4. The formation of sub-groups will be conducted in a randomized manner, but when necessary participants will be moved to another group to ensure that all groups have adequate diversity of background, which will encourage vigorous discussion[6]; (vii) the groups will do scenario validation as a preliminary stage to scenario analysis. viii) the sub-groups will discuss the scenarios in a roundtable set up and reconvene to report their conclusions to the larger audience. During the report session, the facilitator will record any additional comments made by participants and at the end of the session all of the material from individual sub-group presentations will be collected.

Approximately 3 weeks after the scenario analysis there will be the administration of post-test to individuals who participated in scenario analysis.

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[6] Huambo was an exception. Due to limited number of participants (10 participants), only two group were formed to discuss scenarios 1 and 4.

CHAPTER FOUR

RESULTS REPORTING AND DATA ANALYSIS

4.1 Data Collection

Two types of analyses were conducted, namely (i) qualitative scenarios analysis; and (ii) pre- and post-test quantitative analysis. The data came from five provinces in Angola and 122 participants. Collecting primary field data in Angola presented challenges, but overall the scenario analysis approach was effective for collecting information on perceptions of the participants representing each food supply segment. Figure 10 gives a time line for the data collection, which includes the pre-test, scenario analysis and the post-test.

4.1.1 The Pre-test

Each session began with a discussion of the objectives of the study followed by the pre-test. Farming participants had difficulties answering the pre-test questions for several reasons, among which: (i) some had low education levels; (ii) the farmers were not accustomed to being asked to give their opinions; and/or (iii) participating in group discussions was foreign to them. Their difficulty is most likely a result of approximately 17 years of a centrally planned economy coupled with the 27 years of civil war. Because of this, the pre-test session lasted on average 2 hours, when we budgeted 45 minutes for that part of the activities. The instrument was not changed with the exception of questions 14, 15 and 16, where participants were originally asked to give percentages which would add up to 100%. Those questions were impossible to attain accurate information due to the participants' abilities, hence; we do not report those results in this document.

4.1.2 The Scenario Validation

The participants began the scenario validation immediately after they received copies of the individual scenarios. During the scenario validation, participants were asked to indicate aspects of the scenario that: reflected the future of the agricultural sector; aspects of the scenario that did not reflect the future of the agricultural sector; and indicate aspects that might make the scenario more realistic. The scenario validation helped the participants to quickly engage in the discussion and adjust the scenario to more closely reflect their perceptions. The scenario validation created an enabling environment for further group discussion and analysis of the scenario.

4.1.3 The Scenario Analysis

The analysis of scenarios was the core of the research. It enabled participants to engage fully in the discussion and critically analyze uncertainties, development issues and identify opportunities. The group heterogeneity played an important role in stimulating vigorous debate and allowing a more diverse opinion about the future of the agricultural sector. The vigorous debate accounted for the changes that occurred in participants' perceptions, and those changes were reflected in the groups' ratings of the likelihood of occurrence of each scenario which is summarized in section 4.2. After the scenario analysis, the groups reported their findings to the larger group in a plenary session.

4.1.4 The Post-test

The post-test data collection constituted a big challenge for three reasons: (i) to make a second round of field visits to each province proved to be impossible because the ground travel to most study sites is not feasible because of the poor road conditions and

air travel is marked by constant flight delays or cancellation with no prior notice; (ii) the costs in terms of time and missed opportunity for many of the participants was too high, many had to travel 3 to 4 hours (approximately 60 km) to get to a central meeting point to take the post-test (45 minutes – 2 hours) and then return home. To overcome some of these limitations imposed by poor infrastructure, the post-test was administered in two different ways. In Bengo-Luanda green belt, the researcher met the participants in a room, close to their fields and the post-test was administered to them. In Malanje, Cabinda, Kwanza Sul and Huambo, the post-test was administered separately to each individual who participated in the pre-test. In those cases, the post-test was sent (hand carried) to those provinces. The identification sheet bore the name and phone number of individuals who took the pre-test and participated in the scenario analysis to ensure that no new participants were administered the post-test. One individual was chosen from each province to collect the surveys and send them to the researcher as email attachments. The total number of surveys collected and sent to the researcher was 42, but only 40 were entered into the data base because one of the surveys was blank and the other was a repetition from one respondent. Coordination difficulties and other problems resulted in the failure to obtain surveys from Huambo and Cabinda.

4.1.5 Data Analysis Procedures

The results of the scenario analysis are reported in a descriptive form. This part of the analysis provides the results of individual reactions expressed when the facilitator read the scenarios to the participants as well as the results of group discussions, including the scenario validation.

The pre and post-test results were analyzed: (i) testing the hypothesis that the results of the pre and post-test were not significantly different; (ii) testing the magnitude and direction of change in participants' perceptions (analysis of mean differences) in relation to the importance of the variables that were expected to be statistically significant, (iii) assessing the relationship among variables utilizing pearson correlations; (iv) the chi-square from cross tabulation to test the hypothesis that the provinces that did not return post-test surveys were not significantly different from the ones that returned the post-test surveys.

4.2 Scenario Analysis Results

The analysis of potential scenarios for the future of Angola yielded information about groups' perceptions and expectations regarding the role of agriculture in Angola. During the scenario validation and in the course of the analysis, in spite of the groups' heterogeneity in terms of their business interests and economic activities, they defined agriculture as the catalyst of economic growth and the engine of sustainable economic development. Agriculture was perceived by the participants to contribute to the stabilization of food security, reduce unemployment and rural poverty, and to contribute to the stabilization of the balance of payments.

The participants noted that the scenarios were different and responded dramatically differently to each one, once read to the group. They immediately responded verbally after the scenarios were read, indicating that they perceived scenario 1 (**Jump-Start Strategy for Stable Growth,** see appendix 2-A) as the most probable scenario to occur within the next five years. They emphasized that the country's great agricultural potential and that the current level of development programs implemented in Angola will promote

the occurrence of scenario 1, and within the next five years Angola will produce enough to meet its domestic demand for food and gradually reduce food imports. They believe that Angola will have a stable agricultural sector within the next five years and they believe that scenario 4 (**Agricultural Decline Scenario,** see Appendix 2-A) has zero percent chance of occurring. Interestingly, once the participants finished debating about their individual scenario, they were asked to rank, as a group, the probability of that scenario occurring. Contrary to the participants' perceptions expressed during the reading of the scenarios, table 3 indicates that within the next five years, scenario 3 (**Renaissance of a Productive Smallholder Farming Sector,** see Appendix 2-A) has the highest probability of occurring. This change in perceptions indicates that the discussion during the scenario analysis generated interesting debate and influential group members' opinion had an effect on the other members' opinion. During the group discussion of scenarios 1 and 2 (**Export Oriented Production,** see Appendix 2-A) the participants perceived those scenarios to have equal probability of occurring within the next five years. Scenario 4, on the other hand, was perceived to be the least likely to occur, but the possibility of its occurring was not discarded as stated during the reading of other scenarios.

Table 3 gives a summary of the participants' perception that Angolan smallholder farmers have a strong potential to become successful agribusiness entrepreneurs and they will play a prominent role in the process of re-launching the Angolan agricultural sector. They believe that the occurrence of scenario 3 will result in a more efficient smallholder farming sector, and a more efficient smallholder farming sector will lead to higher productivity of resources, and the increase in overall production. Therefore, reinvigorating the smallholder farming sector will have a strong potential to increase

aggregate production levels and gradually reduce food imports. In summary, the occurrence of scenario 3 will lay the foundation for the occurrence of scenario 1 in a complementary way.

Table 3 also shows some provincial level group differences in participants' perceptions regarding the probability of occurrence of each scenario. The provincial level group perceptions diverge mostly on scenario 4. In contrast to scenario 4, the participants are highly optimistic about the probability of the occurrence of scenarios 3 within the next five years. Bengo (Luanda green belt), perceives that scenario 4 has a minimal probability of occurrence. Malanje and Cabinda perceive the probability of occurrence of scenario 4 with moderation. The participants from Kwanza Sul perceive scenario 4 as having a high likelihood of occurrence. The provincial differences suggest that each province has different development needs and they will require different strategies and development approaches. The differences in perceptions may be attributed to three main factors: (i) the proximity of Bengo to Luanda, which is the center of decisions for the entire country and makes participants more optimistic about the future of Angola; (ii) provinces located further away from Luanda may reflect the development commitment demonstrated by each provincial government, versus the central government; (iii) the provincial level differences in participants' perceptions suggest that the provinces have different development needs, therefore, they require different development strategies and approaches.

In spite of the provincial level differences, the participants perceive the smallholder sector as a major contributor to the future of the development of agriculture in Angola. They believe that the development priority for Angola, within the next five

years will have to focus on stimulating local production, become food self sufficient and gradually reduce food imports. Nonetheless, they caution that the production for import substitution should not preclude efforts towards targeting export niche markets. For example, banana and coffee "robusta amboim" which has received a contract promise of $275/ton bonus[7] on top of its market value are two explicit examples of crops with promising export potential along with production for import substitution. However, they also stated that to help those two crops become exportable there has to be appropriate investments to overcome production and quality standards constraints.

In conclusion, the participants' perceptions suggest that the re-launching of a vibrant Angolan agricultural sector will require a strategy that focuses on supporting scenario 3. However, the success of an agricultural development program will depend on a good mix of strategy options and development approaches. At the national level, the government will have a broad based agricultural development strategy. However, sub-sets of strategy options and development approaches will be required at the regional level to take into account specific development needs of each region[8]. The specificity of the sets of strategies and development approaches will be designed in accordance with each region's cropping systems, and the target markets and conditions of accessibility to those markets.

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[7] Robusta amboim is a high quality coffee produced in Kwanza Sul. Unlike most robusta coffee, the robusta amboim has a flavor and aroma unique to it and awards it a higher commercial value than the Arabica coffee. However, current yields are approximately 150 kg/ha, making it difficult to meet the market demand. Therefore, the robusta amboim requires investment to improve productivity and investment in harvesting and drying techniques to keep the uniqueness of its aroma and flavor that make it a preferred coffee (phone interview with a senior official from the Kwanza Sul provincial delegation of "Instituto de Café de Angola-INCA"; Luanda, July 13, 07).
[8] Angola is divided into four main agro-ecological regions. Each region comprises four to five provinces.

Table 3: Group Rating of Pre-test Perceptions About the Likelihood of Scenario Occurrence

Scenario	Question	Province	Perception Rating	Average
1 **Jump-Start Strategy for Stable Growth**	5	Bengo (Luanda Green Belt) Cabinda Kwanza Sul Malanje	4 5 3 3	3.75
2 **Export Oriented Production**	5	Bengo (Luanda Green Belt) Cabinda Kwanza Sul Malanje	4 5 3 3	3.75
3 **Renaissance of a Productive Smallholder Farming Sector**	5	Bengo (Luanda Green Belt) Cabinda Kwanza Sul Malanje	5 4 5 5	4.75
4 **Agricultural Decline Scenario**	5	Bengo (Luanda Green Belt) Cabinda Kwanza Sul Malanje	1 3 4 3	2.75

1. Measure of provincial level groups' perceptions about the likelihood of occurrence of each scenario: Highly probable: 1 ____; 2 ____; 3 _____; 4 ____; 5 ____ Highly improbable.
2. Huambo was not included in the table. Because there were only 10 participants from Huambo, only two groups were formed and scenarios 2 an 3 were excluded from the discussion.

4.2.1 Scenario Group Discussions About the Loss of the Country's Agricultural Production Capacity

According to the participants, various factors have accounted for the loss of Angola's agricultural production capacity. However, they did not vary per scenario. Hence, the results will be discussed jointly across scenarios. The participants stated that the factors that impacted the production capacity the most included those related to production efficiency, institutional support, transportation and marketing:

(i) Production efficiency: deficient farmers' access to quality seeds and fertilizer; lack of access to modern agricultural technologies and limited technical capacity of farmers;

(ii) Institutional support: lack of production incentives to smallholder farmers; deficient government agricultural development strategies; lack of integration of the various segments along the food supply chain; limited access to agricultural credit; limited technical capacity of agricultural schools, and research and extension services;

(iii) Transportation and marketing: difficult access to markets, due to poor road conditions; lack of rural commercialization network; inadequate conditions for storage of perishable food commodities and limited food processing capacity.

The participants perceive the transportation and marketing factors as the most critical factors. They argue that easy access to market facilitates the link between the rural and the urban centers and this link stimulates exchange of goods and services. They support their argument by stating that the increase in exchange of goods and services between the rural and the urban centers stimulate demand for support services, which in turn triggers production efficiency. They further elaborated that the combination of those factors led the country into low productivity levels for most crops, low aggregate production levels, high production costs, and loss of competitiveness of locally produced food commodities.

4.2.2 Scenario Group Discussions About Conditions Needed to Revitalize the Agricultural-led Economy

4.2.2.1 The Perceived Role of the Government

Once again, across all scenarios group discussions and participating provinces, it is perceived that Angola has adequate productive resources to become a major food exporter. However, they believe that to experience a process of reinvigorating the agricultural sector and help it move from a food deficit status to a surplus producer, there will have to be multiple interventions. The principal interventions perceived to be crucial

to kick start the agricultural sector were those that have the potential to stabilize the rural areas. They emphasized massive investments in rural infrastructures, particularly roads, railways, schools, health posts, and the provision of potable water, as a means of stimulating rural development.

Interviews with key informants (BDA, MINADER, Sonangol and ENDIAMA high rank officials) focused mostly on government policies. The key informants stated that the government is determined to promote agricultural development and that they need to adopt a more coordinated development approach and take a more pragmatic approach to institutional reform. They further suggested that the government needs to create functional institutions and efficient systems to support its current reconstruction agenda. The key informants also believed that the establishment of the BDA "Banco de Desenvolvimento de Angola[9]" with the mandate to stimulate entrepreneurship in agriculture (including processing and technical assistance), demonstrates the government's commitment to promote development. However, they believe that such commitment needs to be complemented with institutional arrangements that lead to a more coherent development policy between the bank and the ministry of agriculture and rural development (they believe that the Ministry of Agriculture and Rural Development' agenda lags behind BDA's intended development strategies). Both the participants in roundtable discussions and the key informants, suggest that in addition to the government channeling more mineral resources to agriculture and other non-mineral sectors, the

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[9] The Banco de Desenvolvimento de Angola (BDA) was created to stimulate private investments in food supply chains and the industry of building materials. Its capital comes from the national development fund, which comprises of 5% and 2% tax contributions from oil and diamonds respectively. The first year of operation will be a pilot intervention and the bank will finance investments that stimulate the establishment of supply chains of maize and beans in Kwanza Sul, Huambo, Bie and Benguela, and cotton in Kwanza Sul and Malanje. The bank will also finance technical assistance to agribusiness firms as part of its sustainable strategy. It will charge 8% interest rate in Kwanzas, the local currency (personal interview with a BDA senior official; Luanda, July 24, 07).

government should adequately equip research and education institutions, stimulate scientific investigation, stimulate investments in processing of agricultural produce, reduce food imports, create systems of incentives to agricultural production, create a system of insurance against crop losses and low commodity prices, institutionalize production subsidies and exonerate the import taxes on fertilizers and other agricultural inputs including farm machinery, and improve extension services and the coordination between extension and research. The round table discussions further revealed that to make credit and other institutional arrangements become instruments of economic growth and catalyst of sustainable development, there will also have to be a mechanism that allows more interaction between the government and other development agencies.

4.2.2.2 The Perceived Role of NGOs

NGOs are perceived by participants primarily as providers of: technical assistance to smallholder farmers, helping to build capacity of farmers and technicians to enable them to better face the development challenges; support to local administrations in the design of community development programs, establishing mechanisms of credit intermediation between farmers and banks; promotional materials to encourage public debate to improve citizens' ability to influence policies; market research and helping the government to establish price information systems, and disseminating modern agricultural technologies and improved varieties of food crops. The participants perceived the role of NGOs beyond the agricultural sector and stated that the NGOs intervention can play a crucial role in fostering the development process in the post-war Angola. The participants explained that although the successful intervention during the relief period does not predetermine the types of activities of the NGOs within the next

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five years, it establishes a certain window of opportunity, particularly in relation to credit intermediation, identification of market opportunities and providing technical assistance to farmers.

4.2.2.3 The Perceived Role of the Private Sector

Both the key informants and the participants in the roundtable discussions suggest that the private sector should engage in activities that intensify production and increase productivity. They believe that the role of smallholder farmers, large scale producers and input suppliers are distinct, but all must work closer together to avoid scenario 4 (Agricultural Decline Scenario). Specifically, they believe that smallholder farmers should expand their cultivated fields, adopt improved varieties, identify market opportunities to be able to produce and meet the market requirements as opposed to producing traditional subsistence crops and hope that the market absorbs it. The participants believe that to have a strong agricultural sector, the medium and large scale farmers should become more proactive in adopting modern agricultural technologies and making investment decisions that lead to more efficient production systems. They suggest that the role of the two farming sub-sectors must expand beyond their own production needs, to also be able to help smallholder farmers to access markets.

In order for the agricultural sector to prosper, there has to be a dynamic input supply and output market system. The participants explained that input suppliers should provide farm inputs to smallholder farmers on credit as well as expand the distribution network to reach remote locations. In reference to access to agricultural credit, the participants suggest that the commercial banks should reform their institutions to make credit delivery more expeditious, develop financial products and credit packages specific

to the rural areas, and participate in training sessions organized for producers, loan officers and intermediary institutions such as NGOs.

4.2.3 Scenario Group Discussions Regarding Factors that Will Stabilize the Agricultural Sector

The participants believe that despite an upward trend in the aggregate production level of the main food crops in the past four main harvesting seasons, productivity per unit of land cultivated is low for those crops. They argue that increases in aggregate production levels have resulted mainly from an expansion of cultivated areas as opposed to resulting from improved production practices. This is in line with the MINADER and USDA reports mentioned in preceding literature review paragraphs, and the situation is similar to the Mozambique case. They suggest that unless appropriate strategies are put in place, this trend will lead to short lived periods of production increases, followed by a sharp decline thereafter.

The study revealed that the participants perceive the stabilization of the agricultural sector as a complex process and that they acknowledge that the stabilization will need government development policies that stimulate productivity increases and foster intersectoral links. It was noted that to speed up the development process in line with the growth opportunity offered by the stability of prices of diamonds and oil, Angola will require development strategies that focus on both backward and forward linkages. The backward linkages will represent a significant part of demand created by raising rural incomes and increasing demand for fertilizer and marketing services whereas the forward linkages will stimulate agro-processing and act as a growth engine and opportunity to substitute imports.

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The participants perceive the role of smallholder farmers in the process of stabilizing the agricultural sector as critical because it encompasses the vast majority of rural families. Both the participants and the key informants argue that although smallholder farmers produce low yields and low quality products they are industrious and have a strong entrepreneurial spirit. Therefore, they should have access to investments that increase their chances to access quality inputs, adopt modern production technologies and improve their managerial capabilities.

4.2.4 Scenario Group Discussions About the Development and Coordination of the Food Supply Chain

Both the participants and the key informants believe that roads and railways are essential to connect farmers to markets, and stimulate production increases. They perceive good roads and functional railways as having strong potential to lower transportation costs, reduce delivery delays, improve consistency in supply and increase chances of financial viability of farm enterprises. However, they caution that good roads and railways need to be complemented with the adoption of improved varieties, technical capacity to meet food safety and quality standards, and investment policies that stimulate private investment in every node of the supply chain. They explained that an inefficient road and rail network creates a disincentive to invest in the Angolan food supply chain. Farmers (particularly the smallholders) become increasingly more vulnerable over time, not because they are unable to produce enough, but rather because they cannot manage the products short shelf-life and hence must sell their produce at the time when markets are flooded with products and prices are low. They suggest that the establishment and coordination of food supply chains require a combination of government support for

private investments in agriculture, the establishment of adequate storage facilities (including cold storage), more efficient farming systems and improved capacity of farmers to generate higher profit margins. In addition, they argue that universities, the government and the farming industry should share the responsibility of training more managers for the country to have more skilled agribusiness managers. In addition, well trained development strategy technicians and agricultural policy analysts are needed.

4.3 Pre-test Analysis

4.3.1 Provincial and Institutional Representation

The pre-test was administered to 122 participants, representing five provinces. Figure 12 indicates that Kwanza Sul had the highest representation with 27.9% of the participants; followed by Malanje, with 26.2% of the participants; Cabinda, with 25.4% of the participants; while Luanda and Huambo represented 12.3% and 8.2% respectively.

Of the 122 participants, 54.9% held managerial positions while the remaining 45.1% did not.

Fig.12: Pre-Test % of Participants by Province

Kwanza Sul ■Malanje □Cabinda □Luanda ■Huambo
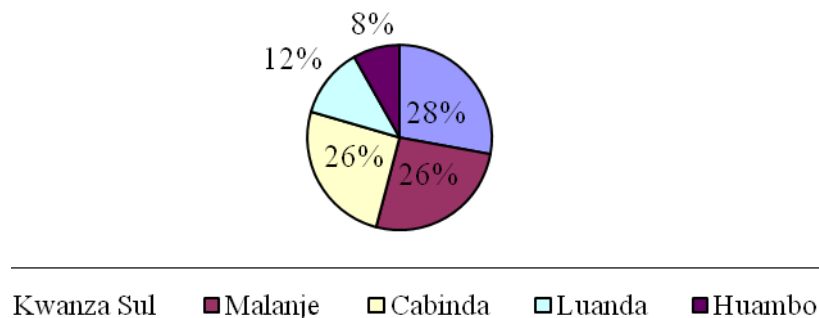
Figure 13 shows that 49.2% of the participants were farmers; 20.5% were government representatives; 15.6% NGOs representatives; 5.7% represented the informal sector; 3.3% were input suppliers; 2.5% represented government officials who are also farmers. The university faculty, supermarkets, bankers, and farmers who are also input suppliers each represented .8% of the 122 respondents.

Fig. 13: Pre-test % of participants by Institution
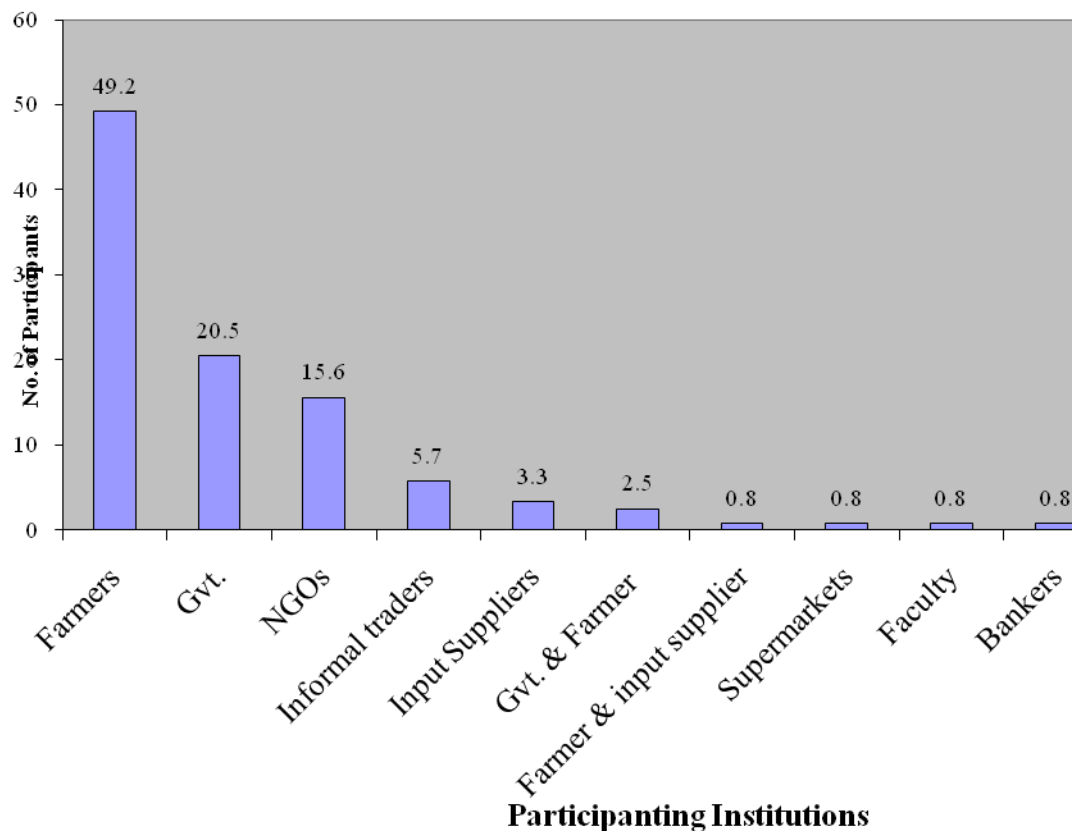
4.3.2 Pre-test Perceptions About the Role of Diamonds and Oil Industries in Promoting Sustainable Development

Figure 14 indicates that 51.4% of the participants strongly believe that more production of diamonds would promote sustainable development; 25.7% believe that it would not, while the remaining 23% are neutral. The figure further indicates that 64.5% of the respondents believe that more oil production would promote sustainable development; 14% believe it would not; while the remaining 21.5% had a neutral opinion.

Fig. 14: Pre-Test Perceptions About Mineral Sector Potential to Contribute to Sustainable Development
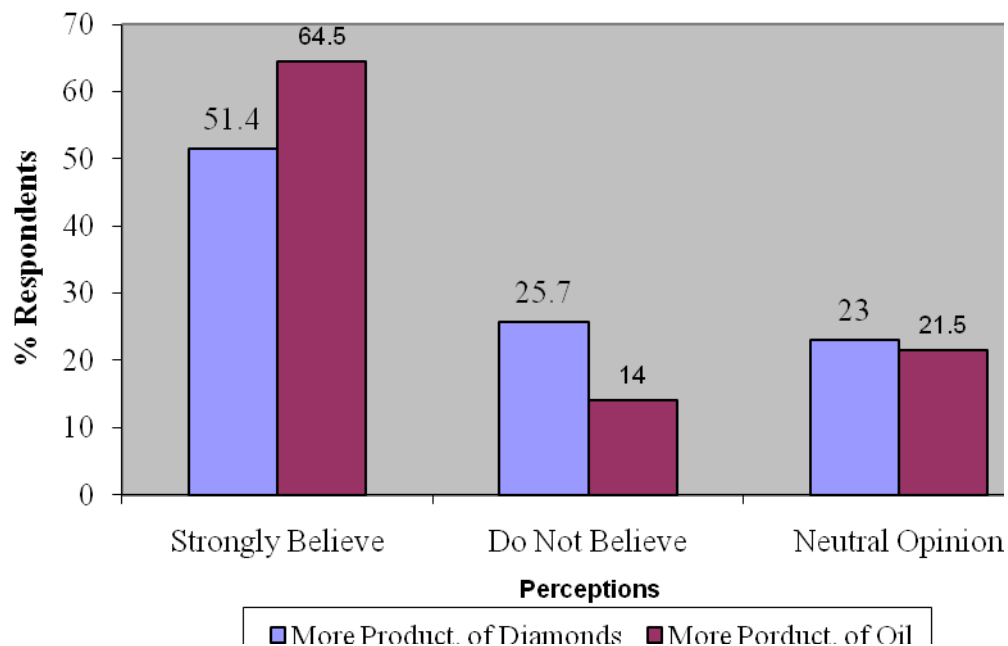
This study found that there is a negative relationship between resource abundance and economic performance. This finding is in line with findings from prior research by (Stevens, 2003). Table 4 illustrates that more production of diamonds has a negative correlation both with an integrated development agenda and with programs aimed at

providing agricultural production incentives. The table also shows that more production

of oil has a negative correlation with an integrated development agenda. The table further

indicates that an increase in the production of diamonds is negatively correlated with

programs that focus on investments in programs that are perceived to have an impact on

poverty reduction programs, such as rural infrastructure and investments in smallholder

agriculture. Similarly, the table shows that an increase in oil production is negatively

correlated with programs that stimulate off-farm activities and programs that stimulate

investment in smallholder agriculture.

However, the table shows positive significant correlations between both more

production of diamonds and more production of oil and investment in large scale

commercial farmers and urban employment. The positive and significant correlation

between those variables illustrates that both the diamonds and the oil industries do not

directly contribute to poverty reduction. This finding confirms findings from prior

research by (Rosser, 2004) which found that the deindustrialization of a country's

economy when natural resources are discovered results in a large inflow of foreign

currency, inducing an export boom and causing an appreciation in the country's currency.

The mineral booms have strong effects on the labor force; yet little is known about their

ultimate impact on the distribution of income and poverty alleviation.

During the round table discussions, the participants' perception about the

potential of the mineral sector to contribute to promoting sustainable development was

related to the sector's capacity to generate financial resources which, if properly utilized

will give a strong impetus to the development of agriculture and contribute to sustainable

development. This finding is in line with prior research by (Rosser, 2004) which indicates

that other scholars suggest that economically successful resource rich countries have been able to break the resource curse because they have adopted radical and well coordinated economic policies, particularly in the macroeconomic and fiscal realms.

Table 4: Pre-test Correlations for Factors that Promote Sustainable Development

Promote sustainable development	More production of diamonds		More production of oil	
	r	Sig.	r	Sig.
Ag. Production incentives	−.063	.526	.158	.103
Pvt. Investment in agriculture	.091	.361	.182	.064
Gvt. Subsidized ag. Credit	.101	.323	.059	.558
Integrated dev. Agenda	−.030	.773	−.154	.137
Investment in rural infrastructure	−.105	.293	.023	.818
Support to off farm activities	.039	.718	−.002	.987
Investment in smallholder farmers	−.139	.168	−.053	.598
Investment in large scale comm. Farmers	.404[*]	.000	.503[*]	.000
Increase in urban employment	.336[*]	.001	.352[*]	.000
Income redistribution	.205	.056	.168	.116

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

4.3.3 The Impact of Agricultural Development on Poverty Reduction

Table 5 illustrates that the agricultural production incentives and the private investment in agriculture are significantly positively correlated with commercial and smallholder farmers' investment. Similarly, private investment in agriculture is significant and positively correlated with both, investment in smallholder and large scale

commercial farmers. The positive and significant relationships between those factors confirm participants' perceptions that the reinvigoration of the agricultural sector within the next five years will need an investment in the smallholder sector and a strong private sector that invests in agriculture. The role of credit in the development of the agricultural sector is shown by the positive and significant relationships in the last row of table 5.

Table 5: Pre-test Correlations for Approaches that Can Impact Poverty Reduction

Factors to promote sustainable develop	Development approaches to impact poverty reduction										
	Investment in rural infrastructure		Support off-farm activities		Income re-distribution		Investment in small-holder farmers		Investment in commercial farmers		Increase urban employment
	r	Sig.	r	Sig.	r	Sig.	r	Sig.	r	Sig.	r	Sig.
Agricultural production incentives	.013	.890	−.030	.774	.040	.702	.238*	.011	.244*	.008	−.046	.634
Private investment in agriculture	.051	.598	.037	.725	.157	.135	.262*	.005	.474*	.000	.176	.069
Integrated development agenda	.169	.094	.143	.192	.015	.889	.253*	.012	.164	.102	.119	.252
Gvt. Subsidized ag. Credit	.297*	.002	.124	.245	.222*	.038	.362*	.000	.464*	.000	.175	.077

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

4.3.4 Perceptions about the Role of Agriculture in Promoting Sustainable Development

The role of agriculture in promoting sustainable development was reaffirmed by 94.8% of the respondents and the key informants interviewed. They believe strongly that agriculture has a great potential to contribute to the achievement of economic growth in Angola, while 2.6% believe it does not. The remaining 2.6% of the respondents had a neutral opinion.

Figure 15 shows that 95% of respondents strongly believe that sustainable

development will be best achieved through the award of agricultural production

incentives; 86.3% believe strongly that it would be best achieved through private

investment in agriculture; 87% strongly advocate for government subsidies to agricultural

credit; while 82% believe strongly that an integrated development agenda[10] would help to

achieve sustainable development in Angola. Sustainable development in Angola will

require translating economic growth into poverty reduction and improvement in standards

of living of the population.

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[10] Agriculture is key to the development of the Angolan economy. During colonial time the diamond
company had agriculture programs aimed at ensuring regular supply of agricultural commodities to the
cafeteria which served meals to hundreds of employees. Such programs allowed rural families to generate
income thereby reducing poverty while at the same time the company did not have to rely on food imports
(personal interview with senior official from ENDIAMA-a conglomerate of diamond exploration owned by
the government of Angola; Luanda, July 22, 07).   The government should develop more coherent
development programs and define intervention strategies that involve the private sector. The Angolan
economy cannot rely only on oil to develop and sustain itself.   Agriculture is the foundation of life and
everyone depends direct or indirectly on agriculture for their sustainable livelihoods. Therefore, there
should be better coordinated strategies to have the country benefit from its high potential (personal
interview with a senior official from SONANGOl-a conglomerate of oil exploration owned by the
government of Angola; Luanda, July 26, 07).

Fig. 15: Pre-test Perceptions About Factors that Can Promote Sustainable Development in Angola
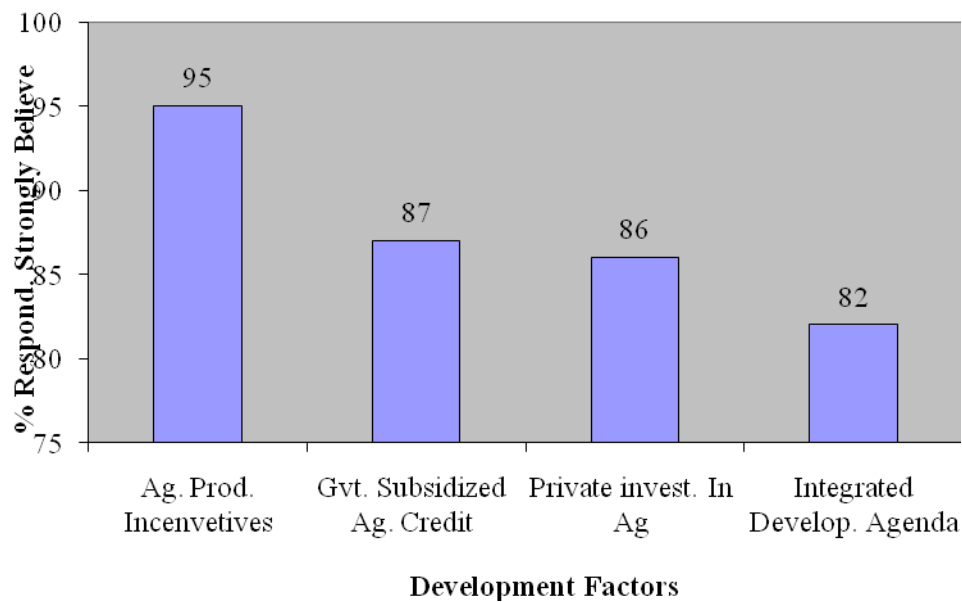
Approximately 71% of the estimated 14 million Angolans rely on agriculture for their livelihoods. The participants in this study established a symbiotic relationship between elements of sustainable development and development approaches that impact poverty reduction. Ninety-four percent of the respondents strongly believe that the rehabilitation or construction of rural infrastructure will have a positive impact on poverty reduction, 93% strongly advocate for support to smallholder farmers. This belief illustrates that if smallholder farmers are given the right support to produce, easy access to market and transportation costs are low, the conditions will be conducive for smallholder farmers to increase production, generate surpluses and help Angola to gradually reduce its dependence on imported food. However, 88% of the respondents stress the need to invest in large scale farming as a means to impact poverty reduction, 73% and 45% of respondents strongly believe that increasing urban employment and

supporting investment in off-farm activities, respectively, will have a positive impact on poverty reduction.

The informal sector attracts many customers because it offers an opportunity for interaction between the customer and the vendor, thereby allowing bargaining. The main incentive to entering the informal sector is that it has zero cost of entry and no delays to start business. The informal sector constitutes the single most important source of employment for Luanda and other main city dwellers in Angola and it functions as a convenient supply system. The informal sector will play a catalyst role in the development of Angola if it is not regulated to certain confinements, and it is allowed to compete with the emerging formal markets.

4.3.5 Pre-test Perceptions About a Sustainable Agricultural Development Program

Figure 16, indicates that 92% of the respondents strongly believe that to have a functional and sustainable agricultural development program in Angola, within the next five years, Angola needs to adopt strategies that focus primarily on production for import substitution. Participants in this study verbally affirmed that within the next five years Angola can produce enough food to meet its internal food requirements, confirming scenario 1. This finding is in agreement with the scenario analysis discussion in the preceding sections, particularly with the positive and significant correlations shown in table 5. The participants explain that the agricultural production systems will not be sufficiently efficient enough to generate adequate surpluses for export within the next five years.

Figure 16, shows also that 96% of the respondents strongly advocate for availability of agricultural credit, 93% argue strongly that to have a functional and sustainable agricultural development within the next five years there will have to be investments in research and extension, whereas the remaining 91% argue strongly that in addition to all other development factors, there will have to be a strong private sector interest in agricultural development to make an adequate investment.

Fig. 16: Pre-test Perception About Approaches for Angola to Have a Sustainable Ag. Development Program
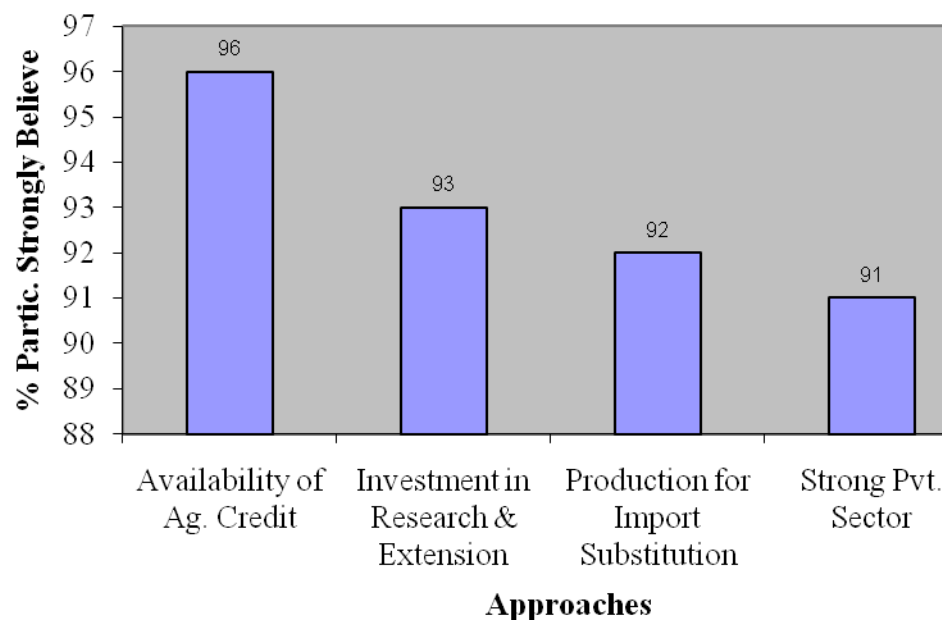
Table 6 shows a positive correlation between the existence of a strong private sector and factors needed to stimulate sustainable food supply chains (training more agribusiness managers, more proactive informal markets, more privately owned supermarkets, higher farmers' profits margins, greater production efficiency, better storage facilities, more government support to private investment, better coordination among donors and more government owned supermarkets). In addition, the table shows that the correlations between a strong private sector and the factors needed to stimulate a

sustainable food supply chain in Angola are statistically significant at α=.05. The positive

significance explains the important role the private sector is expected to play in the

development of agriculture in Angola.

Table 6: Pre-test Correlations for a Sustainable Agricultural Development Program

Factors to stimulate a sustainable food supply chain	Development programs to help Angola to have a functional & sustainable Agricultural development in 5 years											
	Focus on production for exports		Focus on production for import substitution		Strengthening ag. research, education and extension		Better government & donors coordination		More availability of ag. credit		Existence of a strong private sector	
	r	Sig.	r	Sig.	r	Sig.	r	Sig.	r	Sig.	r	Sig.
More govt. support to private investment	.113	.278	.123	.210	.045	.657	.082	.421	.385*	.000	.459*	.000
More government owned supermarkets	.340*	.001	.060	.544	.046	.645	.163	.109	.130	.187	.227*	.026
Better coordination among donors	.189	.072	.091	.372	.102	.327	.328*	.001	.252*	.012	.391*	.000
Better storage facilities	.274*	.006	.087	.368	.186	.057	.065	.523	.393*	.000	.567*	.000
Greater production efficiency	.305*	.002	−.048	.627	.280*	.005	.184	.072	.433*	.000	.586*	.000
Higher farmers' profit margins	.219*	.032	.004	.967	.158	.119	.081	.434	.334*	.001	.410*	.000
More privately owned supermarkets	.403*	.000	.053	.606	.025	.810	.194	.061	.312*	.002	.552*	.000
More proactive informal markets	.267*	.011	−.116	.262	.083	.424	.344*	.001	.273*	.008	.274*	.008
Training more agribusiness managers	.243*	.026	.168	.113	.169	.116	.261*	.016	.208*	.048	.566*	.000

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed)

4.4 Comparative Analysis of the Pre and Post-test Results

The objective of the pre- and a post-test was to assess changes in individual's perceptions in relation to the future of Angola. The pre-test was administered to participants before their exposure to the scenario analysis session and the post-test was administered approximately three weeks after exposure to the scenario analysis. The analysis was based on t-tests for independent samples, repeated measures. The null hypothesis is Ho: the different treatments have no effect on participants' perceptions, against the alternative hypothesis H_1: the different treatments have an effect on the participants' perceptions. The analysis was conducted on three provinces (Bengo-Luanda green belt, Kwanza Sul and Malanje). The other two provinces (Huambo and Cabinda) did not return the post-test surveys. The two provinces that did not return the post-test were discarded from this part of the comparative quantitative analysis using the t-test results. However, cross-tabulation and chi-square tests were used to test the level of significance of the two provinces on the results of the study. It was found that Cabinda and Huambo were not significantly different from Bengo-Luanda green belt, Kwanza Sul or Malanje (see Appendix 3 for the cross-tab results). Therefore, the results from the three provinces are representative of all five provinces statistically.

4.4.1 The Test of Significance (T-test)

The t-test was used to determine the level of significance of change in the participants' perceptions, comparing the pre-test means and the post-test means. Those variables that are significantly different are: government subsidized agricultural credit; government action to promote development of the agricultural sector; crops that would

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give Angola a comparative advantage (cassava and Irish potatoes); and beef that would give Angola a comparative advantage.

Three of the five variables with statistical significance are related to government actions. This shows that participants have high expectations regarding the government's commitment to have actionable development strategies. This illustrates that the people have confidence in the government. However, the government is likely to face difficulties in meeting the high expectations, at this stage of rebuilding a country which has been devastated by approximately three decades of civil war. With an almost endless list of priorities, the government has limited resources and technical capacity to develop sound strategies. These results also raise concerns because heavy reliance on government to perform many of the development tasks may result in a retarded growth of the private sector, either because the government overplays its role or because prospective private entrepreneurs become excessively risk averse, a situation that would inhibit their ability to invest and grow.

The other three variables that show statistical significance are cassava, Irish potatoes and beef. None of these were expected to be statistically significant because there has not been much genetic improvement done on those crops to elevate their production potential. Because their productivity has been far below the levels that would make their production cost-effective, they would require major investments to make them competitive on the international market. The increasingly high demand for Irish potatoes and beef has resulted in larger volumes of imported potatoes and beef. This scenario shows promising markets for those products, however, the Angolan entrepreneurs do not believe they can overcome the production constraints they currently face to produce

efficiently and gradually become the main domestic suppliers of potatoes and beef. Cassava, on the other hand is a crop that is gaining increasingly more importance in the domestic market. The government and the NGOs have been promoting cassava processing initiatives with the aim of diversifying the range of products derived from cassava. However, the statistical significance of the negative direction of change in participants' perceptions indicates that cassava is far from gaining economic importance beyond its traditional role of a food security safety net crop.

Tables 7 through 14 provide summaries of group statistics and t-tests for equality of means, with equal variance and unequal variance. By virtue of their positive association with agricultural development, many variables were expected to have statistical significance, but most of them do not. The summaries below illustrate that there are several variables that did not experience a dramatic change, but remained important to the participants. Given that the rating scale was from 1 to 5, any variable that had a mean of 4.5 or higher could not experience a dramatic change in the post-test. On the other hand, since no variable was rated lower than 3.0, we were not concerned about changes to the lower end.

The variables from question 1 which include: more production of diamonds; more production of oil; agricultural production incentives; private investment in agriculture and integrated development agenda (table 7) are not statistically significant. However, in spite of not being statistically significant, the variables private investment in agriculture and an integrated development agenda show a change in a positive. By contrast, the variables more production of diamonds and more production of oil, show a change in the opposite direction. This trend suggests that the participants' perceptions about the potential for the

mineral sector supporting economic development may have changed in favor of

agriculture. This finding is consistent with the results of the scenario analysis, as

illustrated in figure 13.

Table 7: Group Statistics and T-test for Equality of Means: Question 1: Factors to Promote Sustainable Economic Development in Angola (see Appendix 3)

Variable	N	Mean	Std. Dev	Std Error Mean	t-test for Equality of Means			
					T	Df	Sig.	Mean Difference
Diamond Pre-test	68	3.57	1.364	.165	.259	102	.796	.074
Post-test	36	3.50	1.404	.234	.257	69.625	.798	.074
Oil Pre-test	69	4.01	1.243	.150	.984	104	.327	.258
Post-test	37	3.76	1.362	.224	.957	68.108	.342	.258
Ag.Incentive. Pre-test	78	4.77	.579	.066	.445	115	.657	.051
Post-test	39	4.72	.605	.097	.438	73.265	.662	.051
Pvt invest ag. Pre-test	77	4.53	.821	.094	−.068	110	.946	−.010
Post-test	35	4.54	.561	.095	−.078	93.002	.938	−.010
Int. developt. Pre-test	65	4.28	1.008	.132	−.362	100	.718	−.074
Post-test	37	4.35	.978	.078	−.365	76.882	.716	−.074
Gvt subsidies Pre-test	72	4.39	1.120	.132	−2.137	106	.035*	−.417
Post-test	36	4.81	.467	.078	−2.718	103.563	.008*	−.417

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Table 8 shows that variables from question 2 (approaches that would have an impact on

poverty alleviation) which include: investment in rural infrastructure, support to rural off-

farm activities, investment in smallholder agricultural production, investment in large

scale commercial farmers and income redistribution and urban employment were

expected to be statistically significant, but they are not. The variables large scale

commercial farmers and support to rural off-farm activities show a change in a positive

direction. By contrast, the variables investment in rural infrastructure and investment in

smallholder farmers show a change in the opposite direction. Off-farm was rated at 3.25

in the pre-test and 3.36 in the post-test. The relatively low rating suggests that

participants do not regard off farm activities as highly as agriculture. Its low importance

relative to agriculture may be due to the fact that the more people engage in off farm

activities, the fewer workers would be available for agriculture. The last row shows that

the variable government taking actions to promote development of the agricultural sector

is statistically significant and was discussed in the preceding section.

Table 8: Group Statistics and T-test for Equality of Means; (Question 2: Development Approaches that Impact Poverty & Question 4: Government Taking Appropriate Action) (see Appendix 3)

Variable	N	Mean	Std. Dev	Std Error Mean	T-test for Equality of Means			
					T	Df	Sig.	Mean Difference
Rural Infras								
Pre-test	74	4.64	.837	.097	.931	108	.354	.163
Post-test	36	4.47	.910	.152	.904	64.515	.369	.163
Off-farm								
Pre-test	63	3.25	1.319	.166	−.399	97	.691	−.107
Post-test	36	3.36	1.222	.204	−.407	77.676	.685	−.107
Inc redistrib								
Pre-test	60	3.70	1.381	.178	−.399	97	.691	−.010
Post-test	31	3.71	1.395	.251	−.407	77.676	.685	−.010
Smallholder								
Pre-test	77	4.60	.862	.098	.274	115	.784	.047
Post-test	40	4.55	.932	.147	.268	73.882	.790	.047
Large scale								
Pre-test	78	4.51	.849	.096	−.413	114	.681	−.066
Post-test	38	4.58	.722	.117	−.437	85.124	.664	−.066
Urban empl								
Pre-test	71	3.94	1.286	.153	−.225	106	.822	−.056
Post-test	37	4.00	1.130	.186	−.234	81.804	.815	−.056
Gvt. Action								
Pre-test	75	4.17	1.120	.129	-2.056	113	.042*	-.402
Post-test	40	4.58	.712	.113	-2.343	109.402	.021*	-.402

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Table 9 shows the variables from question 6 (establishment of sustainable supply chains) which include: more government support to private investment, more government owned supermarkets, better donor coordination, better storage facilities, more production efficiency, higher farmers profit margins, more privately owned supermarkets, more proactive informal sector and training more managers, all of which were expected to be statistically significant, but are not. The variables more government support to private investment, more privately owned supermarkets, more government owned supermarkets, better storage facilities, more proactive informal sector and training more managers show a change in a positive direction. By contrast, the variables better donor coordination, more production efficiency and higher farmers' profit margins show a change in the opposite direction. These findings show that the study had a heterogeneous group of participants. One would expect the variables, more production efficiency and higher farmers' profit margins to change to a positive direction; along with the variables training more managers and more proactive informal sector because together these variables are important to increasing employment, income generation and poverty reduction.

In spite the importance of production efficiency and higher farmers' profit margins in promoting a stable agricultural sector, participants' perceptions may have been influenced by the approximately 17 years of a centrally planned economy, in which case profit and production efficiency were not the primary focus of production systems.

Table 9: Group Statistics and T-test for Equality of Means: Question 6: To Stimulate Sustainable Food Supply Chains (see Appendix 3)

Variable	N	Mean	Std. Dev	Std Error Mean	T-test for Equality of Means			
					T	Df	Sig.	Mean Difference
Gvt support Pre-test Post-test	74	4.74	.525	.061	−.951	111	.344	−.103
	39	4.85	.587	.094	−.919	70.330	.361	−.103
Gvt supermkt Pre-test	71	3.41	1.626	.193	−1.341	106	.183	−.429
Post-test	37	3.84	1.482	.244	−1.382	79.321	.171	−.429
Donor coord Pre-test	65	4.29	.931	.115	.735	100	.464	.157
Post-test	37	4.14	1.206	.198	.685	60.646	.496	.157
Storage Pre-test	76	4.59	.677	.078	−.800	110	.426	−.102
Post-test	36	4.69	.525	.087	−.875	86.748	.384	−.102
Prod. effic. Pre-test	72	4.74	.531	.063	1.224	109	.224	.146
Post-test	39	4.59	.715	.115	1.122	61.126	.266	.146
Farmer profit Pre-test	68	4.34	.956	.116	.750	98	.455	.151
Post-test	32	4.19	.896	.158	.768	64.550	.445	.151
Pvt. supermkt Pre-test	70	4.00	1.090	.130	−.391	101	.697	−.091
Post-test	33	4.09	1.128	.196	−.386	60.900	.701	−.091
Market infor Pre-test	64	3.66	1.461	.183	−1.083	95	.282	−.313
Post-test	33	3.97	1.104	.192	−1.183	81.962	.240	−.313
Train manager Pre-test	56	4.63	.776	.104	−.071	87	.944	−.011
Post-test	33	4.64	.653	.114	−.074	76.590	.941	−.011

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Table 10 provides the variables from question 7 (programs that would help Angola to have a functional and sustainable agricultural development strategy), which include: focus on production for export, focus on production for import substitution, availability of agricultural credit, strong private sector, strong private sector, strengthening agricultural schools, strengthening research and extension, better coordination between government and donors, all of which were expected to be statistically significant, but are not. The variables focus on production for export, focus on production for import substitution, availability of agricultural credit, strong private sector show a change in a positive direction and this finding is consistent with the results of scenario analysis in table 3. By contrast, the variables strong private sector, strengthening agricultural schools, strengthening research and extension, better coordination between government and donors show a change in the opposite direction. The variables that show changes in participants' perceptions in a positive direction attribute high importance to the agricultural sector and reinforce Angola's perceived strong agricultural potential. The results showing reduced importance of strengthening agricultural schools and research and extension services reflect the deficient coordination among the three institutions. The results further show that neither the research nor the extension services have been responsive to the needs of the farming communities. The coordination between the host government and donors may play a role in the development process, but it is not key to the success of development programs.

Table 10: Group Statistics and T-test for Equality of Means: Question 7: Functional Agricultural Strategy (see Appendix 3)

Variable	N	Mean	Std. Dev	Std Error Mean	T	Df	Sig.	Mean Difference
					T-test for Equality of Means			
Pro. Export								
Pre-test	67	3.81	1.438	.176	−.094	101	.925	−.027
Post-test	36	3.83	1.342	.224	−.096	76.156	.924	−.027
Pro. Import Substitution								
Pre-test	75	4.52	1.131	.131	−1.235	108	.220	−.251
Post-test	35	4.77	.598	.101	−1.522	106.232	.131	−.251
Ag. Schools								
Pre-test	73	4.71	.677	.079	.542	111	.589	.087
Post-test	40	4.63	1.030	.163	.482	57.869	.631	.087
Res. & Extension								
Pre-test	71	4.49	.892	.106	.356	102	.723	.069
Post-test	33	4.42	.969	.169	.345	58	.731	.069
Gvt/donor								
Pre-test	71	4.35	1.001	.119	−.345	107	.730	−.069
Post-test	38	4.42	.976	.158	−.348	77.428	729	−.069
Ag. Credit								
Pre-test	76	4.83	.598	.069	−.546	110	.586	−.060
Post-test	36	4.89	.398	.066	−.628	97.605	.531	−.060
St. Pvt Sect.								
Pre-test	67	4.64	.883	.108	.408	102	.684	.074
Post-test	37	4.57	.899	.148	.406	73.219	.686	.074

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Table 11 shows variables from question 11 (Factors that would help improve current

production levels), which include: roads and railways, input distribution system,

agricultural technologies, development policies, market information systems, storage

facilities, cold storage, pricing system and transportation costs, all of which were

expected to be statistically significant, but are not. The variables roads and railways,

input distribution system, agricultural technologies, development policies show a change

in a positive direction. By contrast, market information systems, storage facilities, cold

storage, pricing system and transportation costs, show a change in the opposite direction.

The change of participants' perceptions in the opposite direction shows some level of

uncertainty about the efficiency of the government's institutional reforms aimed at

speeding up the process of business legalization, the potential of the newly established

bank "BDA" to support agribusiness enterprises and the ability of the government to

reestablish the road and railways network within the next five years[11].

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[11] The uncertainty is a result of past experience with government development programs. The government created the "Caixa da Agro-pecuária e Pescas (CAP), Fundo de Apoio ao Desenvolvimento Agricola (FADA), Fundo de Apoio ao Desenvolvimento Económico e Social (FDES), with the mandate to support the re-launching of the agricultural sector. However, with exception of the latter that is believed to have been replaced by the BDA, the other two failed to meet the objectives and succumbed to mismanagement.

Table 11: Group Statistics and T-test for Equality of Means: Question 11: Factors to Improve Production (see Appendix 3)

Variable	N	Mean	Std. Dev	Std Error Mean	T-test for Equality of Means			
					T	Df	Sig.	Mean Difference
Road & rail								
Pre-test	78	4.78	.638	.072	−.538	114	.592	−.060
Post-test	38	4.84	.370	.060	−.640	110.477	.523	−.060
Market info								
Pre-test	69	4.28	.906	.109	.283	103	.778	.053
Post-test	36	4.22	.929	.155	.281	69.498	.780	.053
Storage								
Pre-test	63	4.11	1.123	.142	1.387	93	.169	.330
Post-test	32	3.78	1.039	.184	1.423	66.932	.159	.330
Cold storage								
Pre-test	66	4.15	1.153	.142	.533	98	.595	.122
Post-test	34	4.03	.937	.161	.569	79.914	.571	.122
Pricing syst								
Pre-test	69	4.36	.874	.105	.505	105	.615	.099
Post-test	38	4.26	1.131	.184	.469	61.687	.641	.099
Transp costs								
Pre-test	65	4.48	.773	.096	1.827	100	.071	.342
Post-test	37	4.14	1.110	.182	1.659	56.210	.103	.342
Input dist syst								
Pre-test	69	4.38	.987	.119	−1.299	104	.197	−.245
Post-test	37	4.62	.794	.131	−1.387	88.255	.169	−.245
Ag techn								
Pre-test	72	4.68	.688	.081	−.246	109	.806	−.037
Post-test	39	4.72	.887	.142	−.229	63.242	.820	−.037

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Table 12 shows variables from question 12 (Factors that would help smallholder farmers increase productivity), which include: Input handouts , training, functional input retail system, access to farm machinery, functional price system, access to credit, integrated marketing system, irrigation and better land tenure, all of which were expected

to be statistically significant, but are not. The variables input handouts, access to farm machinery, functional information system, integrated marketing systems, and better land tenure show a change in a positive direction. By contrast, variables the training, functional input retail system, access to credit and irrigation show a change in the opposite direction. The variables that show change in participants' perceptions in the opposite direction are those that have constituted the core of NGOs interventions over the past 15 years. The participants may have down played the variables, because they know the services already exist or, alternatively, because they have not seen tangible results from those interventions.

Table 12: Group Statistics and T-test for Equality of Means: Question 12: Factors to Help Smallholder Farmers Increase Productivity (see Appendix 3)

Variable	N	Mean	Std. Dev	Std Error Mean	T	Df	Sig.	Mean Difference
					T-test for Equality of Means			
Inp handout								
Pre-test	61	4.38	.969	.124	−.320	95	.749	−.067
Post-test	36	4.44	1.054	.176	−.313	68.650	.755	−.067
Training								
Pre-test	74	4.59	.905	.105	.575	109	.567	.108
Post-test	37	4.49	.989	.163	.558	66.688	.579	.108
Inp retail								
Pre-test	64	4.27	.930	.115	−.372	97	.710	−.077
Post-test	35	4.34	1.083	.183	−.356	61.543	.723	−.077
Farm mach								
Pre-test	75	4.61	.804	.093	−.0520	110	.958	−.008
Post-test	37	4.62	.762	.125	−.053	75.641	.958	−.008
Price info								
Pre-test	67	4.31	.941	.115	−.456	100	.649	−.087
Post-test	35	4.40	.4.40	.143	−.471	75.731	.639	−.087
Credit								
Pre-test	73	4.84	.472	.055	.022	107	.982	.002
Post-test	36	4.83	.561	.093	.021	60.153	.983	.002
Int mkt syst								
Pre-test	63	4.21	.936	.118	−1.140	94	.257	−.218
Post-test	33	4.42	.792	.138	−1.140	75.199	.233	−.218
Irrigation								
Pre-test	67	4.42	.855	.105	.215	97	.830	.043
Post-test	32	4.38	1.070	.189	.199	50.597	.843	.043
Land tenure								
Pre-test	67	4.49	1.021	.125	−.552	101	.582	−.119
Post-test	36	4.61	1.076	.179	−.543	68.501	.589	−.119

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Table 13 shows variables from question 17 (Crops and meats that would give Angola a comparative advantage in international trade), which include: cassava, potatoes,

carrots, tomato, and beef, all of which were expected to be statistically significant, but not all of them are. Contrary to the expected positive change in participants' perceptions, the four crops and beef show changes in the opposite direction. Cassava, potatoes and beef show dramatic changes and are statistically significant, as discussed above. Carrots and tomatoes show a less dramatic change hence are not statistically significant. The negative change in participants' perceptions regarding the importance of carrots and tomatoes can be attributed to their production seasonality nature and the uncertainty caused by the challenge agribusiness entrepreneurs face to find cultivars that allow year round production schedules.

Table 13: Group Statistics and T-test for Equality of Means: Question 17: Crops and Beef that give Angola a Comparative Advantage (see Appendix 3)

					T-test for Equality of Means			
Variable	N	Mean	Std. Dev	Std Error Mean	T	Df	Sig.	Mean Difference
Cassava								
Pre-test	24	4.21	. 932	.190	3.027	36	.005*	.851
Post-test	14	3.36	.633	.169	3.344	35.005	.002*	.851
Potatoes								
Pre-test	28	4.25	.928	.175	2.150.	46	.037*	.600
Post-test	20	3.65	.988	.221	2.127	39.460	.040*	.600
Carrot								
Pre-test	9	3.67	3.67	1.323	.550	15	.591	.292
Post-test	8	3.38	3.38	.744	.568	12.848	.580	.292
Tomato								
Pre-test	13	4.38	.961	.266	.510	22	.615	.203
Post-test	11	4.18	.982	.296	.509	21.183	.616	.203
Beef								
Pre-test	31	3.97	1.080	.194	2.322	46	.025*	.674
Post-test	17	3.29	.686	.166	2.638	44.852	.011*	.674

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Table 14 shows variables from question 18 (Importance of informal market to the Angolan economy), which include: overall economic growth of the country, rural economy, urban economy, agricultural sector, marketing of fresh fruits and marketing of vegetables, all of which were expected to be statistically significant, but are not. Overall economic growth of the country, rural economy, urban economy and marketing of vegetables show changes in a positive direction. The variable agricultural sector and marketing of fresh fruits show a change in the opposite direction.

The informal market is the single most important marketing channel for fruits and vegetables in Angola. It regulates prices in response to demand for goods and services and the supply response. It offers rural families an economic opportunity that formal markets do not because contrary to formal market channels that procure mostly from nearby sites to reduce costs and pay for goods between 30-90 days after product has been delivered, the informal market reaches further out in search for produce, it pays for goods promptly upon purchase and they bear the transportation costs. From consumer's end, in many instances the informal market is preferred because it functions a network of convenience stores that operate for longer hours and allow human interaction that formal markets do not. Thus, in spite the fact that in some instances consumers pay higher prices in informal markets than in formal markets, consumers do not readily notice the difference in prices for two reasons: the unit of measurement is such that consumers can purchase small quantities as needed and they do not notice that are paying more that what they would if purchased in kilos; the human interaction adds an important dimension to the business because customers discuss prices and can ask for exchange of product units for better quality.

Table 14: Group Statistics and T-test for Equality of Means: Question 18: Importance of Informal Market to the Angolan Economy (see Appendix 3)

Variable	N	Mean	Std. Dev	Std Error Mean	T	Df	Sig.	Mean Difference
Overall economy								
Pre-test	65	4.08	1.203	.149	−.130	99	.897	−.034
Post-test	36	4.11	1.369	.228	−.125	64.867	.901	−.034
Rural econ								
Pre-test	70	4.30	1.040	.124	−.193	103	.847	−.043
Post-test	35	4.34	1.136	.192	−.187	63.034	.852	−.043
Urban econ								
Pre-test	66	3.64	1.185	.146	−1.135	100	.259	−.280
Post-test	36	3.94	1.204	.201	−1.130	71.065	.262	−.280
Agric sector								
Pre-test	71	4.39	1.062	.126	.338	104	.736	.080
Post-test	35	4.31	1.301	.220	.316	57.021	.753	.080
Fresh fruits								
Pre-test	65	4.03	1.089	.135	.249	100	.804	.058
Post-test	37	3.97	1.190	.196	.243	69.625	.809	.058
Vegetables								
Pre-test	68	4.18	1.145	.139	−.536	103	.593	−.121
Post-test	37	4.30	1.024	.168	−.554	81.434	.581	−.121

*T-value is significant at the 0.05 level (2-tailed)
** T-value significant at the 0.01 level (2-tailed)

Remember that the rating scale was from 1 to 5, any variable that had a mean of 4.5 or higher could not experience a dramatic change in the post-test. Those variables that remained strongly important (4.5 or higher) were: (i) private investment in agriculture, investment in smallholder farmers, smallholder access to credit, investment in large scale farmers and agricultural potential; (ii) government support to private investments, agricultural production incentives, strengthening agricultural schools, roads and railways, agricultural technologies, availability of agricultural credit, government subsidized agricultural credit, (iii) access to farm machinery, more production efficiency, better

storage facilities, training more managers, focus on production for import substitution, a strong private sector, and cassava.

The participants' perceptions revealed a bi-modal distribution in the post-test. Interestingly, both modes increased in average indicating that the participants had divided perceptions in relation to most variables. The bi-modal behavior of the distribution was an indication that even though many of the variables that were expected to be statistically significant are not, and that was due in part to the fact that all variable were perceived highly important in the pre-test and remained important in the post test. The scenario analysis had an effect on the participants' perceptions but the measurement approach could not capture the changes to show statistical significance.

4.5 Recommended Agricultural Strategy Options

In response to the post-independence agricultural sector crisis, the pro-socialist Angolan government resorted to confiscation of all formally Portuguese owned farms and converted them into state owned enterprises, created state owned companies that delivered inputs to farmers (including access to farm machinery), purchased agricultural output, and farmers were organized into cooperatives. In addition, the government established trading companies in an attempt to remedy the collapse of rural trade. However, all of the following led to the breakdown of the agricultural sector in the post-independence period: there was a massive influx of rural families into urban centers due to the severity of the civil conflict; the agricultural sector was neglected which was the result of inadequate planning; there was institutional inefficiencies of the trading companies; and weak managerial and technical skills of the post-independence agricultural development planners.

The implementation of a development strategy requires a clear formulation of a conducive policy and institutional environment, a widely shared consensus about the strategy and its targets, and the human capacity and sufficient financial resources.

Angola's resource abundance will be a blessing to the country if the government combines oil and diamond revenues allocation to the development of the agricultural sector with appropriate development strategies, including macroeconomic policy reforms that discourage overvaluation of the local currency.

Abdullahi (1985), Ijere (1986), Kyle (1997) and Ross (2003) consider Nigeria an example of an oil-rich country that has failed to promote sustainable economic development, albeit its enormous natural resource base. The failure of Nigeria to promote sustainable economic development stemmed essentially from the lack of a development strategy that puts an emphasis on agricultural investment coupled with an exchange rate policy designed to avoid over-appreciation (Kyle 1997). This finding is in line with prior research by (Rosser, 2004) which indicates that other scholars suggest that economically successful resource rich countries have been able to break the resource curse because they have adopted radical and well coordinated economic policies, particularly in the macroeconomic and fiscal realms. This analysis prompts an opportunity for Angola to consider lessons from Nigeria and other countries before pursuing economic development strategies.

The government, the private sector, the donor community and the NGOs face the joint challenge of rethinking future agricultural development strategies and making them more in line with specific natural resources endowments, the socio-economic, cultural and cropping systems of each region.

In order to select possible alternatives within each scenario, it was necessary to establish a set of assumptions about the current socio-economic conditions of the infrastructure, past development approaches pursued by mineral rich countries and the information gathered in the course of this study. These assumptions are: (i) the government is going to take appropriate actions to promote the development of the agricultural sector; (ii) the rehabilitation of roads and the railways will be completed within the next five years; and (iii) the Angolan smallholder farmers have a strong entrepreneurial spirit and they can take advantage of development opportunities, as they arise.

Scenario 3; "Renaissance of a Productive Smallholder Farming Sector," was determined to be the most likely to occur within the next five years. Scenario 1; "Jump-Start Strategy for Stable Growth," was the most desired to occur within the next five years. Scenario 2; "Export Oriented Production," was perceived to be equally likely to occur as scenario 1, but it was not discussed as extensively during the scenario analysis. Scenario 4; "Agricultural Decline Scenario," was the least desired to occur within the next five years.

Based on current socio-economic conditions of the infrastructure, past development approaches pursued by mineral rich countries, the opinions of the key informants and the 122 participants in this study, the following is recommended for the development of the Angolan agricultural sector over the next five years.

4.5.1 Strategy Option 1: Investment in Smallholder Farming Sector to Promote the Renaissance of a Productive Smallholder Farming Sector.

The main components of this strategy option include: investment in small and large scale irrigation systems; creation of systems that expedite agricultural credit delivery, adoption of modern agricultural technologies; use of quality inputs (high yielding varieties and fertilizer); easy access to markets (rehabilitation of roads); and food processing enterprises and storage facilities (particularly cold storage). This strategy option will lead to the strengthening of the smallholder farming sector. Because smallholder farmers constitute the backbone of the Angolan agricultural sector and they have a strong entrepreneurial spirit, this strategy option will result in more efficient agriculture production systems, higher productivity of resources, dramatic increases in production levels and the stabilization of the agricultural sector, all of which will lead to gradually reducing food imports.

The study has identified some key roles for the private sector, the government and the NGOs. Although the roles of those institutions are not mutually exclusive, they are listed as follows:

(i) the NGOs will be required to identify sources of improved genetic material (seeds or other planting materials), packaging material; (ii) the NGOs will be required to help with the identification of domestic market opportunities, help develop business relationships between producers and input/output market operators; (iii) the government and the NGOs will be expected to help farmers establish strong cooperatives (cooperatives that create mechanisms for providing technical assistance to their members as well as to farming communities in general and become strong

representatives of farmers' interests); (iv) the NGOs and the government will be expected to provide technical assistance to smallholder farmers; (v) the NGOs will be required to assist farmers with post harvest handling preservation (to ensure regularity and consistency of supplies; (vi) the NGOs and the government will need to work with the banking sector in the development of more diversified financial services; (vii) the supermarkets will be expected to improve purchasing and payment mechanisms and assist smallholder farmers access quality seeds; (viii) the input suppliers will be required to make inputs available in a timely manner and at competitive prices; (ix) the smallholder farmers will be required to adopt modern agricultural techniques and appropriate crop husbandry practices to improve yields and quality; and (x) the government will be expected to rebuild roads and the railways to ensure easier access to markets.

Provincial level recommendations are given due to the fact that each province has some specific needs and concerns.

Bengo-Luanda green belt

- Access to farm equipment

- Regular technical assistance in production, quality standards and marketing

Cabinda

- Approaching the government to stimulate political will to promote the occurrence of this scenario

- Training and capacity building of entrepreneurs involved in the food supply chain

- Better access to land and irrigation water

Kwanza Sul

- Technical assistance in production, quality standards and marketing

- Better access to arable land and quality seed

- Training smallholder farmers in agribusiness management

Malanje

- Establishment of banks in all locations with high agricultural potential

- Organize rural commercialization systems

- Technical assistance to farmers for production and quality standards

If for unforeseeable reasons Angola is not able to accomplish strategy option 1 which is similar to scenario 3, the second best approach would be to follow a strategy that leads to either scenario 1 or scenario 2.

4.5.2 Strategy Option 2: Investment in Medium and Large Scale Agriculture to Either Jump-Start and Stabilize the Growth of Agricultural Sector or Promote an Export Oriented Production.

The key components of this strategy option include: investment in roads and rail ways; large scale irrigation systems; government farmer support programs; easy access to markets; investment in education, research and extension; investment in market information and investment in storage facilities, particularly cold storage. This strategy option will stimulate the quick development of efficient food supply chains. Strategy option 2 will result in Angola quickly penetrating international agricultural markets and generating more foreign currency for the country. It will also create more jobs for rural populations. However, since medium and large scale commercial farmers will focus mostly on production of export cash crops, this strategy option will not directly contribute

to the stabilization of food security. On the other hand, since farm labor wages tend to be among the lowest, when compared to other jobs, this strategy will not have a dramatic impact on poverty reduction.

This study has identified some key roles for the private sector, the government and the NGOs. Although the roles of those institutions are not mutually exclusive, they are listed as follows:

(i) the NGOs will be required to identify sources of improved genetic material (seeds or other planting materials), packaging material and equipments such as cold storage and processing units; (ii) the NGOs will be required to help with the identification of market opportunities both within and outside the country, help develop business relationships between producers and input/output market operators; (iii) the government will be expected to adopt policies that expedite discharge of inputs from customs, exonerate taxes on imported agricultural inputs and repair the roads and the railways; (iv) the government and the NGOs will be expected to jointly provide technical assistance to farmers to help them adopt improved agricultural techniques and modern crop husbandry practices; (v) the medium and large scale farmers will be expected to invest in post-harvest techniques including cold storage facilities and develop marketing strategies that ensure regularity and consistency of supply; and (vi) the supermarkets may identify sources of improved genetic material for the quality standards they demand and help producers access the material.

Because at the provincial level the needs and concerns are different, the following set of specific recommendations is provided:

Huambo

- Better exchange systems between the rural and the urban areas

- Investment in appropriate technologies

- Decentralization of public services

- Subsidies to agriculture (crops and livestock) to safeguard against calamities

- Build stronger links between research, education and the farming community

- Increase investment in agricultural production systems

Bengo-Luanda green belt

- Irrigation

- Mechanized agriculture

- Technical assistance in staggered production, quality standards and marketing

- Development of human capacity

Cabinda

- Permanent rural commerce

- Assurance of high technology

- Support with equipment

- Internal as well as external output markets

- Investment in preservation and processing

Kwanza Sul

- Political stability, holding elections and acceptance of the outcome by all political actors and the international community

- Industrialization and mechanization of agriculture

- The combination of adequate government development policies, access to agriculture, and the establishment of functional food supply chains

- With increasing revenues from oil and diamonds, to serve as a source of capital to finance agriculture and other activities

Malanje

- Creation of conditions that stimulate the return of populations to rural areas

- Implementation of appropriate development policies

- Adoption of modern agricultural technologies

Bengo-Luanda green belt

- High quality production and regularity in supplies

- Adoption of production technologies that lead to increased productivity

- Research become better able to solve production problems

- Farmers organized in cooperatives and associations

Cabinda

- Foreign as well as local investment in agricultural production systems

- Establish infrastructures (green houses, food processing industries and food preservation units)

- Training farmers in production, quality standards and marketing

Kwanza Sul

- Reduction of production costs (make production systems more efficient)

- Availability of factors of production in a timely fashion, and adapted to the reality

- Availability of agricultural research and education

Malanje

- Stimulate the establishment of small scale agro-processing industries

- Since diamonds and oil are the primary sources of revenues, it would be appropriate to have 25-30% of the revenues invested in the development of the agricultural sector

- Enable small and medium scale farming sector to have means of food preservation of perishable commodities green houses and silos, to ensure product quality for exports

There is a need to make a coordinated effort by all institutions involved in the agribusiness field to avoid the occurrence of the least desired scenario 4. However, if in spite of government commitment, private sector determination to invest in agriculture, and donor community support, Angola merges into scenario 4, the alternative will be the adoption of strategy option 3.

4.5.3 Strategy Option 3: Investment in a Program that Mitigates the Impact of Discrimination Against the Agricultural Sector.

This is a strategy option aimed at mitigating the impact of a neglected agricultural sector. It will require greater degree of institutional arrangements and coordination of efforts to accomplish tangible results. The key interventions under this strategy option will be those interventions that have a strong potential to empower smallholder farmers to establish more effective production systems, and sensitize the government, the private sector and the donor community that the smallholder agricultural sector in Angola can be prosperous and contribute to the establishment of a more sustainable economic development program.

The NGOs will be required to play a major role in connecting smallholder farmers, input suppliers, the banking sector the informal and the formal market channels.

These institutional arrangements will help private sector to better understand the needs of the smallholder farming sector, thereby helping the sector to address constraints to realizing its production potential in a cost-effective manner.

Smallholder farmers' access to credit will play a key role in enabling those farmers to make more meaningful capital investment on their farms. However, smallholder farmers lack assets to meet the commercial banks formal lending requirements. There has been some level of donor funding for the purchase of equipment to promote more efficient agricultural marketing by smallholder farmers. Therefore, one alternative to overcoming the limited capacity of smallholder farmers to meet the lending requirements and qualify for productive loans is to allow farmer cooperatives to convert assets purchased with donor funds into cooperatives' assets and use them as collateral against cooperative members borrowing.

Key interventions under this strategy option will include programs that promote easier access of farmers to modern agricultural technologies, introduction of short maturing, improved varieties of food crops, agricultural credit intermediation, helping farmers to form strong cooperatives in order to do strong advocacy for collective needs such as easier access to agricultural credit, bulk purchase and benefit from price discounts collective hiring of farm machinery and tracks to reduce the cost related to land preparation and transportation of agricultural produce to market.

The study has identified some key roles for the private sector, the government and the NGOs. Although the roles of those institutions are not mutually exclusive, they are listed as follows:

(i) the NGOs will be required to have more effective credit intermediation programs, including the establishment of credit guarantee funds with commercial banks; (ii) the NGOs and the Government will be required to help build stronger farmers' cooperatives to enable bulk purchasing and benefit from price discounts; (iii) the extension services and the NGOs will be required to promote more adoption of high yielding short maturing varieties, to ensure consistency and regularity in supplies; (iv) the Government will be required to adopt policies that exonerate taxes on importation of agricultural inputs; (v) the input suppliers will be required to reach out more farmers and make inputs available in time.

At provincial level there will be a need for a more pragmatic response using approaches that include:

Huambo

- Invest oil revenues in agriculture

- Invest in human capital development

- Adoption of participative governance

- Regularity of the democratic process

- A strong and dynamic civil society

- Strengthening institutional capacity of local administrations

Bengo-Luanda green belt

- Efficient marketing network (supply of means of production and commercialization of agricultural products, including livestock)

- Easier farmers access to land

Cabinda

- Oil revenues channeled to the agricultural sector

- Rehabilitation of rural infrastructure

- Conceive agriculture as a priority sector (prioritizing local food production)

- Advocate for introduction of modern technologies

- Create conditions of easy access to markets

Kwanza Sul

- Invest in the establishment of food supply chains

- Need to create jobs in rural areas

- Improvement of conditions of living in rural areas (rehabilitation of rural infrastructure)

- Design programs aimed at combating poverty in rural areas

- Subsidies for means of production

Malanje

- Make available agricultural inputs

- Subsidies for factors of production

- Develop agricultural programs that address poverty reduction

CHAPTER FIVE

CONCLUSIONS

5.1 Conclusions

The methodology used for this study was scenario analysis, based on a modified framework that results from a combination of Lyford et al. (2002), "A Framework for Industry Strategic Planning and Coordination (ISPC)" and "The Technological Demands Determination by Prospective Analysis", by The Brazilian Agricultural Research Cooperation (EMBRAPA). The scenario analysis was effective in engaging key players in an interactive discussion to identify common problem areas, potential development opportunities and possible solutions to the agricultural industry problems. The scenario analysis was an effective way of initiating communication among the various participants in the food supply chain. This communication may lead to the adoption of better coordination of development efforts among institutions and facilitate the identification of institutional roles that improve the efficiency of the food supply chain.

As a result of the scenario analysis and interviews with key informants, the study revealed that Angola has an enormous agricultural potential to become a major food exporter and one of the richest countries in Africa. However, in spite of its great agricultural potential, to be able to produce food for export markets, Angola will first need to address her institutional and structural agricultural development constraints and adopt approaches that allow better coordination of development efforts among institutions.

Current production levels for the main food crops were characterized as low in the provinces where the study was conducted. It was found that the factors that accounted the most for Angola's loss of production capacity over the years were related to:

(i) Production efficiency: deficient farmers' access to quality seeds and fertilizer; lack of access to modern agricultural technologies; limited technical capacity of farmers;

(ii) Institutional support: lack of production incentives to smallholder farmers; deficient government agricultural development strategies; lack of integration of the various segments along the food supply chain; limited access to agricultural credit; limited technical capacity of agricultural schools, research and extension services;

(iii) Transportation and market access: difficult access to markets, due to poor road conditions; lack of rural commercialization network; inadequate conditions for storage of perishable food commodities and limited food processing capacity.

The scenario analysis revealed that the revitalization of an agricultural-led economy will require multiple and coordinated interventions. Since smallholder farmers are the vast majority of the Angolan population, in stabilizing the rural areas, small farmers will play a critical role in the revitalization of an agricultural-led economy. To accomplish the goal of revitalizing the agricultural-led economy, there will be a need for massive investments in rural infrastructure, particularly the roads and railways; schools; health posts; and provision of potable water, to create the basis for rural development and create an incentive for rural families to remain in their villages.

With regard to factors needed to stabilize the agricultural sector, the study revealed that in spite of an upward trend noticed in the aggregate production levels of the main food crops in the past four main harvesting seasons, productivity per unit of land

cultivated remained below production capacity. It was found that the increases in aggregate production levels have resulted primarily from the expansion of cultivated areas, as opposed to resulting from improved production practices. The stabilization of the agricultural sector will require government policies that stimulate productivity increases and foster intersectoral links.

The success of the agricultural stabilization process will depend, to some degree, on investments that promote easier access of smallholder farmers to quality inputs, opportunities for them to adopt modern production technologies and improve their managerial skills.

The study also revealed that the development and coordination of food supply chains will depend largely on the reestablishment of the road and railway network because these infrastructures will help to lower transportation costs, reduce delivery delays, improve consistency in supply and increase the chance of financial viability of farm enterprises. However, it was noted that the reestablishment of good roads and a functional railway network will need to be complemented with adoption of improved varieties, the development of technical capacity to meet food safety standards, government policies that stimulate private investment in every node of the food supply chain and the development of human capacity to address development policy and agribusiness management issues.

The study also found that each province has different development needs; to have a successful program of revitalization of the agricultural sector, there will have to be region specific strategies that address the provinces' needs and support the government's broad-based country-wide agricultural development strategy.

The scenario analysis was an effective methodology in engaging key players in an interactive dialogue for identification of institutional complementary roles in the process of revitalizing the agricultural sector in Angola and gradually build consensus among partners about development priorities. The process of building consensus among partners has been initiated and it is intended to build trust among the various actors, foster working relationships that help visualize potential gains from well coordinated development actions from all segments of the supply chain.

Angola's resource abundance will be a blessing to the country if the government combines oil and diamond revenues allocation to the development of the agricultural sector with appropriate development strategies, including macroeconomic policy reforms that discourage overvaluation of the local currency.

 (Rosser, 2004) research indicates that other scholars have suggested that economically successful resource rich countries have been able to break the resource curse because they have adopted radical and well coordinated economic policies, particularly in the macroeconomic and fiscal realms.

The government, the private sector, the donor community and the NGOs face the joint challenge of rethinking future agricultural development strategies and making them more in line with specific natural resources endowments, the socio-economic, cultural and cropping systems of each agro-ecological region of Angola.

5.2 Further Research

Research on agriculture development strategies has focused primarily on surveys and case studies to analyze food security status of developing nations. A wealth of research findings indicates that in spite of massive foreign investment channeled to

agricultural development programs and the adoption of a variety of development strategies, developing countries in general, and resource-abundant countries in particular, have failed to develop agricultural production systems that lead to the realization of their potential. It is argued that natural resource abundance increases the risk of poor economic performance, which in turn leads to higher poverty rates. However, relatively little attention has been given to understanding why these resource-abundant developing countries have failed. Some questions, which arise from these observations, and require further research, are: (i) the results of agriculture's contribution to economic growth caused by inappropriate strategies or by domestic and international agricultural policies? or (ii) is it the case that developing countries need to develop a "new agriculture paradigm" based on niche markets and agro-processing?

Based on the experience of this field study there are two main adjustments that should be considered in future research on Angola. First, the use of scenario analysis is useful to illicit problems and identify solutions. However, in order to make the study more effective in terms of its ability to effect changes in participants' perceptions, future research should conduct the scenario analysis in two days particularly when there is a wide variation in participants education levels. Second, future research should consider administering an exit qualitative test to capture individual evaluation of the effectiveness of scenario analysis in effecting people's perceptions because it became apparent in this study that assessing peoples' perceptions in a single day exposure to scenario analysis is difficult.

Appendix 1-A: Hypothetical Agricultural Development Scenarios.

Title: "Emerging from 27 Years of Civil War: Developing Strategy Options for
Re-launching a Vibrant Angolan Agricultural Sector"

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Name of the Company: _____   Date:__/___/___

Interview No. _____

Roundtable Session Location: _____

Name of the
Interviewee:_____   Position:_____

Address: _____

Phone No. _____Email: _____

Fax No._____

Emerging from 27 Years of Civil War: Developing Strategy Options for Re-launching a Vibrant Angolan Agricultural Sector

Roundtable Discussion for Scenario Analysis
Good morning, my name is Gomes Cambuta and I am conducting this research with the main objective of creating development strategy options that lead to a quick recovery and the development of a vibrant agriculture sector in Angola. More specifically, this research will lead to the following results:

    i.   determine factors that have contributed to the loss of the country's agricultural production capacity;
    ii.   determine factors needed to jump start the agricultural economy;
    iii.   determine factors that can help stabilize the agricultural sector, and
    iv.   determine conditions required for the development and coordination of the food supply chain.

I would like to ask you some questions. All data will be treated as confidential and be kept in a secure location by the researchers. Moreover, we note that no information about individual business units will be reported in any research publications.

  Beginning of the Roundtable Session

II. Statement of current situation of the agricultural sector
Angola needs to have the right investments in the production of inputs, appropriate technologies and human capital to realize a dramatic increase in production and productivity. To make appropriate investment, the development practitioners and policy makers will be required to look forward and contribute with their skills, innovation, creativity and resources. The Angolan farming sector faces many constraints and uncertainties. However, this research will focus on identification of the most critical uncertainties, and identification of opportunities in order to develop strategy options guided towards a less uncertain agricultural development future and capable of taking advantage of development opportunities. The research will conduct an analysis of four distinct, but interrelated agricultural development scenarios, based on potential impact of: government development plans; imports and exports of agricultural commodities; support to large *versus* smallholder farmers; adoption of production technologies; access to agricultural credit; and supply chains, on agricultural production capacity of the country, over a five-year timeframe (2007 to 2012). Angola has abundant resources that can lead to a rapid and sustainable economic development. However, the country faces many constraints both from the supply and demand sides. From the supply side, the main constraints the country faces are poor rural infrastructure including poor road conditions; non-functioning rail ways; limited access to modern agricultural technology and technical assistance; reliance on low yielding degenerated cultivars; limited access to agricultural inputs; limited access to agricultural credit; limited coordination between agricultural schools and research, and between the two institutions and farmers; limited cadre of qualified agricultural technical staff; limited coordination among supply chain participants, and lack of an efficient market information system.

With the end of the civil war, the country is gradually gaining favorable conditions for foreign investment and tourism. Both foreign investment and tourism are believed to stimulate demand for goods and services. However, the agricultural sector can only produce enough to meet higher demand for locally produced food if the right investments are made in the production of inputs, appropriate technologies and human capital to realize a dramatic increase in production and productivity.

III. Roundtable Discussions for Five Years (2007- 2012) Scenario Analysis in Sub-groups

Scenario 1: Jump-Start Strategy for Stable Growth
As we look at the Angola's agriculture of 2012, we see that all or at least most development constraints were addressed. Over the last five years: Peace prevailed; oil prices either remained stable or were on the rise; and the production of diamonds increased significantly. The government adopted economic development policies that emphasized overcoming major constraints to agricultural production and decided to emphasize the role of agricultural development in promoting sustainable economic development. As part of its assurance of development commitment, the government: repaired the road network and restored the railways; it introduced major institutional changes to make research and education more responsive to the needs of the farming community; it created an enabling macroeconomic environment for private investment in agriculture. The government also created an enabling environment for the establishment of functional markets and production incentives. The government, the civil society in general and the private sector made significant investments in rural infrastructures such as: health posts, schools, potable water, and communications. The government and the private sector made considerable investments in research and human resources development to permit human capital accumulation along with technical innovation. The banks have gained confidence in Angolan entrepreneurs; therefore, there has been easier access to credit for agricultural production, processing and storage. More efficient supply chains have been established to ensure satisfactory business transactions between farmers and retailers. As a result of these investments: skilled farm laborers who had left the rural areas in search for better standards of living, returned to the *planalto*, and other parts of the country; there is considerable private investment in off-farm businesses in the rural areas; markets across the country function without major distortions; transportation systems become more competitive and transportation costs decrease. As a result of improved production technologies and more efficient production systems, agricultural production is more efficient and more cost-effective. Therefore, for the past few years there have been enough production surpluses of food crops to meet domestic demand. In addition, there has been adequate surplus of a few selected commodities that Angola has a comparative advantage to produce for export markets. Appropriate government actions to stimulate agricultural development strategies, combined with private entrepreneurship have resulted in stronger agricultural production systems at both smallholder and large commercial farming sectors and have restored a sustainable food security system and revitalized exports.

In summary: The combination of appropriate government development policies, access to modern production technologies, improved access to credit and the establishment of functional supply chains have all played a critical role in promoting a jump-start and stable growth of the agricultural sector. The large commercial farming sector realized significant growth. The smallholder farming sector realized comparatively less growth, but has proved to have the potential to grow and become a profitable business. The millions of rural families whose livelihoods depend on agriculture have regained hope as prosperous farmers and gradually can see their expectations met.

Roundtable discussion leading questions:
Round 1
1. What aspects of this scenario can be expected to reflect the future of the agricultural sector in Angola?

2. What aspects of this scenario cannot be expected to reflect the future of the agricultural sector in Angola?

3. How can we make the scenario more realistic?

Round 2
1. What factors are likely to promote the occurrence of this scenario (please name not less 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

2. What factors are likely to prevent this scenario from occurring (please name not less than 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

3. What role do you think the government should play to stimulate the occurrence of this scenario?

4. What role do you think the following institutions should play to stimulate the occurrence of this scenario?

a) NGOs;

b) Smallholder commercial farmers;

c) Medium and large scale farmers;

d) Formal markets;

e) Informal markets;

f) Input supply retail system;

g) Commercial banks;

5. How likely is this scenario to occur (please _rate_ your perceptions from 1 to 5, 1 being the least probable and 5 the most probable)?

Highly probable: 1 ____; 2 ____; 3 _____; 4 ____; 5 ____ Highly improbable

6. Would you support the occurrence of this scenario? (why, or why not)

7. Assuming you support the occurrence of this scenario, what would you do/recommend for it to occur?

8. How do you perceive the role of agriculture in promoting economic growth in Angola?

Scenario 2: Export Oriented Production
With its favorable climatic conditions and abundant and diversified natural resource base, Angolan agriculture of 2012 has returned to its historical position of a net exporter of agricultural commodities. Angola had an advantage compared to some other African countries, with respect to making a choice between promoting food crops or the traditional export crops. That is because the second largest export crop prior to independence was a food crop. Therefore, the risk of an export oriented strategy jeopardizing food security was minimal. To help the country realize its export potential and regain a share of the world market, the government made massive investments in rural infrastructure, along with major agricultural policy reforms that stimulated local production, food safety, and restricted food imports. In particular the government development efforts included: reestablishment of roads and the railways; development of appropriate sets of policy alternatives that promoted foreign direct investment as well as local private investment in agriculture production systems; and the development of a functional market information system. On the other hand, commercial banks made credit delivery processes more expeditious and more efficient, agricultural schools, research and extension services became more responsive to the needs of farming communities, by addressing primarily production concerns faced by farmers. As a result of those changes, production costs have declined dramatically and locally produced goods have become competitive on regional markets. In response to these development efforts, medium and large commercial farmers made considerable investments in cash crops, including fruits and vegetables. Smallholder farmers were also able to seize the opportunity and in addition to producing staple food crops, they embarked on production of fruits and vegetables for export markets. Therefore, for the past few years the agricultural sector has generated more jobs for rural people thereby driving down the rural-urban exodus; rural poverty has been declining, and for the past few years the sector has steadily been the second largest contributor to the GDP.

In summary: Since the government adopted appropriate agricultural development strategies, both foreign and domestic entrepreneurs made investments that supported agricultural production. Large and medium scale farmers were the primary beneficiaries of an export oriented strategy. However, as the sector gained stability, there was a pull effect to attract smallholder farmers to make a leap into more commercial farming activities.

Roundtable discussion leading questions:
Round 1
1. What aspects of this scenario can be expected to reflect the future of the agricultural sector in Angola?

2. What aspects of this scenario cannot be expected to reflect the future of the agricultural sector in Angola?

3. How can we make the scenario more realistic?

Round 2
1. What factors are likely to promote the occurrence of this scenario (please name not less 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

2. What factors are likely to prevent this scenario from occurring (please name not less than 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

3. What role do you think the government should play to stimulate the occurrence of this scenario?

4. What role do you think the following institutions should play to stimulate the occurrence of this scenario?

a) NGOs;

b) Smallholder commercial farmers;

c) Medium and large scale farmers;

d) Formal markets;

e) Informal markets;

f) Input supply retail system;

g) Commercial banks;

5. How likely is this scenario to occur (please _rate_ your perceptions from 1 to 5, 1 being the least probable and 5 the most probable)?

Highly probable: 1 _____; 2 _____; 3 _____; 4 _____; 5 _____ Highly improbable

6. Would you support the occurrence of this scenario? (why, or why not)

7. Assuming you support the occurrence of this scenario, what would you do/recommend for it to occur?

8. How do you perceive the role of agriculture in promoting economic growth in Angola?

Scenario 3: Renaissance of a Productive Smallholder Farming Sector
Angolan agriculture of 2012 has been driven largely by the government belief that to have a prosperous agricultural sector it required having a dynamic and robust smallholder farming sub-sector. The government also believed that the single most important limiting factor in promoting a smallholder-led agricultural development strategy was lack of credit. Therefore, as part of a general agricultural development policy, the government created a development bank with the mandate to provide loans to emerging businesses that showed strong potential to generate income on a sustainable basis. Smallholder farmers organized in producer groups were given top priority over other economic sub-sectors. Likewise, urban residents who proved to have farming experience and decided to settle in rural areas and start farming were given priority in accessing loans. A few crops were named to command the list of preferred smallholder farming business. In addition, the government institutionalized a credit guarantee scheme to encourage commercial banks lend to smallholder farmers with reduced risk of losses to default. NGOs that have been implementing micro-credit programs were invited to provide technical assistance to the newly established development bank, in addition to their existing working relationships with commercial banks. As result of this policy instrument, smallholder farmers were better able to access credit which in turn has resulted in their using more fertilizer, making more capital investment in irrigation systems, farm improvements and storage facilities. Farm productivity has increased and production of most crops has been rising steadily. Default rates have been lower than 8% over the last five years. With stabilization of smallholder farming sub-sector, there has been a steady flow of private investments in agricultural processing, input supply, network of rural supply of consumer goods and rural transportation system. Therefore, agricultural credit has played a crucial role in creating jobs, and promoting rural development.

In summary: Agricultural credit has played a critical role in promoting rural development. Smallholder farmers have been the primary beneficiaries of credits and they have demonstrated their ability to become the engine of economic growth. It has also been demonstrated that because the smallholder commercial agriculture was provided with adequate resources, it contributed significantly to rural development.

Roundtable discussion leading questions:
<u>Round 1</u>
1. What aspects of this scenario can be expected to reflect the future of the agricultural sector in Angola?

2. What aspects of this scenario cannot be expected to reflect the future of the agricultural sector in Angola?

3. How can we make the scenario more realistic?

<u>Round 2</u>
1. What factors are likely to promote the occurrence of this scenario (please name not less 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

2. What factors are likely to prevent this scenario from occurring (please name not less than 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

3. What role do you think the government should play to stimulate the occurrence of this scenario?

4. What role do you think the following institutions should play to stimulate the occurrence of this scenario?

a) NGOs;

b) Smallholder commercial farmers;

c) Medium and large scale farmers;

d) Formal markets;

e) Informal markets;

f) Input supply retail system;

g) Commercial banks;

5. How likely is this scenario to occur (please _rate_ your perceptions from 1 to 5, 1 being the least probable and 5 the most probable)?

Highly probable 1 ____; 2 ____; 3 _____; 4 ____; 5 ____ Highly improbable

6. Would you support the occurrence of this scenario? (why, or why not)

7. Assuming you support the occurrence of this scenario, what would you do/recommend for it to occur?

8. How do you perceive the role of agriculture in promoting economic growth in Angola?

9. What would you do/recommend to ensure sustainability of credit systems and sustainability of farming business?

Scenario 4: Agricultural Decline Scenario

As we look at the Angolan agriculture in 2012, we can see that it has declined steadily over the last five years. Given the favorable oil prices of the past few years, the Angolan economy has been reported to be one of fastest growing economies in Sub-Saharan Africa. However, in spite of high revenues realized by the government, there was lack of government commitment to make investment in the rehabilitation of rural infrastructure such as roads and rail network, health posts, schools, potable water, and rural markets. The government perceived agriculture as a backward, non-prosperous sector, therefore neglected it altogether. Furthermore, the government developed the belief that food imports to meet domestic demand were cheaper than making the necessary investment to produce the food locally. Commercial imports, complemented with foreign aid flooded the markets with food commodities. Locally produced commodities became non-competitive to the cheaply imported similar goods. Therefore, no private investment in off farm businesses was made, food supply chains became inefficient and the whole farming industry became stagnant. As a result of this strategy, local production fell below subsistence levels. The standards of living of rural families deteriorated further because smallholder farmers could no longer generate incomes to sustain themselves. The deterioration of rural standards of living resulted in new waves of influx of rural families into towns, with the consequence that the once prosperous farmers became unskilled urban labor force. The pressure on limited urban resources grew beyond capacity, therefore urban standards of living declined, both rural and urban poverty levels rose. As a result of increasing poverty levels and deterioration of living standards, there has been more social instability.

In summary: Lack of appropriate government strategy to promote agricultural development has affected both rural and urban populations. The impact of a declining agricultural sector transcended the downward trend of the agricultural sector and was felt across all sectors of the economy, and it stimulated social instability.

Roundtable discussion leading questions:
<u>Round 1</u>
1. What aspects of this scenario can be expected to reflect the future of the agricultural sector in Angola?

2. What aspects of this scenario cannot be expected to reflect the future of the agricultural sector in Angola?

3. How can we make the scenario more realistic?

<u>Round 2</u>
1. What factors are likely to promote the occurrence of this scenario (please name not less 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

2. What factors are likely to prevent this scenario from occurring (please name not less than 2, but not more than 4)?

i) _____

ii) _____

iii) _____

iv) _____

3. What role do you think the government should play to prevent the occurrence of this scenario?

4. What role do you think the following institutions should play to prevent the occurrence of this scenario?

a) The donor community;

b) NGOs;

c) Smallholder commercial farmers;

d) Medium and large scale farmers;

e) Formal markets (supermarkets);

f) Informal markets;

g) Input supply retail system;

h) Commercial banks;

5. How likely is this scenario to occur (please _rate_ your perceptions from 1 to 5, 1 being the least probable and 5 the most probable)?

Highly probable: 1 ____; 2 ____; 3 _____; 4 ____; 5 ____ Highly improbable

6. Would you support the occurrence of this scenario? (why, or why not)

7. Assuming you do not support the occurrence of this scenario, what would you do/recommend for it not to occur?

8. How do you perceive the role of agriculture in promoting economic growth in Angola?

Appendix 1-B: Pre-test and Post-test Survey Instruments

Emerging from 27 Years of Civil War: Developing Strategy Options for Re-launching a Vibrant Angolan Agricultural Sector

I. Pre-test/Post-test

Province: _____

Please mark with an "*X*", the type of organization you represent							
Government	Farming	University	Markets (output)	Markets (inputs)	Banking	NGO	Others (specify)

1.   What factors would help to promote sustainable economic development in Angola, over the next five years (please *rate* the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Factor	*Least Important*	*Most Important*
More Production of Diamonds	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
More production of oil	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Agricultural production incentives	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Private investment in agriculture	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Integrated development agenda	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Govt. subsidized agric. credit system	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Combination of factors (please name them)		

2. Which development approaches would have an impact on poverty alleviation, over the next five years (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Approach	Least Important	Most Important
Investment in rural infrastructure	*1 ____; 2 ____; 3 ____; 4 ____; 5 ____*	
Support to rural off-farm activities	*1 ____; 2 ____; 3 ____; 4 ____; 5 ____*	
Income redistribution	*1 ____; 2 ____; 3 ____; 4 ____; 5 ____*	
Investment in smallholder agric production	*1 ____; 2 ____; 3 ____; 4 ____; 5 ____*	
Investment in large scale commercial agric	*1 ____; 2 ____; 3 ____; 4 ____; 5 ____*	
Increase urban employment	*1 ____; 2 ____; 3 ____; 4 ____; 5 ____*	
Combination of approaches (please specify and rate them)		

3. How much potential does agriculture have to contribute to economic growth in Angola (please _rate_ the potential from 1 to 5, 1 no potential and 5 high potential)?

No potential 1 ____; 2 ____; 3 ____; 4 ____; 5 ____High potential

4. How likely do you foresee the government taking appropriate actions to promote the development of the agricultural sector (please _rate_ your expectations from 1 to 5, 1 being highly unlikely and 5 highly likely)?

Highly Unlikely 1 ____; 2 ____; 3 ____; 4 ____; 5 ____Highly likely

5. What agricultural strategies for Angola are you familiar with (please check in the box as appropriate)?

MINADER	
FAO	
USAID	
EU	
The World Bank	
Others (please, list them)	
N/A	

5.1 Which of the strategies you have identified above are most compatible with the current agricultural development situation in Angola, and why?

6. What factors would stimulate the establishment of sustainable food supply chains (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Factor	Least Important		Most Important
More Government support to Private	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
More Government Owned Supermark	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Better Coordination Among donors	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Better Storage Facilities	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
More Production Efficiency	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Higher Farmers Profit Margins	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
More Privately Owned Supermarkets	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
More Proactive Informal Markets	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
University/Govt./Industry Training M	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Others (please specify and rate them)			

7. What development program would help Angola have a functional and sustainable agri-cultural development strategy, over the next five years (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Program	Least Important	Most Important
Focus on production for export	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Focus on production for import substitution	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Strengthening agric schools	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Strengthening research and extension	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Better coordination between govt. and donors	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Availability of agric credit	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Strong private sector	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Others (please specify and rate them)		

8. How optimistic are you about the government taking appropriate actions to promote development of the agricultural sector, within the next five years (please _rate_ your optimism from 1 to 5, 1 being not optimistic and 5 being highly optimistic)?

Not optimistic 1 ____; 2 ____; 3 ____; 4 ____; 5 ____ Highly optimistic

9. How do you characterize current productivity (yield/per hectare) of the main crops in this region?

Very low ____; Low ____; High ____; Very high ____;

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10. What factors have accounted for the current production levels (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Factor	Least Important		Most Important
Agricultural Technologies	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Quality of Seed	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Fertilizer	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Irrigation	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Land Availability	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Availability of agric credit	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Others (please specify and rate them)			

11. What factors would help improve current production levels, over the next five years (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Factor	Least Important		Most Important
Roads and rail ways	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Market information systems	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Storage facilities	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Cold storage	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Pricing system	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Transportation costs	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Inputs distribution system	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Agricultural technologies	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Government support	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Development policies	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Others (please specify and rate them)			

12. What factors would help smallholder farmers increase productivity, over the next five years (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Factor	Least Important		Most Important
Input handouts	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Training	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Functional input retail systems	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Access to farm machinery	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Functional price information system	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Access to credit	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Integrated marketing systems	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Irrigation	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Better land tenure	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Others (please specify and rate them)			

13. What crops generate the most income to farmers in this region (please _rate_ the crops from 1 to 5, 1 being the crop that earns the least income and 5 the crop that earns the most income)?

Crop	Lowest Income		Highest Income
Maize	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Cassava	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Potatoes	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Beans	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Peanuts	1 ____; 2 ____; 3 ____; 4 ____; 5 ____		
Fruits (please specify and rate them):			
Vegetables (please specify and rate them):			

14. Which markets do the products from this region go to? Please put in a percentage (%) for each region.

Luanda ____; Benguela ____; Cabinda ____; Huambo ____; Local markets ____;

Other markets (please name them):

15. Who handles the function of getting the product to the market? Please put in a percentage (%) for each method.

Customers come over _____;

We sell by the road _____;

NGOs provide transport ____;

We pool the product together and hire a truck ____;

We do individual sells to retailers ____;

We have a contract with buyers ____;

Other (please explain):_____

16. Who are your main trading partners? Please put in a percentage (%) for each type of partner.

Catering companies (%): ____;

Informal traders (%): ____;

Supermarkets (%) ____;

Wholesalers (%) ____;

Other (please list them):_____

17. Which agricultural products would give Angola a comparative advantage in international trade? (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Product	Least Important	Most Important
Fruits (please specify and rate theme)	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Vegetables (please specify and rate them)	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Cereals (please specify and rate them)	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Roots and tubers (please specify and rate them)	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Meats (please specify and rate them)		

18. How important is the informal market to the (please _rate_ the factors from 1 to 5, 1 being the least important factor and 5 the most important factor)?

Factor	Least Important	Most Important
Overall economic growth of the country	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Rural economy	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Urban economy	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Agricultural sector	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Marketing of fresh fruits	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Marketing of vegetables	1 ____; 2 ____; 3 ____; 4 ____; 5 ____	
Others (please specify and rate them)		

Appendix 2: Province Group Crosstab Results

Crosstab

province * q01dia * prov groups

Count

prov groups			q01dia					Total
			1	2	3	4	5	1
province without post-test	province	1	2	5	12	4	6	29
		3	2	1	1	0	4	8
	Total		4	6	13	4	10	37
province with post-test	province	2	6	1	2	3	11	23
		4	2	2	8	12	20	44
		5	3	11	13	4	6	37
	Total		11	14	23	19	37	104

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	6.573(a)	4	.160
	Likelihood Ratio	7.171	4	.127
	Linear-by-Linear Association	.064	1	.801
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	32.764(b)	8	.000
	Likelihood Ratio	32.135	8	.000
	Linear-by-Linear Association	1.670	1	.196
	N of Valid Cases	104		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .86.
b 6 cells (40.0%) have expected count less than 5. The minimum expected count is 2.43.

province * q01oil * prov groups

Count

prov groups			q01oil					Total
			1	2	3	4	5	1
province without post-test	province	1	0	2	12	8	8	30
		3	1	2	1	0	4	8
	Total		1	4	13	8	12	38
province with post-test	province	2	6	1	2	4	10	23
		4	1	1	4	11	30	47
		5	0	8	13	3	12	36
	Total		7	10	19	18	52	106

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	10.385(a)	4	.034
	Likelihood Ratio	11.241	4	.024
	Linear-by-Linear Association	.275	1	.600
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	43.395(b)	8	.000
	Likelihood Ratio	39.844	8	.000
	Linear-by-Linear Association	.186	1	.666
	N of Valid Cases	106		

a 7 cells (70.0%) have expected count less than 5. The minimum expected count is .21.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is 1.52.

province * q01agr * prov groups

Crosstab

Count

prov groups			q01agr				Total
			2	3	4	5	2
province without post-test	province	1	0	1	8	22	31
		3	2	1	2	5	10
	Total		2	2	10	27	41
province with post-test	province	2	1	0	7	14	22
		4	0	2	9	44	55
		5	1	1	1	37	40
	Total		2	3	17	95	117

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	7.521(a)	3	.057
	Likelihood Ratio	6.898	3	.075
	Linear-by-Linear Association	5.288	1	.021
	N of Valid Cases	41		
province with post-test	Pearson Chi-Square	13.044(b)	6	.042
	Likelihood Ratio	15.171	6	.019
	Linear-by-Linear Association	3.856	1	.050
	N of Valid Cases	117		

a 5 cells (62.5%) have expected count less than 5. The minimum expected count is .49.
b 7 cells (58.3%) have expected count less than 5. The minimum expected count is .38.

province * q01priv * prov groups

Crosstab

Count

prov groups			q01priv					Total
			1	2	3	4	5	1
province without post-test	province	1		0	0	3	28	31
		3		1	4	1	3	9
	Total			1	4	4	31	40
province with post-test	province	2	0		6	5	10	21
		4	0		5	12	34	51
		5	1		0	9	30	40
	Total		1		11	26	74	112

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	20.160(a)	3	.000
	Likelihood Ratio	18.442	3	.000
	Linear-by-Linear Association	17.795	1	.000
	N of Valid Cases	40		
province with post-test	Pearson Chi-Square	14.827(b)	6	.022
	Likelihood Ratio	16.535	6	.011
	Linear-by-Linear Association	5.832	1	.016
	N of Valid Cases	112		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .23.
b 6 cells (50.0%) have expected count less than 5. The minimum expected count is .19.

province * q01intdv * prov groups

Crosstab

Count

prov groups			q01intdv					Total
			1	2	3	4	5	1
province without post-test	province	1	1	1	3	11	13	29
		3	0	0	0	3	5	8
	Total		1	1	3	14	18	37
province with post-test	province	2	1	0	2	5	10	18
		4	0	6	6	9	25	46
		5	0	1	4	8	25	38
	Total		1	7	12	22	60	102

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	1.782(a)	4	.776
	Likelihood Ratio	2.815	4	.589
	Linear-by-Linear Association	1.477	1	.224
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	10.489(b)	8	.232
	Likelihood Ratio	10.262	8	.247
	Linear-by-Linear Association	.650	1	.420
	N of Valid Cases	102		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .22.
b 9 cells (60.0%) have expected count less than 5. The minimum expected count is .18.

province * q01gvsub * prov groups
Crosstab

Count

prov groups			q01gvsub					Total
			1	2	3	4	5	1
province without post-test	province	1	1	2	1	1	25	30
		3	0	0	1	5	4	10
	Total		1	2	2	6	29	40
province with post-test	province	2	1	2	1	2	13	19
		4	1	0	2	7	41	51
		5	2	1	1	9	25	38
	Total		4	3	4	18	79	108

province * q06priva * prov groups
Crosstab

Count

prov groups			q06priva				Total
			2	3	4	5	2
province without post-test	province	1		0	2	26	28
		3		2	2	6	10
	Total			2	4	32	38
province with post-test	province	2	0	0	3	19	22
		4	0	2	8	41	51
		5	1	2	3	34	40
	Total		1	4	14	94	113

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	7.702(a)	2	.021
	Likelihood Ratio	7.371	2	.025
	Linear-by-Linear Association	7.384	1	.007
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	4.203(b)	6	.649
	Likelihood Ratio	5.298	6	.506
	Linear-by-Linear Association	.625	1	.429
	N of Valid Cases	113		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .53.
b 8 cells (66.7%) have expected count less than 5. The minimum expected count is .19.

province * q06gsupr * prov groups

Crosstab

Count

prov groups			q06gsupr					Total
			1	2	3	4	5	1
province without post-test	province	1	1	8	8	3	10	30
		3	2	1	2	2	2	9
	Total		3	9	10	5	12	39
province with post-test	province	2	6	0	1	5	10	22
		4	4	4	3	13	24	48
		5	11	8	3	4	12	38
	Total		21	12	7	22	46	108

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	5.075(a)	4	.280
	Likelihood Ratio	4.486	4	.344
	Linear-by-Linear Association	.396	1	.529
	N of Valid Cases	39		
province with post-test	Pearson Chi-Square	16.584(b)	8	.035
	Likelihood Ratio	19.251	8	.014
	Linear-by-Linear Association	1.928	1	.165
	N of Valid Cases	108		

a 7 cells (70.0%) have expected count less than 5. The minimum expected count is .69.
b 7 cells (46.7%) have expected count less than 5. The minimum expected count is 1.43.

province * q06donor * prov groups

Crosstab

Count

prov groups			q06donor					Total
			1	2	3	4	5	1
province without post-test	province	1	1	1	2	11	13	28
		3	0	0	2	4	3	9
	Total		1	1	4	15	16	37
province with post-test	province	2	2	2	1	5	11	21
		4	0	3	7	11	24	45
		5	1	0	4	11	20	36
	Total		3	5	12	27	55	102

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	2.390(a)	4	.664
	Likelihood Ratio	2.669	4	.615
	Linear-by-Linear Association	.082	1	.774
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	9.207(b)	8	.325
	Likelihood Ratio	11.107	8	.196
	Linear-by-Linear Association	1.618	1	.203
	N of Valid Cases	102		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .24.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is .62.

province * q06stora * prov groups

Crosstab

Count

prov groups			q06stora				Total
			2	3	4	5	2
province without post-test	province	1		0	3	25	28
		3		2	3	4	9
	Total			2	6	29	37
province with post-test	province	2	1	2	3	16	22
		4	0	2	14	35	51
		5	0	2	10	27	39
	Total		1	6	27	78	112

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	10.118(a)	2	.006
	Likelihood Ratio	9.468	2	.009
	Linear-by-Linear Association	9.761	1	.002
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	6.177(b)	6	.404
	Likelihood Ratio	5.438	6	.489
	Linear-by-Linear Association	.337	1	.562
	N of Valid Cases	112		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .49.
b 6 cells (50.0%) have expected count less than 5. The minimum expected count is .20.

province * q06effic * prov groups

Crosstab

Count

prov groups			q06effic				Total
			2	3	4	5	2
province without post-test	province	1		1	2	25	28
		3		0	2	7	9
	Total			1	4	32	37
province with post-test	province	2	0	2	3	17	22
		4	0	1	14	33	48
		5	1	2	5	33	41
	Total		1	5	22	83	111

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	1.858(a)	2	.395
	Likelihood Ratio	1.889	2	.389
	Linear-by-Linear Association	.220	1	.639
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	7.545(b)	6	.273
	Likelihood Ratio	7.727	6	.259
	Linear-by-Linear Association	.024	1	.878
	N of Valid Cases	111		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .24.
b 7 cells (58.3%) have expected count less than 5. The minimum expected count is .20.

province * q06profi * prov groups

Crosstab

Count

prov groups			q06profi				Total
			2	3	4	5	2
province without post-test	province	1	1	5	5	20	31
		3	0	1	2	4	7
	Total		1	6	7	24	38
province with post-test	province	2	1	4	3	13	21
		4	2	5	12	25	44
		5	2	9	5	19	35
	Total		5	18	20	57	100

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	.767(a)	3	.857
	Likelihood Ratio	.897	3	.826
	Linear-by-Linear Association	.001	1	.980
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	4.515(b)	6	.607
	Likelihood Ratio	4.521	6	.607
	Linear-by-Linear Association	.344	1	.558
	N of Valid Cases	100		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .18.
b 5 cells (41.7%) have expected count less than 5. The minimum expected count is 1.05.

province * q06psupr * prov groups

Crosstab

Count

prov groups			q06psupr					Total
			1	2	3	4	5	1
province without post-test	province	1		3	2	6	15	26
		3		0	2	3	1	6
	Total			3	4	9	16	32
province with post-test	province	2	1	1	2	7	10	21
		4	0	7	6	15	20	48
		5	1	4	4	10	15	34
	Total		2	12	12	32	45	103

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	6.154(a)	3	.104
	Likelihood Ratio	6.401	3	.094
	Linear-by-Linear Association	.930	1	.335
	N of Valid Cases	32		
province with post-test	Pearson Chi-Square	3.475(b)	8	.901
	Likelihood Ratio	4.357	8	.824
	Linear-by-Linear Association	.235	1	.628
	N of Valid Cases	103		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .56.
b 7 cells (46.7%) have expected count less than 5. The minimum expected count is .41.

province * q06infor * prov groups

Crosstab

Count

prov groups			q06infor					Total
			1	2	3	4	5	1
province without post-test	province	1	2	2	6	3	13	26
		3	1	1	1	3	1	7
	Total		3	3	7	6	14	33
province with post-test	province	2	2	2	2	3	10	19
		4	5	5	12	9	12	43
		5	3	1	4	8	19	35
	Total		10	8	18	20	41	97

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	5.362(a)	4	.252
	Likelihood Ratio	5.203	4	.267
	Linear-by-Linear Association	1.090	1	.296
	N of Valid Cases	33		
province with post-test	Pearson Chi-Square	9.848(b)	8	.276
	Likelihood Ratio	10.367	8	.240
	Linear-by-Linear Association	.262	1	.609
	N of Valid Cases	97		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .64.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is 1.57.

province * q06train * prov groups

Crosstab

Count

prov groups			q06train					Total
			1	2	3	4	5	1
province without post-test	province	1			2	7	19	28
		3			1	1	7	9
	Total				3	8	26	37
province with post-test	province	2	0	0	1	2	14	17
		4	0	1	3	7	27	38
		5	1	0	0	9	24	34
	Total		1	1	4	18	65	89

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	.835(a)	2	.659
	Likelihood Ratio	.917	2	.632
	Linear-by-Linear Association	.059	1	.808
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	7.107(b)	8	.525
	Likelihood Ratio	9.157	8	.329
	Linear-by-Linear Association	.461	1	.497
	N of Valid Cases	89		

a 3 cells (50.0%) have expected count less than 5. The minimum expected count is .73.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .19.

province * q07pexpo * prov groups

Crosstab

Count

prov groups			q07pexpo						Total
			1	2	3	4	5	7	1
province without post-test	province	1	1	3	6	5	13		28
		3	0	2	2	0	4		8
	Total		1	5	8	5	17		36
province with post-test	province	2	5	1	1	5	9	0	21
		4	5	2	6	16	19	1	49
		5	2	5	5	7	14	0	33
	Total		12	8	12	28	42	1	103

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	2.681(a)	4	.613
	Likelihood Ratio	3.861	4	.425
	Linear-by-Linear Association	.130	1	.719
	N of Valid Cases	36		
province with post-test	Pearson Chi-Square	10.528(b)	10	.395
	Likelihood Ratio	10.418	10	.405
	Linear-by-Linear Association	.384	1	.536
	N of Valid Cases	103		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .22.
b 10 cells (55.6%) have expected count less than 5. The minimum expected count is .20.

province * q07pimpo * prov groups

Crosstab

Count

prov groups			q07pimpo					Total
			1	2	3	4	5	1
province without post-test	province	1				0	27	27
		3				3	7	10
	Total					3	34	37
province with post-test	province	2	0	1	0	4	17	22
		4	2	1	1	3	42	49
		5	3	1	1	4	30	39
	Total		5	3	2	11	89	110

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
province without post-test	Pearson Chi-Square	8.815(b)	1	.003		
	Continuity Correction(a)	5.248	1	.022		
	Likelihood Ratio	8.606	1	.003		
	Fisher's Exact Test				.015	.015
	Linear-by-Linear Association	8.576	1	.003		
	N of Valid Cases	37				
province with post-test	Pearson Chi-Square	5.225(c)	8	.733		
	Likelihood Ratio	6.256	8	.619		
	Linear-by-Linear Association	.642	1	.423		
	N of Valid Cases	110				

a Computed only for a 2x2 table

b 2 cells (50.0%) have expected count less than 5. The minimum expected count is .81.
c 12 cells (80.0%) have expected count less than 5. The minimum expected count is .40.

province * q07schoo * prov groups

Crosstab

Count

prov groups			q07schoo					Total
			1	2	3	4	5	1
province without post-test	province	1			2	5	24	31
		3			2	2	6	10
	Total				4	7	30	41
province with post-test	province	2	1	0	3	2	16	22
		4	0	2	1	6	42	51
		5	1	1	0	3	35	40
	Total		2	3	4	11	93	113

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	1.802(a)	2	.406
	Likelihood Ratio	1.609	2	.447
	Linear-by-Linear Association	1.656	1	.198
	N of Valid Cases	41		
province with post-test	Pearson Chi-Square	11.794(b)	8	.161
	Likelihood Ratio	11.746	8	.163
	Linear-by-Linear Association	1.903	1	.168
	N of Valid Cases	113		

a 3 cells (50.0%) have expected count less than 5. The minimum expected count is .98.
b 12 cells (80.0%) have expected count less than 5. The minimum expected count is .39.

province * q07resea * prov groups

Crosstab

Count

prov groups			q07resea					Total
			1	2	3	4	5	1
province without post-test	province	1			1	11	17	29
		3			0	2	7	9
	Total				1	13	24	38
province with post-test	province	2	0	0	2	8	11	21
		4	2	2	2	7	32	45
		5	1	0	2	10	25	38
	Total		3	2	6	25	68	104

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	1.205(a)	2	.547
	Likelihood Ratio	1.466	2	.480
	Linear-by-Linear Association	1.172	1	.279
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	8.208(b)	8	.413
	Likelihood Ratio	9.378	8	.311
	Linear-by-Linear Association	.148	1	.700
	N of Valid Cases	104		

a 3 cells (50.0%) have expected count less than 5. The minimum expected count is .24.
b 9 cells (60.0%) have expected count less than 5. The minimum expected count is .40.

province * q07coord * prov groups

Crosstab

Count

prov groups			q07coord					Total
			1	2	3	4	5	1
province without post-test	province	1		2	3	5	17	27
		3		0	0	3	4	7
	Total			2	3	8	21	34
province with post-test	province	2	0	0	3	4	13	20
		4	2	2	3	16	28	51
		5	2	0	4	6	26	38
	Total		4	2	10	26	67	109

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	2.726(a)	3	.436
	Likelihood Ratio	3.539	3	.316
	Linear-by-Linear Association	.283	1	.595
	N of Valid Cases	34		
province with post-test	Pearson Chi-Square	7.765(b)	8	.457
	Likelihood Ratio	9.236	8	.323
	Linear-by-Linear Association	.091	1	.762
	N of Valid Cases	109		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .41.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .37.

province * q07credi * prov groups

Crosstab

Count

prov groups			q07credi				Total
			1	3	4	5	1
province without post-test	province	1		1	0	29	30
		3		1	4	5	10
	Total			2	4	34	40
province with post-test	province	2	0	2	2	16	20
		4	1	0	3	47	51
		5	0	1	2	38	41
	Total		1	3	7	101	112

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	14.588(a)	2	.001
	Likelihood Ratio	13.819	2	.001
	Linear-by-Linear Association	8.000	1	.005
	N of Valid Cases	40		
province with post-test	Pearson Chi-Square	7.438(b)	6	.282
	Likelihood Ratio	7.469	6	.280
	Linear-by-Linear Association	1.880	1	.170
	N of Valid Cases	112		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .50.
b 9 cells (75.0%) have expected count less than 5. The minimum expected count is .18.

province * q07priva * prov groups

Crosstab

Count

prov groups			q07priva					Total
			1	2	3	4	5	1
province without post-test	province	1			1	3	25	29
		3			2	3	3	8
	Total				3	6	28	37
province with post-test	province	2	2	0	1	3	13	19
		4	0	1	1	9	36	47
		5	1	1	2	2	32	38
	Total		3	2	4	14	81	104

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	8.409(a)	2	.015
	Likelihood Ratio	7.429	2	.024
	Linear-by-Linear Association	7.898	1	.005
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	9.871(b)	8	.274
	Likelihood Ratio	10.494	8	.232
	Linear-by-Linear Association	1.894	1	.169
	N of Valid Cases	104		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .65.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .37.

province * q08optim * prov groups

Crosstab

Count

prov groups			q08optim					Total
			1	2	3	4	5	1
province without post-test	province	1	3	0	7	7	13	30
		3	0	2	2	2	2	8
	Total		3	2	9	9	15	38
province with post-test	province	2	0	0	4	3	13	20
		4	0	0	3	12	37	52
		5	3	3	9	12	12	39
	Total		3	3	16	27	62	111

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	8.853(a)	4	.065
	Likelihood Ratio	8.264	4	.082
	Linear-by-Linear Association	.648	1	.421
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	24.523(b)	8	.002
	Likelihood Ratio	27.170	8	.001
	Linear-by-Linear Association	7.537	1	.006
	N of Valid Cases	111		

a 7 cells (70.0%) have expected count less than 5. The minimum expected count is .42.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is .54.

province * q11roads * prov groups

Crosstab

Count

prov groups			q11roads					Total
			1	2	3	4	5	1
province without post-test	province	1	1	2	3	6	15	27
		3	0	0	0	2	7	9
	Total		1	2	3	8	22	36
province with post-test	province	2	0		0	5	18	23
		4	1		1	3	46	51
		5	0		2	5	35	42
	Total		1		3	13	99	116

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	2.545(a)	4	.637
	Likelihood Ratio	3.969	4	.410
	Linear-by-Linear Association	2.183	1	.140
	N of Valid Cases	36		
province with post-test	Pearson Chi-Square	6.596(b)	6	.360
	Likelihood Ratio	7.191	6	.304
	Linear-by-Linear Association	.001	1	.975
	N of Valid Cases	116		

a 7 cells (70.0%) have expected count less than 5. The minimum expected count is .25.
b 8 cells (66.7%) have expected count less than 5. The minimum expected count is .20.

province * q11infsy * prov groups

Crosstab

Count

prov groups			q11infsy					Total
			1	2	3	4	5	1
province without post-test	province	1	1	1	1	11	14	28
		3	0	0	1	3	4	8
	Total		1	1	2	14	18	36
province with post-test	province	2	0	0	3	8	11	22
		4	0	2	4	20	20	46
		5	1	3	5	7	21	37
	Total		1	5	12	35	52	105

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	1.469(a)	4	.832
	Likelihood Ratio	1.749	4	.782
	Linear-by-Linear Association	.059	1	.809
	N of Valid Cases	36		
province with post-test	Pearson Chi-Square	8.826(b)	8	.357
	Likelihood Ratio	10.284	8	.246
	Linear-by-Linear Association	.503	1	.478
	N of Valid Cases	105		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .22.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is .21.

province * q11stora * prov groups

Crosstab

Count

prov groups			q11stora					Total
			1	2	3	4	5	1
province without post-test	province	1	1		2	5	18	26
		3	0		1	5	1	7
	Total		1		3	10	19	33
province with post-test	province	2	1	3	4	4	9	21
		4	2	2	7	14	16	41
		5	1	1	4	13	14	33
	Total		4	6	15	31	39	95

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	8.384(a)	3	.039
	Likelihood Ratio	8.588	3	.035
	Linear-by-Linear Association	1.705	1	.192
	N of Valid Cases	33		
province with post-test	Pearson Chi-Square	5.195(b)	8	.737
	Likelihood Ratio	4.986	8	.759
	Linear-by-Linear Association	1.200	1	.273
	N of Valid Cases	95		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .21.
b 7 cells (46.7%) have expected count less than 5. The minimum expected count is .88.

province * q11colds * prov groups

Crosstab

Count

prov groups			q11colds					Total
			1	2	3	4	5	1
province without post-test	province	1	0		2	6	20	28
		3	1		0	2	4	7
	Total		1		2	8	24	35
province with post-test	province	2	1	1	3	5	10	20
		4	1	1	8	10	25	45
		5	2	1	9	9	14	35
	Total		4	3	20	24	49	100

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	4.792(a)	3	.188
	Likelihood Ratio	4.404	3	.221
	Linear-by-Linear Association	1.928	1	.165
	N of Valid Cases	35		
province with post-test	Pearson Chi-Square	3.043(b)	8	.932
	Likelihood Ratio	3.045	8	.931
	Linear-by-Linear Association	.310	1	.578
	N of Valid Cases	100		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .20.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is .60.

province * q11prici * prov groups

Crosstab

Count

prov groups			q11prici					Total
			1	2	3	4	5	1
province without post-test	province	1	0	1	4	8	15	28
		3	1	0	1	2	4	8
	Total		1	1	5	10	19	36
province with post-test	province	2	0	4	2	4	11	21
		4	1	3	4	14	28	50
		5	0	1	2	10	23	36
	Total		1	8	8	28	62	107

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	3.844(a)	4	.428
	Likelihood Ratio	3.570	4	.467
	Linear-by-Linear Association	.647	1	.421
	N of Valid Cases	36		
province with post-test	Pearson Chi-Square	7.294(b)	8	.505
	Likelihood Ratio	6.933	8	.544
	Linear-by-Linear Association	3.200	1	.074
	N of Valid Cases	107		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .22.
b 9 cells (60.0%) have expected count less than 5. The minimum expected count is .20.

province * q11trans * prov groups

Crosstab

Count

prov groups			q11trans					Total
			1	2	3	4	5	1
province without post-test	province	1		2	3	6	16	27
		3		0	0	5	3	8
	Total			2	3	11	19	35
province with post-test	province	2	1	2	2	4	9	18
		4	0	3	3	15	29	50
		5	0	1	2	11	20	34
	Total		1	6	7	30	58	102

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	5.205(a)	3	.157
	Likelihood Ratio	5.896	3	.117
	Linear-by-Linear Association	.014	1	.906
	N of Valid Cases	35		
province with post-test	Pearson Chi-Square	7.185(b)	8	.517
	Likelihood Ratio	5.888	8	.660
	Linear-by-Linear Association	3.119	1	.077
	N of Valid Cases	102		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .46.
b 9 cells (60.0%) have expected count less than 5. The minimum expected count is .18.

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province * q11input * prov groups

Crosstab

Count

prov groups			q11input					Total
			1	2	3	4	5	1
province without post-test	province	1		1	3	5	17	26
		3		0	0	4	3	7
	Total			1	3	9	20	33
province with post-test	province	2	0	0	1	4	15	20
		4	0	0	8	7	32	47
		5	1	5	2	5	26	39
	Total		1	5	11	16	73	106

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	4.445(a)	3	.217
	Likelihood Ratio	4.832	3	.185
	Linear-by-Linear Association	.010	1	.922
	N of Valid Cases	33		
province with post-test	Pearson Chi-Square	14.494(b)	8	.070
	Likelihood Ratio	16.205	8	.040
	Linear-by-Linear Association	2.671	1	.102
	N of Valid Cases	106		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .21.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .19.

province * q11atech * prov groups

Crosstab

Count

prov groups			q11atech					Total
			1	2	3	4	5	1
province without post-test	province	1				3	25	28
		3				2	7	9
	Total					5	32	37
province with post-test	province	2	1	1	1	3	15	21
		4	0	1	3	3	43	50
		5	0	1	1	5	33	40
	Total		1	3	5	11	91	111

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Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
province without post-test	Pearson Chi-Square	.772(b)	1	.380		
	Continuity Correction(a)	.101	1	.750		
	Likelihood Ratio	.704	1	.402		
	Fisher's Exact Test				.577	.352
	Linear-by-Linear Association	.751	1	.386		
	N of Valid Cases	37				
province with post-test	Pearson Chi-Square	7.154(c)	8	.520		
	Likelihood Ratio	6.261	8	.618		
	Linear-by-Linear Association	2.501	1	.114		
	N of Valid Cases	111				

a Computed only for a 2x2 table
b 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.22.
c 12 cells (80.0%) have expected count less than 5. The minimum expected count is .19.

province * q11gvsup * prov groups

Crosstab

Count

prov groups			q11gvsup				Total
			2	3	4	5	2
province without post-test	province	1		3	3	24	30
		3		0	4	5	9
	Total			3	7	29	39
province with post-test	province	2	0	4	1	16	21
		4	1	0	2	48	51
		5	2	1	5	31	39
	Total		3	5	8	95	111

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	6.033(a)	2	.049
	Likelihood Ratio	5.913	2	.052
	Linear-by-Linear Association	.374	1	.541
	N of Valid Cases	39		
province with post-test	Pearson Chi-Square	17.467(b)	6	.008
	Likelihood Ratio	15.643	6	.016
	Linear-by-Linear Association	.337	1	.562
	N of Valid Cases	111		

a 3 cells (50.0%) have expected count less than 5. The minimum expected count is .69.
b 9 cells (75.0%) have expected count less than 5. The minimum expected count is .57.

province * q11polic * prov groups

Crosstab

Count

prov groups			q11polic					Total
			1	2	3	4	5	1
province without post-test	province	1			1	6	21	28
		3			0	1	9	10
	Total				1	7	30	38
province with post-test	province	2	0	0	1	3	14	18
		4	0	2	0	16	32	50
		5	1	0	1	4	31	37
	Total		1	2	2	23	77	105

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	1.090(a)	2	.580
	Likelihood Ratio	1.408	2	.495
	Linear-by-Linear Association	1.060	1	.303
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	12.198(b)	8	.143
	Likelihood Ratio	13.929	8	.084
	Linear-by-Linear Association	.002	1	.962
	N of Valid Cases	105		

a 3 cells (50.0%) have expected count less than 5. The minimum expected count is .26.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .17.

province * q12input * prov groups

Crosstab

Count

prov groups			q12input					Total
			1	2	3	4	5	1
province without post-test	province	1		0	2	6	19	27
		3		1	1	2	4	8
	Total			1	3	8	23	35
province with post-test	province	2	0	1	1	6	12	20
		4	1	0	2	8	34	45
		5	1	5	3	6	17	32
	Total		2	6	6	20	63	97

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	3.972(a)	3	.264
	Likelihood Ratio	3.558	3	.313
	Linear-by-Linear Association	2.576	1	.108
	N of Valid Cases	35		
province with post-test	Pearson Chi-Square	11.452(b)	8	.177
	Likelihood Ratio	13.110	8	.108
	Linear-by-Linear Association	1.719	1	.190
	N of Valid Cases	97		

a 5 cells (62.5%) have expected count less than 5. The minimum expected count is .23.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .41.

province * q12train * prov groups

Crosstab

Count

prov groups			q12train					Total
			1	2	3	4	5	1
province without post-test	province	1			1	2	26	29
		3			0	1	8	9
	Total				1	3	34	38
province with post-test	province	2	0	0	2	3	17	22
		4	1	1	3	9	38	52
		5	3	0	2	4	28	37
	Total		4	1	7	16	83	111

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	.465(a)	2	.792
	Likelihood Ratio	.684	2	.710
	Linear-by-Linear Association	.029	1	.865
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	5.447(b)	8	.709
	Likelihood Ratio	6.139	8	.632
	Linear-by-Linear Association	.765	1	.382
	N of Valid Cases	111		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .24.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .20.

province * q12retai * prov groups

Crosstab

Count

prov groups			q12retai					Total
			1	2	3	4	5	1
province without post-test	province	1			4	5	18	27
		3			0	1	6	7
	Total				4	6	24	34
province with post-test	province	2	0	1	2	4	11	18
		4	1	3	6	11	28	49
		5	0	3	2	10	17	32
	Total		1	7	10	25	56	99

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	1.379(a)	2	.502
	Likelihood Ratio	2.176	2	.337
	Linear-by-Linear Association	1.296	1	.255
	N of Valid Cases	34		
province with post-test	Pearson Chi-Square	2.902(b)	8	.940
	Likelihood Ratio	3.309	8	.913
	Linear-by-Linear Association	.146	1	.702
	N of Valid Cases	99		

a 5 cells (83.3%) have expected count less than 5. The minimum expected count is .82.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .18.

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province * q12machi * prov groups

Crosstab

Count

prov groups			q12machi					Total
			1	2	3	4	5	1
province without post-test	province	1		1	0	1	28	30
		3		0	3	0	5	8
	Total			1	3	1	33	38
province with post-test	province	2	0	1	3	2	16	22
		4	1	1	1	13	37	53
		5	0	1	2	3	31	37
	Total		1	3	6	18	84	112

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	12.475(a)	3	.006
	Likelihood Ratio	11.042	3	.012
	Linear-by-Linear Association	4.588	1	.032
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	10.602(b)	8	.225
	Likelihood Ratio	10.611	8	.225
	Linear-by-Linear Association	1.128	1	.288
	N of Valid Cases	112		

a 6 cells (75.0%) have expected count less than 5. The minimum expected count is .21.
b 10 cells (66.7%) have expected count less than 5. The minimum expected count is .20.

province * q12infsy * prov groups

Crosstab

Count

prov groups			q12infsy					Total
			1	2	3	4	5	1
province without post-test	province	1			3	7	16	26
		3			1	2	3	6
	Total				4	9	19	32
province with post-test	province	2	0	1	4	4	10	19
		4	1	2	6	11	29	49
		5	0	1	2	12	19	34
	Total		1	4	12	27	58	102

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Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	.283(a)	2	.868
	Likelihood Ratio	.277	2	.870
	Linear-by-Linear Association	.263	1	.608
	N of Valid Cases	32		
province with post-test	Pearson Chi-Square	5.280(b)	8	.727
	Likelihood Ratio	5.562	8	.696
	Linear-by-Linear Association	.777	1	.378
	N of Valid Cases	102		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .75.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is .19.

province * q12credi * prov groups

Crosstab

Count

prov groups			q12credi				Total
			2	3	4	5	2
province without post-test	province	1		0	3	25	28
		3		1	1	8	10
	Total			1	4	33	38
province with post-test	province	2	0		2	16	18
		4	2		6	44	52
		5	0		4	35	39
	Total		2		12	95	109

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	2.877(a)	2	.237
	Likelihood Ratio	2.748	2	.253
	Linear-by-Linear Association	1.438	1	.230
	N of Valid Cases	38		
province with post-test	Pearson Chi-Square	2.300(b)	4	.681
	Likelihood Ratio	3.069	4	.546
	Linear-by-Linear Association	.009	1	.925
	N of Valid Cases	109		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .26.
b 5 cells (55.6%) have expected count less than 5. The minimum expected count is .33.

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province * q12markt * prov groups

Crosstab

Count

prov groups			q12markt					Total
			1	2	3	4	5	1
province without post-test	province	1			1	9	19	29
		3			0	2	6	8
	Total				1	11	25	37
province with post-test	province	2	0	2	2	4	10	18
		4	1	1	8	15	20	45
		5	0	0	3	11	19	33
	Total		1	3	13	30	49	96

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	.436(a)	2	.804
	Likelihood Ratio	.649	2	.723
	Linear-by-Linear Association	.362	1	.548
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	8.423(b)	8	.393
	Likelihood Ratio	8.445	8	.391
	Linear-by-Linear Association	.939	1	.332
	N of Valid Cases	96		

a 3 cells (50.0%) have expected count less than 5. The minimum expected count is .22.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is .19.

province * q12irrig * prov groups

Crosstab

Count

prov groups			q12irrig					Total
			1	2	3	4	5	1
province without post-test	province	1			2	2	24	28
		3			0	2	7	9
	Total				2	4	31	37
province with post-test	province	2	0	0	6	2	12	20
		4	2	1	4	9	30	46
		5	0	0	5	7	21	33
	Total		2	1	15	18	63	99

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	2.127(a)	2	.345
	Likelihood Ratio	2.391	2	.302
	Linear-by-Linear Association	.002	1	.969
	N of Valid Cases	37		
province with post-test	Pearson Chi-Square	8.643(b)	8	.373
	Likelihood Ratio	9.501	8	.302
	Linear-by-Linear Association	.484	1	.486
	N of Valid Cases	99		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .49.
b 8 cells (53.3%) have expected count less than 5. The minimum expected count is .20.

province * q12landt * prov groups

Crosstab

Count

prov groups			q12landt					Total
			1	2	3	4	5	1
province without post-test	province	1	2	2	3	2	20	29
		3	0	0	0	1	6	7
	Total		2	2	3	3	26	36
province with post-test	province	2	1	2	1	1	13	18
		4	2	2	5	5	35	49
		5	1	0	0	2	33	36
	Total		4	4	6	8	81	103

Chi-Square Tests

prov groups		Value	df	Asymp. Sig. (2-sided)
province without post-test	Pearson Chi-Square	2.278(a)	4	.685
	Likelihood Ratio	3.558	4	.469
	Linear-by-Linear Association	1.488	1	.223
	N of Valid Cases	36		
province with post-test	Pearson Chi-Square	9.694(b)	8	.287
	Likelihood Ratio	12.047	8	.149
	Linear-by-Linear Association	3.446	1	.063
	N of Valid Cases	103		

a 8 cells (80.0%) have expected count less than 5. The minimum expected count is .39.
b 12 cells (80.0%) have expected count less than 5. The minimum expected count is .70.

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