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Agriculture and Rural Poverty in Yemen; Current Status, Constraints and Potential of Agricultural Activity, and its Relevance to Rural Poverty(*)

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1. Introduction

Agriculture is the predominant economic activity in Yemen with respect to income generation and employment creation. It supports the majority of the rural population who represents 3/4 of the total population in Yemen. However, the productivity of the sector is low and, hence, the average individual's income it generates is low as compared to the other sectors in the economy. The result is the spread of poverty among the rural population; 83% of the poor resides in the rural areas. Thus, there is a strong relation between agriculture and poverty in Yemen. One may say that the key to combat rural poverty is raising productivity of the sector.

To get acquainted with the factors responsible for the low productivity and, hence low income generated in the sector, the current status of the agriculture sector with respect to its main characteristics and its production performance has to be reviewed and assessed, and the growth constraints to the sector have to be investigated. Finally, the potential of the agricultural activity will be explored, given the difficulties that currently confront the sector, especially with respect to scarcity of water and low factor productivity.

Accordingly, the report will consist of four parts besides the Introduction which forms part one. Part two reviews the current status of the agriculture sector. Part three discusses the constraints to agricultural growth. Part four covers agriculture and poverty issues. Finally, part five examines the potential of agricultural activity in Yemen.

2. Current Status of the Agriculture Sector:

The current status of the agriculture sector in Yemen will be discussed via four dimensions, which are: the main characteristics of the sector; the role it plays in income generation and employment creation in the economy; its contribution to the food self-sufficiency of the population; and, finally, its capability in earning foreign exchange to the country.

Yemeni agriculture has special characteristics. One may point out six important characteristics in this respect:

First, the diversification of the topography of the land. There are four main agro-ecological regions in Yemen: the Highlands (includes 47 % of cultivated area); the Tihama (31% of the area); the Eastern Plateau (18% of the area); and the Coastal Areas of the Gulf of Aden (4% of the area)[(1)].

Second, the dispersion of the holdings. The agricultural land is dispersed so

(1) World Bank, Republic of Yemen, «Rural Development Strategy: Implementing the Poverty Reduction Strategy in Rural Areas,» (Report, Ministry of Planning and International Cooperation, May 2003).

that on average, there are 3.6 pieces per holder, while the average size of holding is 1.36 hectare (ha) in 2002, according to the latest Agricultural Survey(2).

Third, the predominance of small land holders. The majority of the land holders have small landholdings. According to the preliminary findings of the Agricultural Survey in 2002, 73.4% of the holders have landholdings of less than one hectare; 20% of them have landholdings from 1- less than 5 ha; and 7% of holders have land size of 5 ha and more(3).

Fourth, the legal forms of the land holdings. The legal forms of the landholdings in Yemen are private ownership, cooperative ownership, renting / share cropping use of the landholdings, *WAKF*, and state's ownership. According to the Agricultural Survey, in 2002 the majority of the landholdings in Yemen is privately owned either by individuals, or families, or companies. Private ownership covers 140,873,503 ha, which makes 87.8% of the total agriculture land. Cooperative ownership includes 399.65 ha, representing 0.002% of total land. Renting / crop sharing includes 161,934.48 ha, making 10.1% of the agricultural land. Finally, *WAKF* and state's ownership cover 19667.30 ha and 3570.34 ha respectively, representing 1.2% and 0.080% of the total land(4).

Fifth, water sources and land productivity. Groundwater irrigated land increased to 368000 ha in 1996, representing 32% of the farmed area, and producing two thirds of the agricultural output value. This expansion in the groundwater irrigated land supported a very rapid increase in the production of fruits, vegetables and qat, and made a tremendous contribution to the viability of the rural economy(5). The majority of the agricultural land holders depend on rainfall irrigation. There are about 795 thousand landholders of rain-fed agricultural land, as compared to 87 thousands holders of ground water irrigated land and 81 thousand holders of the agricultural land irrigated by means of floods and springs runoff(6).

Sixth, crops production and livestock raising. The distribution of the number of agricultural holders involved in agricultural production and livestock raising

(2) Central Statistical Organization (CSO), Ministry of Planning (MOP), and Ministry of Agriculture and Irrigation (MOAI), «Agricultural Structural Survey - 2003 (ASS - 2003),» (Unpublished Preliminary Findings, Yemen, Sanaa, August 2004).

(3) Ibid., table 29A.

(4) Ibid., table 5.

(5) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region,» (Report no. 17973, World Bank, Washington, DC, May 1999).

(6) H. A-Shami, *The Poverty Reduction Strategy and Food Security in Yemen (Current and Perspectives): As the Key Components of the Socio-economic Development Plans* (Sanaa: Food and Agriculture Organization (FAO), 2004).

in 2002 is as follows: out of a total number of 1,488,406 holders, 131,618 holders are involved in agricultural land cultivation only (representing 8.8% of the holders), 308,301 holders are involved in animal raising only (representing 20.7% of the holders), and 1,048,487 holders are involved in both agricultural land cultivation and livestock raising, representing 70.4% of total number of the holders(7).

Seventh, market orientation of the agriculture product. The majority of the agricultural production in Yemen is not market oriented. Only 4% of the agricultural land holdings produce solely for the sale in the market, while 76% of the holdings grow temporary crops for own-consumption of the holders. The remainder, 20% of the holdings, produce for both own-consumption and sale in the market(8). This means that agriculture in Yemen is directed mainly towards self-sustainable type of production, which is one of the important reasons for the low contribution of agricultural production in export.

Agriculture is the predominant economic activity in Yemen with respect to income generation and employment creation. It contributes the largest share in non-oil GDP and employs more than half the labour force in Yemen. Agriculture (crop production and livestock raising) remains the main source of income in rural areas. The crops composition of the agriculture product has changed against cereals and towards qat (as first priority), coffee, and fruits. During 1995 - 2000, the land area allocated for cereals cultivation have been reduced, and productivity of the hectare has also declined. Land area was reduced from 787 thousand ha in 1995 to 671 thousand ha in 2000 (i.e. by 14.7%), and productivity per ha fell from 1.68 tons to 1.62 tons for wheat, from 0.96 tons to 0.95 tons for sorghum and maize, from 1.29 tons to 1.14 tons for barley, and from 1.2 tons to 1.14 tons for legumes. Domestic cereals production has continued as a subsistence crop, and less than 10% of local grain production reaches the market. Cereals (mainly sorghum) are the dominant crops on the terraces representing 59% of cultivated area(9).

Qat, coffee and grapes are strategic crops in Yemen. Qat is the dominant cash crop, cultivated in 15% of the area and represents more than half of the area devoted to cash crop such as coffee, sesame, cotton and tobacco. Between 1970 and

(7) Central Statistical Organization (CSO), Ministry of Planning (MOP), and Ministry of Agriculture and Irrigation (MOAI), «Agricultural Structural Survey - 2003 (ASS - 2003),» table 1.

(8) Ibid.

(9) «Republic of Yemen: Poverty Reduction Strategy Paper (PRSP) 2003 - 2005,» (International Monetary Fund (IMF), 31 May 2002), and «Republic of Yemen: Poverty Update: Middle East and North Africa Social and Economic Development Group (MNSED),» (Report no. 24422, World Bank, Washington, DC, December 2002), 2 vols.

2000, the area under qat increased 13-fold (from 8000 ha to 103000 ha), while the area under coffee increased only 5-fold (from 7000 to 33000 ha), and the area of grapes increased only 2-fold (from 10000 to 23000 ha). Qat is the main user of ground water (70%). Imports of qat and fruits are banned which encourages their cultivation(10).

Livestock are widely owned. As mentioned above, 20.7% of the agricultural holders (land and livestock) are sole holders of livestock and 70.4% of the holders own both agricultural land and livestock. The widely held ownership of livestock has resulted in intensive use of animal products, consumer preference for fresh milk and animal products, women's significant role in livestock management and product processing, and limited sector expansion due to limitations on grazing feed and labor (7% of the cultivated area are used for fodder)(11).

As shown in Table (1), agriculture product in 1991 and in 1995 was 34,402 million Yemeni Rials (Y.R.) and 87,737 million Y.R. in the two years respectively(12) which was the highest sectoral product in the economy; higher even than the product of mining and quarrying sector (including oil and gas) in the two mentioned years. Agriculture share in non-oil GDP was 26.2% and 23.2% in 1991 and 1995. The average annual rate of growth of the agriculture product over the period 1991 - 95 was 5.21%. In the years 2000 and 2003, the agricultural product rose to 201,830 million Y.R. and 266,541 million Y.R. respectively, with an average annual rate of growth of 3.47% between the two years. Despite the low annual growth rate of the agricultural product in the period 2000 - 2003 as compared to 1991 - 95, agriculture continued to have the highest product among the non-oil sectors, with the exception of wholesale & retail trade and restaurants & hotels. However, its share in non-oil GDP has been declining over the period 1991 - 2003; it fell from 26.2% in 1991, to 23.2 in 1995, to 20.4% in 2000, and to 18.5% in 2003.The significant change in the sectoral structure of the Yemeni economy was due to the considerable increase in the oil and gas production, making the product value of the mining and quarrying sector more than double the product value of agriculture in the years 2000 and 2003. The value of the agriculture product was 201,830 million Y.R. in 2000 as compared to 550,971 million Y.R. in mining and quarrying, and was 266,541 million Y.R. in agriculture in 2003 as compared to 628,398 million Y.R. in mining and quarrying.

(10) «Yemen: Country Assistance Evaluation,» (Report no. 21787, World Bank, Washington, DC, January 2001), and World Bank, Republic of Yemen, «Rural Development Strategy: Implementing the Poverty Reduction Strategy in Rural Areas».

(11) World Bank, Republic of Yemen, Ibid.

(12) Note that the unification of Yemen was in 1990, and the devastating Civil War that broke in the country was in 1994.

Table (1)
GDP by Sectors
(at Current Prices)

Economic Activity	1991		1995		2000		2003		1991-1995	2000-2003
	GDP		GDP		GDP		GDP		Average Annual GDP Rate of Growth (at constant prices) (%) (9)	Average Annual GDP Rate of Growth (at constant prices) (%) (10)
	Million Y.R (1)	% of Non-Oil GDP (2)	Million Y.R (3)	% of Non-Oil GDP (4)	Million Y.R. (5)	% of Non-Oil GDP (6)	Million Y.R. (7)	% of Non-Oil GDP (8)		
1. Agriculture (including Qat), Hunting & Forestry	34402	26.2	87737	3.2	201830	20.4	266541	8.5	5.21[1]	3.47[1]
2. Fisheries	1384	1.1	8832	2.3	13627	1.4	29879	2.1	(-1.46)	(12.87)
3. Mining & Quarrying	15437	-	74218	-	550971	-	628398	-	9.7	2.16
(Oil & Gas)	(14830)	-	(69116)	-	(549277)	-	(626397)	-	-	-
4. Manufacturing	14251	10.9	45706	12.1	79792	8.1	97207	6.7	2.83	4.81
5. Electricity, Water & Gas	4411	3.4	9067	2.4	10117	1.0	18654	1.3	3.56	5.66
6. Construction	4620	3.5	17091	4.5	69138	7.0	88795	6.2	5.80	3.61
7. Wholesale & Retail Trade; Restaurant & Hotels	20678	15.8	65748	17.4	180022	18.2	291979	20.3	5.54	13.50
8. Transport, Storage & Communications	10664	8.1	33352	8.8	165271	16.7	242561	16.8	5.15	7.10
9. Financial Institutions & Real Estate	10823	8.3	30977	8.2	115831	11.7	169419	11.8	2.19	4.93
10. Others	-	-	-	-	154037	15.6	233799	16.2	-	-
11. GDP (at market prices)	146012	-	447753	-	1538636	-	2067232	-	3.13	5.14
12. Non-Oil GDP	131182	100.0	378637	100.0	989359	100.0	1440835	100.0	2.46	5.68

Note: (1) Including Fisheries.

Sources: -Columns 1, 3, 5 and 7 are taken from: Republic of Yemen, Ministry of Planning, Central Statistical Organization: *Statistical Yearbook 1998* (Sanaa: The Ministry, 1999), chap. 17, table (2), (in Arabic), and *Statistical Yearbook 2003* (Sanaa: The Ministry, 2004), chap. 21, table (2) (in Arabic).

- Columns 9 and 10 are calculated as the mean of the average annual rate of growth over the periods 1991-95 and 2000-03. The annual rate of growth are taken from: Ibid., chap. 17, table (6), and chap. 21, table (6) respectively.

As shown in Table (2), the agriculture sector is the major employer in the economy. According to the latest Employment Survey of 1999, it employs 53.2% of the employed labour force in Yemen; the next sector in importance, with a large gap though, is the wholesale & retail trade, restaurants & hotels which employs 12.1% of the employed labour force. Agriculture has also the lowest average wage as compared to the other sectors. The average monthly wage in agriculture was 10656 Y.R. in 1999, next in order come the two sectors -electricity, water & gas, and the manufacturing sector- with an average monthly wage of 12496 Y.R. in the former sector, and 12575 Y.R. in the latter. The average monthly wage in agriculture was 82% of the average monthly wage in the Yemeni economy in 1999, which was 12974 Y.R.

The low wages in agriculture are attributed mainly to the low labour productivity in the sector. Productivity of the agricultural worker remains less than that of his counterpart in Saudi Arabia by fifteen folds and in Korea by seventeen folds and in Singapore by 62 times(13). However, this direct relationship between productivity and wages does not apply to all the sectors as it is supposed to be in the market economy system, which Yemen is following. For example, despite that the average annual labour productivity in construction (290.2 thousand Y.R.) is considerably lower than the average annual labour productivity in electricity, water & gas (862.4 thousand Y.R.) and in manufacturing (588.2 thousand Y.R.), the average monthly wage in the construction sector is 17946 Y.R, which is significantly higher than the average monthly wage in electricity, gas & water (12496 Y.R.) and in manufacturing (12576Y.R.)(14).

Agricultural production does not provide self sufficiency in food and animal consumption for the Yemeni population. Besides, the extent of food self-sufficiency has been decreasing over time. An indicator to that is the evolution of the ratio of import of food and animals to agriculture product. Import of food and animals were 6,693.7 million Y.R. and 14,270.7 million Y.R. in 1991 and 1995, as compared to 111,136.6 million Y.R. and 158,938.5 million Y.R. in the years 2000 and 2003 respectively(15). This represents 19.5% and 16.3% of agriculture product in 1991 and 1995, as compared to 55.1% in 2000 and 59.6% in 2003, indicating the fall in the

(13) «Republic of Yemen: Poverty Reduction Strategy Paper (PRSP) 2003 - 2005».

(14) It is important to note that because of the non-availability of data, the comparison has been made between the average monthly wage of the mentioned sectors in 1999 and the average annual labour productivity of those sectors in 2000. see also table (2) in the text above.

(15) Republic of Yemen, Ministry of Planning, Central Statistical Organization: *Statistical Yearbook 1996* (Sanaa: The Ministry, 1997), chap. 18, table (4) (in Arabic), and *Statistical Yearbook 2003* (Sanaa: The Ministry, 2004), chap. 20, table (11 - 1/3) (in Arabic).

extent of food self-sufficiency in Yemen in the years of two thousands as compared to the nineties[16].

Table (2)
Employed Persons, Labour Productivity, and Wages in Yemen

Economic Activity	1999			2000
	Employed Persons (15 years & over)		Average Monthly Wage (Y. Rials) (3)	Average Annual Labour Productivity (Thousand Y. Rials) (4)
	Number (1)	% (2)		
1. Agriculture (including Qat), Hunting, Forestry	1927748	53.2	10656	104.7
2. Fisheries	31389	0.9	13280	434.1
3. Mining & Quarrying	17699	0.5	18467	31130.1
4. Manufacturing	135659	3.7	12576	588.2
5. Electricity, Water & Gas	11731	0.3	12496	862.4
6. Construction	238246	6.6	17946	290.2
7. Wholesale & Retail Trade; Restaurants & Hotels	437001	12.1	13784(1)	411.9
8. Transport, Storage & Communications	122309	3.4	16544	1351.3
9. Financial Institutions & Real Estate	29968	0.8	20773(2)	3865.2
10. Others	669929	18.5	-	229.9
11. GDP (at market prices)	-	-	-	424.8
12. Non-Oil GDP	-	-	-	274.5(3)
13. Total	3621679	100.0	12974	-

Notes: (1) This is the weighted average of the monthly wage of wholesale and retail trade and hotels and restaurants. (2) This is the weighted average of the monthly wage of finance and business and real estate. (3) Calculated as Non-Oil GDP / (total number of employed persons - number of employed persons in mining and quarrying).

Sources: - Column 1 is taken from: Republic of Yemen, Ministry of Planning, Central Statistical Organization, *Statistical Yearbook 2003*, chap. 4, table (7) (in Arabic). - Column 3 is taken from: Republic of Yemen, Ministry of Labour and Vocational Training-Central Statistical Organization, Labour Market Information System Programme, *Final Report: 1999 National Labour Force Survey Results* (Sanaa: The Author, 2000), table (22-5), pp. 368-369 (in Arabic). - Column 4 is calculated as GDP in 2000 (from Table (1) in the text) / Number of Employed Persons.

Agriculture capabilities in foreign exchange earnings is marginal as reflected in the small share of agriculture export in total export of Yemen. This share represents 3.4% of total export in 1998, 1.5% in 2000, and 2.0% in 2003; the share of oil export was above 90% of total export over the period 1998 - 2003[17]. Putting aside oil export, the relative share of agriculture export in total non-oil exports will be much higher. Agriculture contributes to about a third of total non-oil merchan-

(16) The calculation has been made using the agriculture product in the four years -1991, 1995, 2000, and 2003- included in Table (1) in the text above.

(17) Aly Abdalla Kaned, «Export of Non-Oil Goods: Poor Performance and Development Obstacles,» *Journal of Faculty of Commerce and Economics* (University of Sanaa, Yemen), no. 22 (September 2004) (in Arabic).

dize export[18]. The small export share of agriculture is attributed mainly to the fact that the majority of the agricultural holdings (76%) target own-consumption as mentioned above. Another indicator of the small export capabilities and, hence, foreign exchange earnings capacity of the agriculture sector in Yemen, is the ratio of food and animals export to agriculture product. Exports of food and animals (including re-export) in 1991 and 1995 were 279.1 million Y.R. and 1891.1 million Y.R., as compared to 12471.2 million Y.R. in 2000 and 29699.9 million Y.R. in 2003[19], representing 0.8% and 2.2% of agriculture product in 1991 and 1995, as compared to 6.2% and 11.1% of the agriculture product in the years 2000 and 2003[20]. This indicated the increase in the exported share of the agriculture product in Yemen in the years two thousands as compared to the nineties.

3. Constraints to Agriculture Growth:

Agriculture growth rate has been deteriorated in the recent years as compared to early nineties. Agriculture had the lowest annual rate of growth among all the sectors over the period 2000 - 2003, excluding mining and quarrying, while its growth performance was higher, and considerably good compared to other sectors during 1991 - 95. The average annual rate of growth of agriculture was 3.47% during 2000 - 2003, as compared to 5.21% in the period 1991 - 95 (see Table (1)). One may point out two types of constraints that are responsible for slowing down the agriculture growth: water scarcity which is aggravated by inappropriate management policies, and the insufficient investment allocated to the sector.

Yemen is among the poorest countries in the world with respect to water resources. Agriculture is the leading economic activity in the economy with respect to income generation and employment creation, despite that it is the major water consumer among the sectors. Agriculture consumes 90% of the water use in the Yemeni economy. The tightness of the water constraint can be seen clearly if we compare water availability in Yemen with other places. The per capita share of the available water resources in Yemen amounts to 137 m^3, as compared to 1250 m^3 for the MENA region, and 7500 m^3 world wide. The per capita share of water resources in Yemen is considerably below the water poverty line estimated at 1000 m[21].

(18) «Republic of Yemen: Poverty Update: Middle East and North Africa Social and Economic Development Group (MNSED)».

(19) Republic of Yemen, Ministry of Planning, Central Statistical Organization: *Statistical Yearbook 1996*, chap. 18, table (6) (in Arabic), and *Statistical Yearbook 2003*, chap. 20, table (12 - 1/3).

(20) Calculation is based on the agriculture product in Table (1) in the text above for the mentioned years.

(21) World Bank, *Economic Growth in the Republic of Yemen, Sources, Constraints and Potentials* (Washington, DC: The Bank, 2002).

Despite the scarcity of water availability, its use is not well managed. Some of the policies applied encourage the intensive use of the water resources, which aggravates the water problem in the country. Over two decades, government policy actively promoted ground water irrigation through credit and diesel price subsidies and a ban on fruit, vegetable and qat imports. The absence of any regulation on development or extraction of groundwater added also to the abuse of water. Effectively, anybody with the financial resources necessary to drill could appropriate groundwater(22). The result was a large increase in the irrigated agriculture over time. Between 1970 and 2000, irrigated agriculture had tripled from 21 thousand ha to 630 thousand ha(23).

Water resources in Yemen are subject to overuse,salination, and pollution. The most serious problem is the rapid depletion of groundwater resources as withdrawal exceeds the annual groundwater recharge. The gap between available water resources (2.5 billion m3) and the current water used (estimated at 3.4 billion m3) has increased from 400 million m3 in 1990 to 900 million m3 in 2000, and is predicted to reach 10 billion m3 by 2010, assuming the increase in water use efficiency. With this trend, it is expected that 12 billion m3 of the estimated 20 billion m3 of groundwater reserves will be depleted by 2010(24). At the present rate of consumption, it is estimated hat the groundwater in Sanaa will be depleted in a 10 year period, and the fresh water in the country will be depleted in a period of 50 years - 100 years. Besides the fast rate of depletion of the groundwater resources, the quality of water is threatened of deterioration due to salination for the overuse of the groundwater stock, and due to pollution for the extreme use of fertilizers and pesticides in the rural areas and the waste thrown in it in the urban areas(25).

The subsidized pricing of electricity and diesel, as well as the concessional prices provided for pumps make groundwater available to farmers at very low cost. The result is the considerable waste realized in the water used for irrigation. It is estimated that water losses between the well and the fields range between 9% - 78%, and in more than two thirds of cases, the losses exceeded 30%(26). Besides the price subsidy of the means of water pumping, the Yemeni government has also encouraged and supported groundwater irrigation through other policies, like providing

(22) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

(23) World Bank, Ibid.

(24) Ibid.

(25) «Yemen: Country Assistance Evaluation», and «Republic of Yemen: Poverty Update: Middle East and North Africa Social and Economic Development Group (MNSED)».

(26) World Bank, *Economic Growth in the Republic of Yemen, Sources, Constraints and Potentials*.

credits and conducting research directed mainly towards the groundwater irrigated areas, banning the import of fruits, vegetables, and qat and encouraging their cultivation through irrigated systems. However, the Yemeni government became aware in the recent years about the threat of the sharp decline in the water table. Accordingly, the National Water Resources Authority (NWRA) has been created in 1996 to develop a framework to regulate and plan the use of water resources efficiently, and adjust the distorted management of those resources(27).

Another cause for the low growth rate of the agriculture sector is the neglect of the government of the rain-fed agricultural land, despite that rain-fed land encompasses 53% of total agricultural land in Yemen. Government of Yemen (GoY) has focused on land and water development in the plains and lower catchments. The poorer rain-fed environments in the upper catchments have been largely overlooked by official development programs. As a result, there is degradation in the age-old systems of terracing and water harvesting which have negative impacts on land cultivation in these areas. In agricultural areas, the most effective method of controlling erosion is well-maintained terracing, which implies that government policies should encourage terrace agriculture in Yemen(28).

The gradually increasing temperature is another factor that aggravates the water problem in Yemen. Consumption of water is expected to increase due to the increased evaporation and, also, the needs for water by human, plant, and livestock are expected to increase because of the rise in temperature. Also, the productivity of current agriculture crops is expected to go down in the hot environment. Besides, the risk of land erosion by water, which Yemen faces now, will increase due to the increased sloping of the surface and the inability of the present irrigation systems to control flooding(29).

Insufficient investment, private and public, present another constraint to agricultural growth. The private sector is the main actor in the agricultural activity. About three quarters of the land holders (73.4%) have land holdings less than one hectare(30), indicating the low-income status of most of the agricultural holders. The private sector focused during the past period on the implementation of infrastructure projects which were financed by the public budget or by foreign assistance(31). Since the Gulf War, there have been fewer donors and fewer pro-

(27) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

(28) Ibid.

(29) «Republic of Yemen: Poverty Reduction Strategy Paper (PRSP) 2003 - 2005».

(30) Central Statistical Organization (CSO), Ministry of Planning (MOP), and Ministry of Agriculture and Irrigation (MOAI), «Agricultural Structural Survey - 2003 (ASS - 2003)».

(31) «Republic of Yemen: Poverty Reduction Strategy Paper (PRSP) 2003 - 2005».

jects in the sector[32]. Private investment in agriculture has been reduced with the return of about 800 thousand workers from the Gulf to their home country, Yemen. Many of the returnees have worked in non-agricultural activities and for those who continued working in agriculture, their main source of investment has dried out after their return. Before the 1990 Gulf War, remittances, which amount to about US $ 1.5 billion a year represented a major source of income for rural area; they have contributed to the modernization of agriculture and expansion of livestock[33]. One of the important results of the fall in private investment in agriculture is the deterioration of the terraces land. A good indicator of the small private investment in agriculture is the small percentage of holders who have invested in upgrading the irrigation system by applying modern irrigation techniques. According to the latest Agriculture Survey, there have been 7118 holders, out of a total number of 1149215 holders, who were using the modern irrigation technique in 2002; those represent 0.6% only of the total number of agriculture holders[34].

Public investment in agriculture is also insufficient. Few indicators can be used in this respect. **First**, public spending on agriculture represent 2% only of government spending, and investment in agriculture forms 7% of public investment. During 1972 - 1997, all what has been spent by the government for the development of the physical and social infrastructure in the rural areas is about US $ 600 million (including loans and assistance), which amounts to US $ 20 per hectare annually. Moreover, the average credit provided to the farmers has not exceeded US $ 5 per hectare, which is very low[35] **Second**, public spending on research and encouraging credit was directed towards the irrigated land, neglecting the rain-fed agricultural land which has low production as compared to the groundwater irrigated lands and, hence, low income generation capability; also, it is owned mainly by the poor and the low-income holders. **Third**, government support to agriculture has deteriorated. The Cooperative and Agricultural Credit Bank (CACB), which is a government bank, have a poor record; few farmers have access to credit facilities[36] **Fourth**, the farmers do not receive good quality services, like government-financed research to overcome problems and raise production, nor are they provided with

(32) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

(33) World Bank, Republic of Yemen, «Rural Development Strategy: Implementing the Poverty Reduction Strategy in Rural Areas».

(34) Central Statistical Organization (CSO), Ministry of Planning (MOP), and Ministry of Agriculture and Irrigation (MOAI), «Agricultural Structural Survey - 2003 (ASS - 2003),» table 32.

(35) Ministry of Agriculture and Irrigation (MOAI), *Aden Agenda* (Sanaa, Yemen: MOAI, 2000) (in Arabic).

(36) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

extension services to improve agriculture production or needed infrastructure (physical and social) to rural areas. According to the 1998 Households Budget Survey (HBS 98), the percentage of the rural population connected to the public nets of drinking water, sanitary sewerage, and electricity are 11.2%, 0.0%, and 15.2% respectively, as compared to 80%, 52.7%, and 88.7% of the urban population[37]. However, the government became recently aware of the necessity of improving the services provided to the farmers. More attention will be given to the research in the rain-fed agricultural land to improve its productivity, and more attention will be given, also, to improve the management and control of groundwater. Also, the government passed a new law on farmer association which, accordingly, one farmer in ten belongs now to the association. In support of this movement, the government has set up special institutions, like the Agricultural and Fisheries Production Promotion Fund (AFPRF) and the Social Fund for Development to finance local development initiatives[38].

4. Agriculture and Poverty:

There is a strong correlation between agriculture and poverty in Yemen. According to the HBS, 98, 83% of the poor live in the rural areas, and they make 45% of the rural population. Rural population represent 3/4 of the total population in Yemen. They are scattered among 41800 villages, with 74% of the population living in settlements of less than 5000 people[39]. The scattering of the population in wide areas makes extending sufficient physical and social infrastructure in the rural areas, which is needed to upgrade the quality of life of the rural population and combat poverty, quite costly especially with the meager resources of Yemen. Poverty exists also in the urban areas, but at a considerably lower level as compared to the rural areas; 30% of the urban population are classified as poor according to the HBS 98.

Agriculture (crop cultivation and livestock raising) is the main economic activity and, hence, the main source of income in the rural areas. More than 93% of agriculture output is derived from the farming, forestry, and livestock sub-sectors, and the remaining from fisheries[40]. Non-farm activities are considerably limited in

(37) Republic of Yemen, Ministry of Planning, Central Statistical Organization, *Statistical Yearbook 2003*, chap. 8, tables (1), (2) and (3).

(38) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

(39) The situation in the urban areas is not much better, as only 9% of the population lives in eight settlements of more than 100,000 inhabitants, and 16% of the population live in cities of more than 10,000 inhabitants. See: World Bank, Republic of Yemen, «Rural Development Strategy: Implementing the Poverty Reduction Strategy in Rural Areas».

(40) «Republic of Yemen: Poverty Update: Middle East and North Africa Social and Economic Development Group (MNSED)».

Yemen and, hence, it is a marginal source of income for the rural population(41). Thus, one may say that the low average income generated in the agricultural activity is the main cause of poverty in Yemen. Low average agriculture income implies low investment in the agricultural activity and, hence, low factor productivity including low labour productivity which results in low wages and low income. Thus, there is a vicious circle between agricultural activity and poverty in Yemen; low agriculture productivity is at the same time a cause and consequence of low rural income and, hence, of poverty. To break this vicious circle, land and labour productivity has to be increased to raise agriculture production and generate higher income.

Thus, raising agriculture production is the key to reduce rural poverty. However, the reduction of poverty could be also enhanced by applying different policy measures (fiscal, monetary, price adjustments, etc.) which target this objective. To assess the means for combating poverty in the rural sector, two types of policy will be discussed: **First**, addressing the factors responsible for the low average income generated in the agriculture sector; and, **second**, reviewing and assessing the policy measures that are responsible for aggravating, or reducing, rural poverty as included in the structural adjustment package -the Economic, Financial, and Administrative Reform Program (EFARP)- adopted in Yemen since 1995.

First, factors responsible for the low income generated in the agriculture sector. Low factor productivity is mainly the cause responsible for the average low income generated in the agriculture sector. Agricultural land productivity is low in Yemen as compared to other countries comparable in their environments. By comparing the average yields of major crops -potato, tomato, banana, orange- in Yemen, Lebanon and typical areas, one finds that the average agriculture land yield in Yemen is 13 tons per ha, as compared to 25.5 tons per ha in Lebanon and 20-25 tons per ha in typical areas. For tomato, the average yield is 16 tons per ha in Yemen, 33.5 tons/ha in Lebanon and 25-50 tons per ha in typical areas; average yields of banana is 7.4 tons per ha in Yemen, 18.9 tons per ha in Lebanon and 15-25 tons per ha in typical areas; and the average yield of oranges is 1.8 tons per ha in Yemen as compared to 13.5 tons per ha in Lebanon and 10-25 tons per ha in typical areas(42).

Important factors responsible for the low agriculture yield per ha in Yemen are: the topography of the agricultural land, irrigation sources, insufficient invest-

(41) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

(42) Ibid., table (4).

ment, and labour productivity. The rough topography of the land requires considerable amounts of investment and significant human effort to cultivate it efficiently to bring high yields. With the topography of Yemen having rugged features, this leads to difficulties for engaging in agricultural activities in many parts of the country, and to a higher costs of agricultural production and marketing in the other parts. The area of rocky terrain and deserts amounts to about 30 million hectares(43).

More than half of the agricultural land (53%) are rain-fed, with large variation in the amount of rainfall according to the weather conditions. There are also expectations that Yemen temperature is rising with time and it will become more exposed to dry environment in the future which will have negative impact on agricultural production(44). It is the traditional rain-fed and livestock systems that support the poorest rural people and they are also in the long run, the most sustainable production systems. Livestock raising is the predominant economic activity of rural women who account for 80% of livestock production(45). The groundwater irrigated land gives higher productivity than the rain-fed land, but its water supply is not free from problems. The water acquifires are falling at a wider pace since the rate of water usage is higher than the renewable rate of water, and this high pumping rate makes the underground water exposed to salination, a problem which has already been felt in some areas.

Investment allocated to agriculture is mainly from the private sector. As mentioned above, the returnees of labour after the Gulf War in 1990/91 have led to a fall in the investment allocated to agriculture as most of them used their money in investing in non-agricultural activities. The government did not step in to fill this gap. Government allocation of investment has been always modest; so is also its support to the credit directed to this sector. As mentioned above, during 1972-1997, the average investment allocated to the development of the rural sector was US $ 20 annually, and average credit was US $ 5 per hectare. Moreover, the government was focusing in investment, credit, and research on the irrigated agricultural land, despite that the largest part of the agricultural land in Yemen is rain-fed, and it is the one with the lowest productivity, and it is also largely owned by the poor and the low-income rural population. Those groups are the ones who are short of income and, hence, in bad need of any financial support from the government to enhance the land production and raise their income (through investment, credit, services).

(43) «Republic of Yemen: Poverty Update: Middle East and North Africa Social and Economic Development, Group (MNSED),» Box 4.4.

(44) Ibid.

(45) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

As shown above, average labour productivity and average wage are lower in agriculture as compared to other sectors in Yemen. In addition to low investment, which is responsible for low labour productivity and hence low wages, the low education level of the agricultural workers is another cause for the low average wage in agriculture. According to the Agricultural Survey, 80.6% of the agricultural land holders were illiterates or can just read and write in 2002[46]. Generally speaking, there is a direct relation between the level of education and poverty. As revealed from the HBS 98, about 87% of the poor are illiterates or have not completed primary education[47]. Also, according to the Food Insecurity and Vulnerability Information and Mapping System (FIVIMS) Survey carried out by the Food and Agricultural Organization (FAO) in Yemen in 2003[48], it has been found that there is indirect relation between education and food insecurity. The FIVIMS Survey has proved the hypothesis that the more educated are less likely to be food insecure. The Survey found that the prevalence of food insecurity declines sharply, the higher is the education level of the agricultural households[49].

Second, poverty related policies in the EFARP[50] In 1995, the GoY started the implementation of EFARP which has been set with the cooperation of the International Monetary Fund, the World Bank, and a number of donors. The focus of this program was to restore the overall economic balance to control inflation, and to set the economy on a course that will achieve medium-term and long-term growth.

To assess the impact of EFARP on poverty in general, and rural poverty in particular, the policies of this program that have direct impact on the poor will be identified, first, then their likely impact on the poor will be assessed next. One may identify two types of policies in this respect. **First**, macro-economic policies that affect the poor and the population in general through their impact on prices, employment creation, and income distribution. **Second**, policies designed specifically to support the poor.

A. Macro-economic policies affecting the poor. Those policies affect the population in general, and the poor in particular, through three channels: changes in the

(46) Central Statistical Organization (CSO), Ministry of Planning (MOP), and Ministry of Agriculture and Irrigation (MOAI), «Agricultural Structural Survey - 2003 (ASS - 2003),» table (29B).

(47) «Republic of Yemen: Poverty Update: Middle East and North Africa Social and Economic Development, Group (MNSED)».

(48) The Survey was conducted to nationally representative sample of 112,413 households during June 2003, of which 84,944 households were agriculture households and 27,469 are non-agriculture households. It is the largest sample survey carried out in Yemen so far. See: Food and Agriculture Organization (FAO), Central Statistical Organization (CSO) and Ministry of Agriculture and Irrigation (MOAI), «Support for the Establishment of a National Food Insecurity and Vulnerability Information & Mapping Systems (FIVIMS) in Yemen Project,» (Preliminary Summary of Findings, ICP/YEM0168 & TCP/ Yem/3001, [n. d.]).

(49) Ibid.

(50) Unless otherwise stated, this part depends on the source: «Republic of Yemen: Poverty Update: Middle East and North Africa Social and Economic Development Group (MNSED)».

price of goods and services consumed by the households, which cause change in their cost of living; changes in the employment status in the economy which affect income earned by the household members; and changes in income distribution.

One of those macro-economic policies that affect the poor is the reduction of subsidies on basic commodities and services, which has led to an increase in their prices. The subsidy bill declined from 10.2% of GDP in 1995 to 5.8% in 1997 and then to 0.6% in 2000. The gradual reduction of government subsidies for basic commodities and services has impacts on aggravating the inequitable distribution of income and the deterioration in the standard of living of the poor. The subsidies have served for more than a decade, as a form of safeguard for maintaining real standards of living of these groups. What makes matters worse is that the withdrawal of the government from undertaking this role comes in light of the retraction of real wages and consumption, the rise in unemployment, and the deterioration of the quality of public services, all of which have led to the increase of the severity of the effects of the EFARP on the poor.

One of the important subsidies that has been applied by the GoY and has been removed gradually, is the subsidy to imports of wheat and wheat flour. This subsidy peaked in 1995 when the official wholesale price was only 19% of the import parity price. The government is gradually reducing the subsidy and this, combined with the fall in the world prices of wheat, brought the official price to 58% of import parity in July 1997. It is planned to reduce the subsidy further to bring wheat prices sold at local market to import parity. Locally grown cereals are traded at a large premium. In 1997, locally produced wheat was selling at 50 Y.R. per kg against 15 Y.R. per kg official price for imported wheat(51). The elimination of this subsidy will have two opposite effects on rural poverty. On one hand, it will increase the cost of food in rural areas(52), most of which are cereal-deficit areas, thus aggravating rural poverty; but on the other hand, it will shift the terms of trade towards the locally produced wheat by narrowing, or closing, the price gap between the imported and local cereals. This is expected to encourage the production of the locally produced wheat raising, hence, the income of the Yemeni producers, which will have favorable impact on reducing rural poverty. It may be argued, though, that the number of consumers, rural and urban, who will be hurt by the rise in the price of imported wheat will be much greater than the few farmers who will be benefiting from lowering -or maybe eliminating- the price differential between the local and imported wheat. According to this argument, the net impact of the removal of subsidy on imported cereals on the rural, and also on the urban, poor will be negative.

Another argument is that the increase in the demand for local cereals can be

(51) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region,» annex 2.

(52) The price of cereals and, hence, the cost of food will be increased in urban areas as well.

expected after the removal of the import subsidy on cereals and the consequent rise in its prices, but this is unlikely to stimulate large increase in cereal production for market as 90% of local grain production is consumed on farm, and the profitability of market oriented production lies as much in the straw for fodder as it does in grain. The higher consumer prices for imported cereals are likely to lead to an increase in local production for subsistence and this could provide incentive to terrace maintenance which is needed(53). A counter argument that can be raised in this respect is that the current situation of the on-farm consumption of the 90% of the locally-produced wheat will not necessary continue in the future when the price differentiation between the two types of cereals narrows, or may be eliminated. It is more plausible that the demand for local wheat will increase, since it is more preferred taste wise(54), which will make cereal production more market oriented as compared to the current situation and, hence, income of the local wheat producers will be raised.

An additional favorable impact of eliminating the subsidy on imported cereals on the local producers' income is adjusting the deteriorating relative prices of local cereals with respect to the general price level. The price of the local cereal lags behind the increase in the consumer price index; the market price of local cereals increased only by 30% over a seven-year period (from 1975 to 1982), while the consumer price index rose 40% a year(55). This implies a reduction in the real income of the cereals producers in Yemen. This factor is likely to be removed after narrowing, or removing, the price differential between imported and local wheat, since adjusting the relative prices between the imported and the locally- produced wheat is expected to raise the demand for local wheat, which may make it feasible for the wheat producers to raise the local wheat price at a pace consistent with the consumer price index without running the risk of loosing their narrow market.

Another important cost of living subsidy that has been adopted in Yemen, and now is gradually reduced, is the subsidy on the petroleum derivatives, especially diesel. The gradual removal of the subsidy on diesel increased the cost of water pumping and, hence, the cost of production of the agricultural crops which depend on irrigation; those crops include cereals, fruits and vegetables, and the less important commodity, qat. Since 1995, GoY has gradually raised the price of diesel from 3 Y.R per liter to 10 Y.R. per lit and was about 18 Y.R. per lit in 1999; it is presently about 65% of export parity. The price was expected to be raised further to border parity level by the year 2000(56), but this was not implemented as of July

(53) Ibid, annex 2.

(54) Despite the large price differential between the imported and local cereals, there was still a market demand for local cereals. The strong preference for local (balady) cereals substantially insulates local prices from international prices. See: Ibid., annex 2.

(55) Ibid., annex 1.

(56) Ibid.

30th, 2004[57]. Using a static model, it was estimated that the total removal of the subsidy on diesel will reduce farmers' income by 13%. This is equivalent to a drop in agriculture GDP by 3%[58].

As part of the EFARP, the Yemeni Rial has been devalued. Devaluation of the Yemeni Rial in 1995 was another factor for raising prices. However, the Rial has been devalued also before 1995. The price of agricultural product has been declining in real terms for at least a decade due largely to the successive currency devaluation, which has increased the price of tradables vis-a-vis non-tradables. Only meat and fish prices have kept pace with inflation as these are tradable items[59]. Prices of imported goods increased, which entail increase in prices of basic consumer goods, intermediate and capital goods. Since Yemen depends heavily on imported agricultural goods as shown above by the low food self-sufficiency level, prices of food have increased, raising the cost of living of the population in general and the poor in particular, since the poor spend a larger portion of their income on food; 54% of the income of the urban poor and 67% of the income of the rural poor are spent on food as revealed from the HBS 98[60]. Also, the increase in the imported prices of intermediate and capital goods entails an increase in the locally produced non-food items, which raises also the cost of living of the population, poor and non-poor, with the pinch to be felt most by the poor because of their limited financial means.

One of the positive impacts of EFARP is the reduction in the inflation rate due to the contractionary fiscal and monetary policies applied. The rate of change in the consumer price index (CPI) was reduced from 49.2% in 1994 to 30.6% in 1996, to 2.2% in 1997, and then rose to about 4% in 2000. This has its impact on reducing the cost of living of the population, including the poor.

B. EFARP policies designed specifically for the poor. Among those policies are the establishments of a social safety net, covering all the groups that are incapable of acquiring assistance, through the Social Welfare Fund that provides cash assistance to the poor. EFARP created also the Social Fund for Development which is involved in financing primary services projects, and the Public Works Project which is concerned with small projects that are labour intensive, with a view towards providing temporary job opportunities as well as setting up other funds and projects. However, those institutes established under the social safety net, provide their services mainly in the urban areas, serving the low-income people and the poor in those areas more than in the rural areas.

(57) A-Shami, *The Poverty Reduction Strategy and Food Security in Yemen (Current and Perspectives): As the Key Components of the Socio-economic Development Plans*.

(58) «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region».

(59) Ibid., annex 2.

(60) «Republic of Yemen: Poverty Reduction Strategy Paper (PRSP) 2003 - 2005».

5. Potential of Agricultural Activity in Yemen[61]:

The natural resources that can be used in agriculture are already fully utilized. However, there are still considerable potential in increasing agricultural production in Yemen, despite the difficulties that confront the sector, such as scarcity of water resources, yearly fluctuations of rain-fed irrigation on which a large segment of agricultural land depends, the exposure of the country to drought and flood periods, desertification, the low factor productivity of agriculture, post-harvest losses, the spread of qat cultivation with its negative consequences on competing crops and on population health. The potential of increasing agricultural production lies in the possibilities of combating those difficulties if appropriate policies are adopted and more resources are channeled in the right direction.

Realizing those potential entails the adoption of policies that target the improvements in the management of water resources (rainfall and groundwater), increasing irrigation efficiency, raising factor productivity in agriculture through research and agriculture extension services, and choosing rewarding crop alternatives to maximize income generation. Among those important policies, one may point out the followings:

1. Spreading modern irrigation methods, which have been so far extremely limited in use[62], to improve the irrigation efficiency of groundwater by reducing the in-field losses that are quite high. The high in-field losses are attributed to the irrigation habits of the farmers who may simply flood the field and the water infiltrates. Only some of the water reaches the roots, much evaporates or percolates back to the water table.

2. Reducing conveyance losses which are quite high, since farmers send water to their fields by rough earthern canals. It has been found that in some areas up to three quarters of water were lost before it reached the field, and in more than two thirds of the cases losses exceeded 30%. These losses could be largely reduced by conveying water from the well to the fields in pipes or in lined canals.

3. Improving the efficiency of rainwater harvesting by expanding the construction of small and diversionary dams, water dikes, and distribution canals.

4. Applying appropriate irrigation scheduling, depending on the cultivated

(61) This part of the study depends on the following sources: Ibid.; «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region», and World Bank, *Economic Growth in the Republic of Yemen, Sources, Constraints and Potentials*.

(62) According to the Agriculture Survey, only 0.6% of the landholders are using modern irrigation techniques in 2002. See: Central Statistical Organization (CSO), Ministry of Planning (MOP), and Ministry of Agriculture and Irrigation (MOAI), «Agricultural Structural Survey - 2003 (ASS - 2003),» table (32).

crops. Farmers used to rainfall irrigation may over-irrigate their crops when they shift to pumped groundwater irrigation system. Over-irrigation wastes water and reduces yields. The solution is for farmers to know and apply the optimum amount of water for crop requirements, which can be achieved through appropriate farmers education and extension services.

5. Supporting less water-intensive crops and improving rain-fed sustainable crops, such as date palms, cotton and cereals. Rain-fed cereals have the potential to grow by up to 12% per annum with improved quality of indigenous seeds and better crop husbandry. Irrigated crops (vegetables and fruits) have the potential to grow by up to 16% annually with improved extension services and better management of irrigation. Fruits and vegetables are among the fastest growing export items in Yemen.

6. Natural resources are already fully utilized. Therefore, the key to production growth in agriculture is productivity improvements using technology, capital, and Yemen's relatively low-cost labour to produce more value added from the existing resource base. Agriculture productivity of several crops is considerably lower than in comparable countries. Some crops are capable of much higher yields and returns to factors, especially water, under improved husbandry systems. For example, vegetable yields under open field systems may be multiplied by several times as has been shown by ordinary farmers in Jordan and Syria, where innovations like plastic houses, drip irrigation and integrated pest management have been widely adopted.

7. Post-harvest losses are estimated to be quite high: 15% - 30% for cereals, 10% - 40% for potatoes, 45% for tomatoes, 15% for grapes, 38% for bananas, 56% for papaya. The causes are in harvesting techniques, rough handling and transportation and poor packing. There is scope for improvement of handling and conservation of the raw materials.

8. There is a potential for increasing agriculture value added by more on-farm processing, as with improved wool and rug making, where local product is absent. Fruits and vegetables which have grown strongly in production in recent years have never become industrial inputs. Potential is there for using them as industrial inputs and increase their value added by on-farm processing.

9. Supporting agriculture research is essential to realize potentials in several areas. One of those areas is the challenge of research to come with a low risk but higher yielding variety of the local «land races» of Yemen's crop varieties. Those local varieties are adapted to local climates, soil, etc. and able to produce under unpredictable and low water availability, but have low yields. Research should also be directed towards those crops which are «performing below potential» for

reasons that are not obviously to do with production constraints. Examples are: cottons, coffees, sesames, saffrons, dyes, groundnuts and medicinal plants. The reasons for this low performance are not always clear; it may be marketing and processing outlets in the case of cotton, it may be the world market and lack of sufficient profitability to induce investment in the case of coffee, it may be simply lack of entrepreneurship in the case of medicinal plants. Research is needed to examine the chain from first input to final consumer to understand why these crops are failing and what might be done about it. A third important area for agriculture research is promoting bio-protection and resistance to plant diseases and aphids and have them linked with extension programs that are practicable to the farmers.

10. Improving livestock grazing to meet the needs of domestic consumption and direct attention to higher milk yield, and faster growing livestock to increase subsidiary products, such as wool and dairy products(63). Livestock has good potentials for growth with improved husbandry practices, cross breeding, and improved management of rangelands. The efficiency of small holder livestock production can considerably increase through adoption of some known technologies such as mineral supplements (especially of phosphorus), control of production disease, improved animal housing, and introduction of better fodder plants.

11. Giving incentives to the private sector to invest in agriculture production and marketing, and to adopt projects that promote integration between agriculture and industry.

(63) Because of the high cost of production, farmgate price of milk in Yemen is double the farmgate price in the US. See: «Republic of Yemen: Agricultural Strategy Note: Rural Development, Water and Environment Department, Middle East and North Africa Region,» annexes 1 and 11.