

## **Recent Developments in the Rwandan Agriculture: The Challenges of Attaining Food Security and Abolishing Absolute Poverty**

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### **Abstract:**

The paper intends to take stock of the situation in the agricultural sector of Rwanda. The main purpose is to identify the gaps in the efforts so far; and subsequently to consider new policy interventions that are needed to achieve the goal of eliminating the 'Fear of Want'. The sector's performance is crucial in achieving the MDGs in the country. Noteworthy is that the largest part of Rwandan population agriculture is a livelihood and for the policy makers the sector is continuing to be a development problem. This paper analyzes the links between agriculture, food security and poverty reduction in Rwanda based on available secondary data. It is done in light of two important happenings in the country development scenario after the completion of the reconstruction phase (after war and genocide) of 1994-98. The first is related to the overall development strategy that is followed by the country. Rwanda has set a clear strategy of development in the form of VISION 2020 and also a programme for poverty reduction in the form of PRSP. The second important development was with respect to sector specific initiatives. Four important initiatives merit mentioning- 'The Strategy and Action Plan for Food security', 'The National Agricultural Policy', the 'Strategic Plan for Agricultural Transformation' and the 'Long-Term Framework for The Implementation of The Comprehensive Africa Agriculture Development Programme (CAADP) in Rwanda'. All these plans were framed for an exhaustive transformation of the agriculture sector so as to bring about the necessary change that is needed to face the challenges of abolishing absolute poverty and hunger. The following hypothesis was framed to guide the analysis: a more productive and profitable agricultural sector is the necessary component in meeting the challenges of attaining food security and abolishing absolute poverty in Rwanda. This hypothesis reflects Rwanda's national perspective and linked to the country's development plans (PRSP and VISION 2020) and policies. Analysis enabled to oversee the hypothesis in order to arrive at plausible conclusions related to Rwanda's agricultural sector performance during last six years (1999-2005). Some crucial areas like cropping pattern, incentives, agricultural prices, public distribution system, implementation of land reform measures etc needs the right attention. If the agricultural sceptics have their way, most Rwandans will face a bleak future of worsening poverty and hunger.

### **Introduction**

Rwanda is a land locked country, with land area of 26338 sq. km and a population of about 8.9 million. It is categorised under the Least Developed Countries of the world. The country is emerging out of a period of war and genocide (1990-94), and none of the basic indicators on Rwandan economy give a brilliant / picture. Per capita income in Rwanda is currently US\$250, equivalent to only 25 percent of the per capita income targeted for 2020; about 60 percent of the population still earns less than US\$1/day. About 90 % of the people live in rural areas and 79.6 % depend on agriculture as their livelihood (EICV2 See Table 7 below). The issue of tackling absolute poverty and hunger, therefore, boils down to around 1.5 million rural households in the country. Studies have shown that more immediate gains in poor households'

welfare can be achieved through agriculture, which can help the poor to overcome some of the critical constraints that they now face in meeting their basic needs (The World Bank, IFPRI undated, p-ix). In the case of Rwanda, in addition of the "poverty-conflict trap" (Musahara, 2005), it is also experiencing "poverty-hunger-malnutrition trap" where the health of women and children are of immediate concern. Rwanda has set a clear strategy of development in the form of VISION 2020 and also a programme for poverty reduction in the form of PRSP (currently EDPRS). Also, Rwanda has designed sector specific development initiatives. Four important initiatives merit mentioning- 'The Strategy and Action Plan for Food security', 'The National Agricultural Policy', 'The Strategic Plan for Agricultural Transformation and the 'Long-Term Framework for The

Implementation of The Comprehensive Africa Agriculture Development Programme (CAADP) in Rwanda'. All these strategic plans were framed for an exhaustive transformation of the agriculture sector so as to bring about the necessary change that is needed in Rwandan agriculture to face the challenges of abolishing absolute poverty and hunger. Studies elsewhere confirmed that productivity growth had an enormous impact on food supplies and food prices, and consequent beneficial impacts on food security and poverty reduction (Pingali 2006). The present study, therefore, is intended to examine the situation of agriculture in Rwanda so as to address the issues pertaining to food security and abolishing absolute poverty.

### **Materials and Methods**

The following working hypothesis was framed to guide the analysis: a more productive and profitable agricultural sector is the necessary component in meeting the challenges of attaining food security and abolishing absolute poverty in Rwanda. This hypothesis reflects Rwanda's national perspective and linked to the country's development plans (PRSP and VISION 2020) and policies. The study mainly relied on the available secondary data and the analysis concentrated the period between 2000 and 2006, although not less frequently there is reference to the period before. One of the important sources of data was the household surveys known as *Enquête Intégrale sur les Conditions de Vie des ménages de Rwanda* (EICV) of 2000-1 and 2005-06. Another important source is the surveys of Ministry of Agriculture (MINAGRI) on various aspects of the Rwandan agriculture. The 'Rwanda Development Indicators' published by Ministry of Finance and Economic Planning (MINECOFIN), the Rwanda National Statistical Institute publication on 'Rwanda Comprehensive Food Security and Vulnerability Analysis' were also consulted. The author has been actively involved in the preparation of "Rwanda National Human Development Report 2006" and as part of that, a survey of 347 households, chosen from 10 erstwhile districts of the country, was undertaken in September 2006. The results from that survey and the author's field observations were an important input in the preparation of this paper. Simple statistical techniques like percentages, indexes and growth rates were used in the analysis of the data. However, it is to be noted that due to the poor statistical base of the

Rwandan agriculture our analysis is limited to some of the dimensions of the issue under study.

### **Results and Discussions**

The following four sections try to get answers to the issues of Rwandan agriculture that are related poverty reduction and food security. In the beginning a brief description, using some widely accepted indicators, of the performance of Rwandan agriculture is presented. Following that, a display of the latest trend in poverty and inequality in Rwanda was done. The section that followed highlighted Rwanda's current scenario of food security and vulnerability. In the last part, as conclusion, we attempt some policy implications that emerge from the study.

#### ***Nature of Agricultural Production in Rwanda***

*Structure and growth of production:* The agricultural sector employs 87.3 % of active population (Census 2002); it contributes 43% of GDP (see Table1) and 55.04 % of exports (in 2005, see Table 3). Agricultural production in Rwanda was in doldrums even before 1994 as shown in Table 1. Between 1980 and 1989 agricultural sector growth rate was negative: -1.4, and between 1990 and 1999 it was -0.01 percent per annum. Therefore, the present state of affairs in Rwandan agricultural sector cannot be attributed solely to war and destruction; even prior to war the sector had shown signs of stagnation. In Rwanda, the economic situation began to deteriorate at the beginning of the 1980's when the coffee (export earner) price fell and arable land became scarce as a result of demographic pressure. The economy continued to decline during the conflict in 1990-93 and collapsed in 1994. The traditional agricultural base of the economy is not under transition as seen from the sector's contribution to GDP between 1968 and 2005. During the three decades there is an increase in the sector's contribution to GDP, from 38 % to 45% in 2003 and 43 % in 2005, which is not in tune with the general nature of agriculture's contribution to GDP which declines when countries develop. However, the promising point about Rwanda's agriculture currently is that it could halt that declining trend experience over the years and could show a growth rate of 5.55 per cent growth rate between 1999 and 2005.

*Cropping pattern:* Food crops occupy 92 % of the total cultivated land; while coffee and tea occupy respectively 6.3 and 1.6 % of the total cultivated land (Republic of Rwanda 2004b). There is 1.39 % per

annum increase in the area under food crops between 2000 and 2006. While production and productivity increase was 3.5 and 2.1 % respectively (see table 2). About 75.22 % of the cultivated area is under following three crops - banana (22.31%), Roots and tubers (25.74%), and pulses (27.17%) in the year 2006. A notable feature of the area under food crop production is that the proportion of the area under bananas came down significantly over the years: From 28.56 % in 1990, and 34.68% in 1998, it came down to 22.31 % in 2006. Alternatively, there is an increase in the proportion of area under vegetables and cereals. From Table 2, it can also be seen that Roots and Tubers (41.04 %), and banana (37.16%) together constitute 78.2 % of the gross output in 2006. This shows that slowly other crops enter the scene as same two crops output in 2000 was 88.06 %. An important notable feature in crop output of Rwandan Agriculture, by looking into combination of Food Crops and Export Crop to GDP, is that the contribution of food crops has been increasing during 1999-2005 at the rate of 5.77% per annum while the share of export crop declined by - 1.54 % (see Table 3). The index of export crops during 1990 – 2005 declined from 100 to 82.47, while that of food crops increased to 138.92. This may be, from the food security point of view, a welcome development. As noted by McKay and Loveridge (2005) “the poorest households also shifted their agricultural production out of cash crops and dedicated more land to cropping food staples. More of those staples were then consumed at home, rather than marketed, leading to nutritional improvements”. Further, it can be seen from Table 2 that the productivity levels of all crops grown are far below to any international standards. However, it can be noticed that there is an increase in the overall productivity of food crops by 2.1% per annum during 2000-2006. This finding may be of importance to Rwanda as a recent cross-country analysis by Thirtle and others (2002) found that, at the national level, a one percent increase in agricultural yields decreases the percentage of population living on less than \$1 per day by 0.64 to 0.91 percent, with a slightly higher reduction for the countries in Africa. The productivity increase was mainly accounted in Vegetable & Fruits (12.72 %) and cereals (4.7 %). While in the case of Roots & Tubers the trend is stagnating as it showed only 0.27 % per annum increases in productivity during the same period. It is observed that there has been considerable progress in terms of increasing productivity of key food crops, while in relation to the productivity of

food security crops there is some concern. (Republic of Rwanda 2006b) This increase in the productivity levels is reflected in the overall indexes of food crop production and per-capita food production (see Table 3) which reached 138.92 and 108.37 respectively in 2005 over 1990. However, the index of population growth during the same period was 128.19; truly this is an area of concern from the point of view of food security.

*Use of inputs – land:* The pressure on land in Rwanda led to low per capita availability of land. In 2006 nearly 71.1 percent of all farm families live on less than one hectare of land (See Table 4) and their number increased over by 20 percentage point between 1991 and 2006. There seems to be a link between size of family holding and intensity of poverty as all those provinces where the intensity of poverty is high the size of land holding is smaller than the national average (Republic of Rwanda, 2002a). However, the issue is about the distribution of land as it improves the asset base of the land less which leads to fairer rural livelihood to the poor. Studies conducted on Rwandan land issues already noted that land and environmental scarcity coupled with severe demographic pressure are associated with conflict and poverty in Rwanda (Musahara, Huggins 2004). It is estimated that soil erosion affects the ability to feed 40000 persons per year. In view of the fact that poverty in Rwanda is more rampant in rural populations that depend on land, it is logical that land reform is a prerequisite in reducing poverty and hunger and ensuring better livelihoods for the majority of Rwandans (ICARRD 2006). Production systems in Rwanda are characterised by small family farms with an average of less than one hectare in size.

About 11.5 % of the households have no land to cultivate. Table 4 shows that:

- 39.4% of all national households had plots of less than 0.3ha: this constituted a total of 63,921ha or 5.9% of all rural land holdings. Hence, the average per household land holding was 0.11ha or 0.02ha per capita.
- 31.7% of all national households had plots of more than 0.3ha but less than 1.0ha: this constituted 273,724ha in total or 25.2% of all rural land holdings. In this category, the average per household land holding was 0.58ha or 0.12ha per capita.
- 25.8% of all national households had plots equal to or greater than 1.0Ha: this constituted 749,643ha of all rural land holdings. Hence the average

Table 1: Structure and Growth of Production in RWANDA-Selected years.

Sector	Share of GDP (in percentage)							Annual growth (in percentage)			
	2	3	4	5	6	7	8	9	10	11	12
	1968	1989	1990	1995	1999	2003	2005	1965-80	1980-89	1990-99	1999-05
GDP	100	100	100	100	100	100	100	4.9	1.5	0.16	5.55
Agriculture	38	37	45	44	43	45	43	-	-1.4	-0.01	5.18
Industry	22	23	20	16	18	19	20	-	1.6	-1.17	7.5
Services	40	41	35	40	39	37	38	-	4.1	1.05	4.9

Source : (i) Figures in columns 2, 3, 9 and 10 are from USAID.1992. *Country Programme Strategic Plan for Rwanda, Table 2, page 10.*

(ii) Figures in column 4, 5, 6, 7 and 11 are worked out from Table 2.2 of Republic of Rwanda.2004. *Rwanda Development Indicators, MINECOFIN, Kigali.[GDP at 1995 Constant Rwf]*

(iii) Figures in column 8 and 12 are calculated from Republic of Rwanda.2006. *Annual Economic report 2005, (Draft) MINECOFIN, Kigali.Table-3.2.1*

- household land holding was 1.94ha in this group – or 0.35ha per capita (Republic of Rwanda 2006b, p-18).

The critical challenge to Rwandan agriculture is that of identifying alternative vocations to the surplus labour or to reduce the pressure of population on the available meagre land area for cultivation.

*Use of other inputs –Fertilizer, irrigation credit and new technology:* The resources allocated to the Agricultural sector in the past six years are far lower than those necessary to achieve the PRS objectives and do not meet the Maputo declaration of allocating at least 10% of the total Government budget to the agricultural sector. The percentage of funds allocated to the agricultural sector to the total Government budget fell continuously from 5.8% in 2001 to about 3% in 2004 (Republic of Rwanda 2004a, p. iv). The Rwandan agriculture is caught in the low investment trap and more so when the majority of farmers are having a subsistence existence. The usual problem remains that the agricultural sector continues to indicate the smallest percentage of 5.5 to the share of credit, yet it constitutes a bigger percentage of the economy. As seen from Table 5 that all the other indicators, reflecting the use of modern techniques in Rwandan agriculture, show that the challenges before Rwandan policy makers are enormous.

*Allied Agricultural Activities:* Another notable feature of the agriculture in Rwanda is its lack of diversification into allied agricultural activities like livestock, fisheries, forestry etc. This is obvious if one looks into the contribution of allied agricultural activities to agricultural GDP (See Table 3) as it was only around 12.97% in 2005; and its share to total GDP was 5.59% during the same year and it has not

shown any appreciable increase over 1990. However, there is absolute increase in this sector's contribution to GDP – about 4.53 % per annum, during the period 1999-2005. The percentage share of livestock in total GDP too shows a very low segment in 2005 (4.06 %); which was on the decline between 1999 and 2005 (in 1999 it was 4.18%). However it can be noticed from Table 3 that there is significant improvement in absolute figures during 1999-2005 – about 5.03 % per annum change. The index of allied agricultural activities shows that its performance is catching up with food crops during 1999-2005. However, among all allied agricultural activities the performance of livestock sector still needs improvement as its relative share is rather stagnant. As seen from the figure 1 below, there are big deficits in all livestock products in Rwanda. With respect to consumption of livestock products in Rwanda, it is seen that 12 litres of milk and 4.8 Kg of meat per person per year, while FAO recommends respectively 220 litres and 50 Kg per person per year (Republic of Rwanda 2006c). The distribution livestock shows that there is unequal distribution among provinces. Animal production systems in the country are essentially traditional with little improved husbandry techniques. The composition of different animals shows that the population of the indigenous types is higher than exotic or crosses. Because of that, the production potential is low. It is important that livestock provide, in addition to supplementary income to the households, the necessary fertilisers for crop production. This is very vital as the country has a much deteriorated soil fertility levels. Ownership of livestock, especially cattle, constitutes, just at the same

**Table 3.** Role of allied agricultural activities in Rwanda – Index of GDP by kind of activity (in million 1995 constant Rwf )

	1999	% to Total Agrl GDP	2005	% to Total Agrl GDP	% per annum change 1999-05
Food Crop	185263	82.89	259430	84.71	5.77
Food crop production Index	99.2		138.92		
Population(in millions)	7.49		8.9		2.92
Population growth Index	107.91		128.19		
Per capita Food crop production	24728		29149		2.78
Food crop production per capita Index	91.93		108.37		
Export Crop	7806	3.49	7110	2.32	-1.54
Export Crop Index	43.09		82.47		
of which coffee Index	41.05		218.93		
Livestock	21486	9.61	28850	9.42	5.03
Livestock Index	92.35		124		
Fisheries	1762	0.79	2000	0.65	2.13
Fisheries Index	103.71		117.72		
Forestry	7185	3.21	8860	2.89	3.55
Forestry Index	187.45		231.15		
Total of Allied Agricultural	30433	13.62	39710	12.97	4.53
Total of Allied Agricultural activities Index	105.68		137.89		
Total Agriculture GDP	223502	100	306250	100	5.39
Total Agriculture GDP Index	95.65		131.06		
% of agriculture to total GDP	43.49		43.09		-0.15
% of Livestock in Total GDP	4.18		4.06		-0.48
% of Food crop in total GDP	36.05		36.5		0.21
% of Allied agricultural activities to total GDP	5.92		5.59		-0.95

Note: Index Base 1990=100

Source: (i) The World Bank.2003. *World Development Indicators*, CD-Rom,

(ii) Republic of Rwanda.2004. *Rwanda Development Indicators 2004*, MINECOFIN, Statistics Department, Kigali.

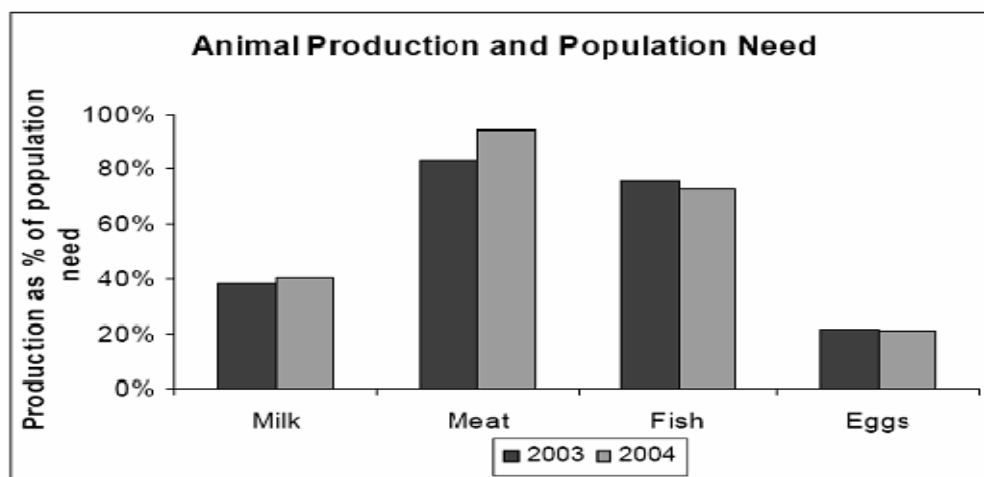
(iii) Republic of Rwanda.2006. *Annual Economic report 2005*, (Draft) MINECOFIN, Kigali.

level as ownership of land, an indicator of the standard of living.

**Table 4:** Analysis of EICV2 (2006) Land Holding Data.

	Per HH land holding <0.3Ha	Per HH land holding >0.3Ha<1.0Ha	Per HH land holding is => 1.0Ha	Rural total
Share of HH numbers in national total (%)	39.4	31.7	25.8	96.9
Average HH size	4.5	4.9	5.6	5.3
Total Land holding (Ha)	63,921	273,724	749,643	1,087,288
Share in rural total land holding (%)	5.9	25.2	68.9	100
Average per HH landholding per HH (Ha)	0.11	0.58	1.94	0.75
Average per capita land holding (ha)	0.02	0.12	0.35	0.15

Source: Republic of Rwanda. 2006. Self evaluation of the PRSP by agriculture SWG of rural cluster, MINAGRI, Kigali. Table 6

**Figure 1. Animal production compared to population need**

Source: 2004 – MINAGRI; 2003 – MINECOFIN estimate

**Figure 1:** Animal Production Compared to Population Need**Table 5.** Indicators reflecting the use of modern techniques in Rwanda Agriculture

Indicators	1996-98	2004-2005
Irrigated land % of crop land	0.4	9.8*
Fertilizer consumption (kg per ha of arable land)	0.4	< 4.0
Tractors used (per 00 ha. Of arable land)	1	NA
Arable land (ha. Per capita)	0.10	0.15**
Bank Credit to Agriculture % to Total	2***	5.46****
Crossbreeds and exotic livestock		13%
% of agriculture of total budget (average of 1999-2004)		4.62
Total priority spending	0	0.4

Note: \* relate to 2002, \*\* EICV2, 2006, \*\*\* relates to 1999, \*\*\*\* data related to 31st May 2005

NA-not available

Source: (i) Column (2) from Republic of Rwanda. 2001. *Rwanda Development Indicators 2001*, MINECOFIN, Kigali

(ii) Column (3) Republic of Rwanda. 2004. *Rwanda Development Indicators 2004*, MINECOFIN, Kigali;

(iii) Republic of Rwanda. 2006. *Annual Economic Report 2005 (Draft)*, MINECOFIN, Kigali; and

(iv) Republic of Rwanda.2004. *Strategic Plan for Agriculture Transformation in Rwanda*, MINAGRI, Kigali.

The recent EICV2 data shows that there is significant increase in the percentage of households reported ownership of livestock- 71.3% in EICV2 compared to 59.9 % in EICV1. However, the percentage of cattle ownership is less than 30 % among the poor households. This may be the reason why still organic fertilizer use is practiced by just 6.8 % of the

households. An earlier estimate by MINAGRI (in 2004) showed that only half of the rural households do not possess animals and a third of farmers do not use

manure (Republic of Rwanda 2004b) implying that it affects agricultural productivity adversely. Having

Table 6. Poverty headcount and inequality: 2000/01 to 2005/06 (%)

	Poverty headcount		Gini coefficient	
	EICV1	EICV2	EICV1	EICV2
City of Kigali	24.4	20.2	0.520	0.499
Rural	66.1	62.5	0.374	0.439
Southern province	65.8	67.3	0.394	0.510
Western province	63.1	62.0	0.418	0.465
Northern province	66.9	62.7	0.417	0.407
Eastern province	61.8	50.4	0.382	0.434
National	60.4	56.9	0.473	0.508

Source: Andy McKay Mary Strode, Clare O'Brien OPM, and Geoffrey Greenwell. 2007. *EICV Poverty Analysis for Rwanda's Economic Development and Poverty Reduction Strategy*, Oxford Policy Management Unit & MINECOFIN, Kigali.

seen the performance of the Rwandan agriculture, the following section presents a brief picture of poverty and inequality in Rwanda.

### Poverty and Inequality in Rwanda

*Level of Poverty and inequality:* It can be seen from the Table 6 below that between 2001 and 2006 there is a reduction in the percentage of people below the poverty line, but the disturbing issue is the increasing inequality in the country during the period under reference as the Gini coefficient has increased from 0.473 to 0.508. As observed from the same Table 6 that the rural inequality has worsened and the Southern province showed a miserable picture in both counts. As seen from Table 7 that the major occupation of the people of Rwanda is Agricultural & Fishery Workers and poverty level is the highest (88.9 %) among these groups. The intensity of poverty in Rwanda may be understood in its entirety if one look into the food security and vulnerability of its people. The section that follows attempted to do this.

### Food Security and Vulnerability

*Food deficit:* Rwanda's latest food security/insecurity scenario can be understood from the latest Annual Economic Report of Rwanda (Republic of Rwanda 2006c, p-10): "The high rate of food insecurity which marked the second half of 2004 persisted until March 2005, with close to 110,000 people affected by season 2005 A crop failure, mostly in Kigali Ngali, Kibungo and Umutara provinces, which needed food assistance". Agricultural production and food import

have together been insufficient to meet national minimum food needs for 1990s (UNICEF, 1998).

As already seen from Table 3, the index of per capita food production during this period was less than the index of population growth. This raises serious concerns about Rwanda's food security situation. During the decade 1987-1997, total food imports have grown at a rate of 17 % per annum; almost 72 percent of the imports in 1997 were food aid (The World Bank 1998, Table 8). The country is depending still on food imports as shown in Table 8. In 2005 Rwanda imported (commercial) around 35 million USD worth of food items – about 79850 tons (Republic of Rwanda 2006c). However, there is a decline in commercial imports as well as Food aid since 1997 as can be seen from the Table 8- the Index is showing a downward movement A notable change that has taken place since 1998 was that the percentage share of food imports (Commercial imports in terms of Value) to total imports declined to 8.79 % in 2005 as against 19.27 % in 1998 (Republic of Rwanda 2002b and 2006c). This implies that the country is trying to cover the food deficit (see Table 9) by concentrating more on local production. The Table 9 shows the food balance sheet in the last 3 years.

*Food Access and Consumption:* Access to food, mostly monitored at household level, is the ability of the household to regularly acquire adequate amounts of food through a combination of their own home production and stocks, purchases, barter, gifts, borrowing or food aid. The Comprehensive Food Security and Vulnerability Analysis (CFSVA) shows that 38% of households has a weak access to food which means that they acquire food in difficult and

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**Table 7.** Rwanda - Occupation by gender, poverty and rural status (%)

	Male		Female		Poor		Non poor		Rural		National	
	EICV1	EICV2	EICV1	EICV2	EICV1	EICV2	EICV1	EICV2	EICV1	EICV2	EICV1	EICV2
Agricultural & Fishery Workers	83.5	71.2	92.4	86.3	96.4	88.9	77.1	68.2	94.8	87.3	88.6	79.6
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: EICV1 & EICV2. All Persons Aged 16 and Over Working in Previous 12 Months

**Table 8:** Food Imports 1997-2005

Type of Imports	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	2	3	4	5	6	7	8	9	10
Commercial imports (in million USD)	53.5	57.4	28	46.6	51.7	46.1	28.3	33.16	35.26
Index	100	107.29	52.34	87.10	96.64	86.17	52.90	61.98	65.91
Food aid (000Tons)	130	101.08	102	41.86	23.12	NA	NA	NA	NA
Index	100	77.75	78.46	32.20	17.78				

Note: NA- data Not Available

Source: (i) Republic of Rwanda.2002. *Rwanda Development Indicators 2002*, Statistics Department, MINECOFIN, Kigali.

(ii) Republic of Rwanda.2004. *Rwanda Development Indicators 2004*, Statistics Department, MINECOFIN, Kigali.

(iii) Republic of Rwanda.2006. *Annual Economic report 2005*, (Draft) MINECOFIN, Kigali.

population in Rwanda is in the category of food insecure and vulnerable. The recent MNAGRI evaluation, however, points out that while there has been considerable progress in terms of increasing

**Table 9.** Food Balance (in 1000 MT Cer-Eq)

Quantities	2004A	2004B	2005A	2005B	2006A	2006B	2007A
Consumption	1016	1021	1031	1045	1058	1092	1090
Production	910	901	914	1044	920	1061	938
Net Imports	141	150	141	141	141	141	141
Food Deficit	-35	-30	-24	-140	-3	-111	10

Note: (\*) Calculated consumption on the basis of 2100 Kcal/personne/jours with 1 equivalent-cereal kg = 3225.32 Kcal; A= Season A, B= Season B

Source: Republic of Rwanda. 2007. *Agricultural Sector Performance in 2006: Report of the Joint Budget Sector Review V*, MINAGRI, Kigali, Table Annex .4

**Table 10.** Food access and consumption profiles cross classification

		Food Access Profile %					
Food		Very weak	Weak	medium	Good	Total	
Consumption	Poor	7.8	3.2	2.2	0.1	13.3	
Classification %	Borderline	15.8	11.8	8.1	1.3	37.0	
	Fairly good	11.0	13.5	8.9	1.7	35.1	
	Good	3.2	5.3	4.3	1.7	14.6	
	Total	37.9	33.9	23.4	4.8	100	

Source: Republic of Rwanda. 2006. *Rwanda Comprehensive Food Security and Vulnerability Analysis*, National Institute of Statistics of Rwanda, MINECOFIN & World Food Programme, Kigali, December.

productivity of key Food Crops, the trends noted above in relation to the productivity of Food Security Crops are concerning (Republic of Rwanda 2006b). One of the components of food security is the access of the population to safe and nutritious food which meets their dietary requirements and food preferences for an active healthy life. This aspect of food security is explained by the quantity and quality of food intake in terms of Kilocalories, proteins and lipids. It is also explained by the consumption pattern and the diversity of consumed items by households. The CFSVA shows that only 14% of households are in poor consumption profile considering the diversity of the diet which implies a poor nutrition intake (Republic of Rwanda, 2006d).

From the food balance sheet of the crop assessment 2006B, the per capita Kilocalories consumption was 1949kcal the protein consumption was 49g and that of lipids was 6.5 grams against the international standards of 2100 kcal, 50g and 40g per capita consumption. This situation is different from one of 2006A where per capita consumption was 1752kcal and 43g of proteins. The average caloric consumption deficit is about 15 percent, but increases to nearly 30 percent for proteins and about 70 percent for lipids. The main contributors to energy requirements in Rwanda are banana, Irish potato, beans, cassava, and sweet potato. Beans are the main source of protein, followed by sweet potato and sorghum. Maize, beans, groundnuts, and soy- beans provide lipids. However, production of sweet potato, beans, banana, and cassava has been declining over time. Together with sorghum, these five crops constitute more than 70 percent of the consumption basket in rural area (Republic of Rwanda 2007a). As seen, diversification in food production was limited and therefore the nutritional impacts on poor may be hard to assess. The Figure 2 gives a brief idea of food insecurity in Rwanda.

### Conclusion

On the issue of a more productive and profitable agricultural sector in Rwanda it appears that there are the winds of change as seen from the efforts of the government. Still, the road ahead is quite rough as the agricultural production technologies remain obsolete, equitable distribution of farm land not materialised, markets not developed, weak extension services prevail, and above all there remain weak capacities at

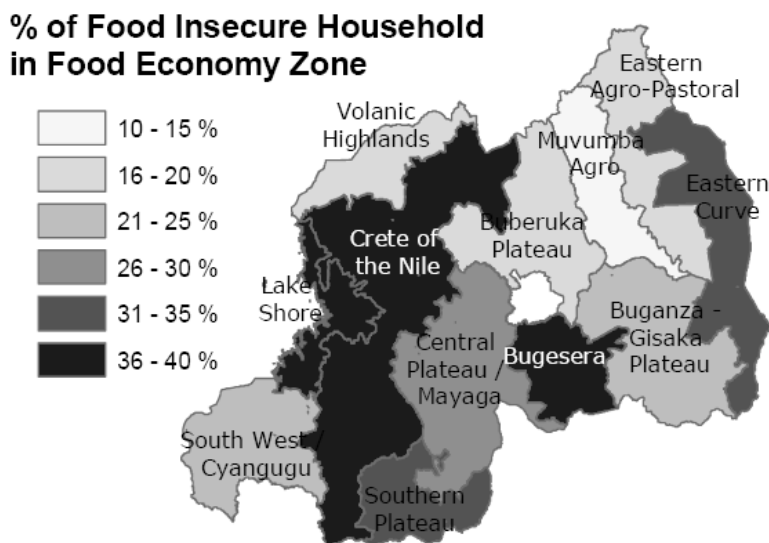
grass root level. Product market is not well developed and prices suffer seasonal gluts; farmers are deprived of remunerative prices and income. Exploiting the growth potential of staple crops from dissemination of modern technology requires not only investment but also changes in farm management and a transition from current farming traditions to more modern farming systems. Rwandan agriculture shows high potential, due to its varied agro-ecology, its abundant rainfalls and its large water resources which can be used for irrigation.

Moreover, the amount of agricultural land can still be extended in Rwandan, in fact on 165,000 ha of marshlands, 100,000 ha can be developed for agricultural use (Republic of Rwanda 2006b). However, it needs to be highlighted that increased crop production often exceeds farmers' own consumption. Hence, expanding markets for these crops is a necessary condition for farmers to benefit from growth. Moreover, to improve crop yield, farmers need to increase the use of modern inputs, which are purchased from markets. Development of input and output markets can strongly support the growth of agricultural production. There are three essential dimensions of food security: (i) Food availability, (ii) Stability of supplies (iii) Access to food. The document prepared by MINAGRI on food security highlighted the existing constraints for the improvement of food security in Rwanda which are: macroeconomic constraints like debt, lack of competition, marketing constraints, and narrowness of the domestic markets, land-lockedness, and low urban base. Constraints to agricultural production are linked to soil fertility, scarcity of production means, high pressure on natural resources, and insecurity and risk. Current understanding maintains that agriculture is sustainable when current and future food demands can be met without unnecessarily compromising economic, ecological, and social/political needs DFID (2004a). Yet, its operationalization can be problematic. Agriculture in Rwanda remains very vulnerable to the vagaries of climate, with a continued lack of adequate irrigation and water storage systems. Rwandan rural households have faced production deficits due to drought, pests and diseases in various crops, and the devastating effects of the 1994 genocide.

**Table 11.** Food Insecurity in Rwanda – Results of the CFSVA

	% in rural pop.	Food consumption & food access profiles
Food Insecure	28	Households with poor or borderline food consumption and very weak food access; or households with weak or very weak access and poor consumption.
Vulnerable	24	Food access and consumption profiles are limited (weak to medium access and poor to borderline consumption)
Moderately food secure	26	At least one of the two profiles is sub-optimal (weak access, borderline consumption) while the other component is better (medium access or fairly good consumption)
Food Secure	22	Fairly good to good food consumption and medium to good food access, includes also those with good access but borderline consumption” and those with good consumption but weak access.

Source: Republic of Rwanda. 2006. *Rwanda Comprehensive Food Security and Vulnerability Analysis*, National Institute of Statistics of Rwanda, MINECOFIN & World Food Programme, Kigali, December.



**Figure 2:** Food insecure Household

Among the factors that correlated with food security the following are of direct link to agriculture: (i) Land size-. Forty one percent (41%) of those who cultivated less than 0.1 ha were food insecure compared to 21% or less for those cultivating 0.5 ha or more. (ii) Poor income is more likely to be food insecure. Over 90% of the food insecure earned less than 100,000RWF/year; they are less than 60% among the Food Secure. As agriculture is the main livelihood of nearly two third of the population, especially of agriculturalist and Agro-labourers, any effort to attain food security boils down to Rwandan agriculture. The population of Rwanda is growing. Besides population increase, improved purchasing power among the poor will enhance the demand for food. In contrast per capita availability of arable land is shrinking. Water use efficiency is very low. There is still a widespread mismatch between production and post harvest technologies, especially in perishable commodities, which affect the interest of both producers and consumers. The failure to achieve agricultural intensification and diversification is predominantly agricultural country like Rwanda will be socially disastrous. This is because, agriculture including crop and animal husbandry, forestry, fisheries provide livelihood to nearly 90 % of Rwanda's population. The smaller the farm, the greater is the need for higher marketable surplus for increasing the income. Even a million new livelihoods will have to be created in the coming years in Rwanda. Rwanda needs (i) greater investment in irrigation and technology development and dissemination leading to enhanced production and productivity (ii) better distribution through the public distribution system (iii) adequate food reserves (iv) purchasing power enhancement through employment generation and guarantee schemes, and (v) special intervention programme for children, pregnant and nursing mothers and old and infirm persons. Since several non-food factors like environmental sanitation and hygiene also affect food security, we need to develop a holistic concept of food security which in the words of M. S. Swaminathan, the internationally known agricultural scientist "Food security implies livelihood security at the level of each household and all members within and involves ensuring both physical and economic access to balanced diet, safe drinking water, environmental sanitation, primary education and health care" (Swaminathan 1996, P-62) . To operationalise this concept in Rwanda the following actions are needed:

- (i) Ensuring sustainable availability of food by maintaining the growth in food production over population growth through the development and dissemination of technologies like biotechnology, information technology, renewable energy technology and management technology.
- (ii) Ensure adequacy of household income through promotional social security, such as accessing assets, employment and organizational and marketing empowerment. Agricultural development programmes should concurrently aim at more food, more jobs, and more income (which necessitates value-addition implying farm and non farm employment generation).
- (iii) Entitlement to food to vulnerable groups through protective social security measures such as employment guarantee and food for nutrition programmes, and Public Distribution Systems.

Rwanda faces two basic food security challenges: First, maintaining the availability of food through production within the country, which is constrained due to conditions diminishing land resources, soil depletion, inadequate investment in the infrastructure and not enough availability of technology. Second, expanding the economic access to food at household level under conditions of insufficient growth in household income arising from slow growth in diversification of the Rwandan economy. There fore, the two food security challenges of Rwandan economy is that of sustaining the availability of food and expanding the economic access to food, thereby ensuring food security all at the household level. This, obviously, is unattainable without appropriate public policies and sufficient investment so as to build up the productive capabilities and access to income and entitlement to food. The growth rate that is intended to be achieved by agricultural sector is of 5 to 8% so as to reach its expected objectives. As seen earlier the current growth rate achieved between 1999 and 2005 is 5.77 % per annum. It is imperative to sustain as well as improve this rate. For which the main challenges to the agriculture sector in Rwanda are the following: (i) The severity of diseases which cause losses to the production in plots and to the stored grains, (ii) the poor land use and poor soil management which result in erosion and soil loss and poor productivity, (iii) the lack of value addition to the production by the lack of processing skills and utilities, (iv) the low use of improved seed, fertilizers and pesticides which

determine very low yield, (v) the lack of credits and loans facilities to finance the needed investments in agriculture sector, and (vi) the weak number of skilled people capable of disseminating knowledge and capacity building through proper extension work. (vii) weak base of the livestock sector as well deficiencies prevalent in the development of the sector. However, there is no other option, other than agricultural development, to Rwanda if she has to achieve the goals of attaining food security and abolishing absolute poverty. This is because agricultural development can contribute significantly to peace (in a society that is conflict ridden for years) by raising incomes and employment, thereby reducing the social frustrations that give rise to violence and conflict. Agricultural growth also generates revenues for governments, allowing them to redress the grievances of disadvantaged populations. In this way, growth can be made more equitable. Agricultural development thereby supports the political strategies for conflict resolution and peace-building. A budding democracy in Rwanda will work only if it listens to the voices of the millions of rural households which eke out a subsistence living in its rural areas. Summarizing the discussion so far about Rwanda's experience in agricultural development one may note: (i) Land and water resources still have to be harnessed in order to achieve physical and quantitative goals. (ii) Seed-fertilizer technology has not yet seen any significant breakthrough as its accessibility to peasants still beyond their reach. (iii) The need for a comprehensive approach to production, income, consumption, and growth would require integration of farm and home decisions and an understanding of their linkages (iv) The need for a target group approach with coordinated action plan would be cost effective and growth oriented. Participatory involvement of farm households would be an essential pre-condition so as to attain the goals that are intending. At the macro level the supportive elements of policies are related to prices, tariff, taxes and income transfer; and at the micro level, resources, technology, skills and attitudes, access to use of critical inputs, and labour are the elements of decision domain. However some crucial areas like cropping pattern, incentives, agricultural prices, public distribution system, etc needs the right attention. If the agricultural sceptics have their way, most Rwandans will face a bleak future of worsening poverty and hunger.

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Table 2: Area, Production and Productivity of Food crops in Rwanda

Major crops	2000				2006				% change per annum 2000-2006				
	Gross Area (in Ha.)	%	Gross Production in Tons	%	Productivity (T/H)	Gross Area (in Ha.)	%	Gross Production in Tons	%	Productivity (T/H)	Area	Production	Productivity
Banana	360470	23.85	2212250	38.09	6.14	366296	22.31	2653548	37.16	7.24	0.27	3.08	2.78
Roots and Tubers	425429	28.15	2902051	49.97	6.82	422586	25.74	2930095	41.04	6.93	-0.11	0.16	0.27
Legumes	406204	26.88	251643	4.33	0.62	446083	27.17	336605	4.71	0.75	1.57	4.97	3.22
Cereals	277557	18.36	235706	4.06	0.85	322,139	19.62	361674	5.07	1.12	2.51	7.40	4.70
Vegetables & Fruits	41692	2.76	205675	3.54	4.93	84830	5.17	858010	12.02	10.11	12.57	26.88	12.72
Total	1511352	100.00	5807325	100.00	3.84	1641934	100.00	7139932	100.00	4.35	1.39	3.50	2.10

Note: In parenthesis the percentage increase in total area between 2000 and 2005 is given.

Source: Worked out from (i) Republic of Rwanda, 2006. *Self evaluation of the PRSP by agriculture SWG of rural cluster*. MINAGRI, Kigali. Table Annex 1A;

(ii) Republic of Rwanda 2007. *Agricultural Sector Performance in 2006. Report of the Joint Budget Sector Review V*. MINAGRI, Kigali. Table Annex 2