

## Chapter 8

# Conclusions and recommendations

This report has attempted to establish a perspective on the demand for irrigated production in the sub-Saharan Africa region with projections to 2030. It has considered the economic impacts of expanded production in particular and has indicated where opportunities for such expansion exist at a regional level.

The conclusions of this report need to be taken in the context of an overall decline of the agriculture sector in sub-Saharan Africa. As far as the irrigated sub-sector is concerned, there is very little evidence of publicly funded irrigation assets performing as designed. At the same time, most of the small scale private irrigation is not organised efficiently to supply markets and sustain growth. At a regional level, there is a fundamental structural mis-match between styles of production and the character of national and regional demand. This can be expected to seriously hinder an appropriate regional response. Transport and marketing costs for bulk production are high and with very little value-added processing, the scope for regional markets development will be limited unless spatial and value chain ‘friction’ is overcome. It appears very easy for imported grain products to enter the regional hinterland, but very difficult for domestic production to get out.

It is not possible to be highly specific about the demand for irrigated production *per se* beyond broadly concluding that the most pressing demand is in cereals, notably maize, rice and wheat, for which both rainfed and irrigated production present options. Despite this, only rice, sugar and vegetables offer immediate targets for new investment given current irrigation costs and world prices for higher quality rice.

The economic factors and incentives to concentrate production through irrigation exist in terms of pure calorie demand. While this may be no surprise, current trends in commercial food import bills indicate that public and private initiatives in irrigated development are highly lagged, with real growth rates in irrigated areas averaging only 0.9 percent/year and with a continuing legacy of non-performing irrigation schemes. Indeed, in many specific cases, growth rates are actually negative.

The prime conclusion is that the sub-Saharan Africa region can obviate the need for expansion of its irrigated areas simply by closing yield gaps on production from existing equipped irrigated areas. However, while an agronomic solution in the short to medium term can offset the costs of expanding the irrigated area, investment in the post-harvest and value-added chain will remain a priority.

As far as the natural resource base is concerned, while land and water do not pose technical limits at a regional level, they can be a local absolute constraint. Even so, where this is the case, these constraints can be exacerbated by institutional and/or regulatory shortcomings rather than a lack of resources or areas equipped for irrigation.

It is the systemic factors in the irrigated subsector – high costs, rising labour rates and the impact of HIV/AIDS, and the overall structure of the industry – that mean it is not geared to produce high volumes of high-quality cereals where they are needed. For example, the small artisanal production centres, notably for rice in the Gulf of Guinea and Sudano-Sahelian regions, cannot produce to the scale and quality demanded/preferred by urban dwellers. At the same time, the incentives for commercial growers to produce staples under irrigation in the South and Eastern regions are generally

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limited by the need to do this as part of a rotation with a high-value cash crop (not least to obtain credit or to be eligible for inputs such as fertilizer).

It is difficult to see how large-scale, low-margin cereal production can generate the service fees sufficient to guarantee service cost recovery unless indirect subsidies are factored into farmgate prices that are supported by governments as buyers of first resort. Some central costs can be mitigated by participatory irrigation management; but this has not proved to be the universal panacea that was once hoped.

Beyond economic and technical considerations, the overall picture is one of a general failure to structure the irrigated subsector to balance and buffer the volatility of the rainfed sector in a consistent fashion (to maintain domestic producer and consumer price stability) while also developing regional and export markets in both irrigated staples and cash crops.

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This strategic failure to match the structure of the irrigated subsector to changing demand patterns in sub-Saharan Africa may not always be overcome despite rising demand and rising food import bills. Some absolute issues such as agroclimatic suitability cannot be addressed through more public expenditure or private investment. However, others such as the relative involvement of public and private agents or the provision of marketing chains can be addressed where political capital is adequate. What then can be offered as recommendations to at least improve the structure of irrigated production? This study makes the following recommendations:

- Ensure that the scaling is right. This applies to the scaling of small-scale irrigation initiatives to address local demand as much as to identifying profitable irrigated farming systems. Matching the structure of the irrigated subsector to the structure of demand is key. It is crucial to be clear about the style of irrigation that will make an impact, and the scale at which producers will enter the market. This implies a regional response rather than a set of individual national responses.
- Realize the value of the existing asset base where supply chains, storage and processing can be concentrated to address specific, well-identified markets. The conditions conducive for scaling up irrigated production (including the incentive for both small-scale and large-scale private investment) will take time to coalesce.
- Prior to new public expenditure or the encouragement of private investment, ensure that the full implications of price impacts are taken into account.
- Assess the costs of supplying into crop markets sensibly. In addition to financial costs, there will also be significant political costs accruing to the kind of changes necessary to establish the enabling environment for successful, sustainable irrigation. These will involve: the devolution of planning and decision-making functions to civil society; the commercialization (in the sense of efficient, cost-effective and transparent service delivery) of public services in the sector; the deregulation of markets; the attraction of private investment; and the establishment of reliable water rights systems and allocation mechanisms.

With these provisions in mind and the political and institutional constraints notwithstanding, irrigated production opportunities in sub-Saharan Africa can be realized where natural resources and markets coincide. However, this can only be achieved through focusing a great deal more attention on production costs, price formation, effective water allocation mechanisms, economically efficient water use, and strong, responsive institutions.

## References

- Allan, T. 2000. *The Middle East water question – hydropolitics and the global economy*. London, I.B. Taurus.
- Aw, D. & Diemer, G. 2005. *Making a large irrigation scheme work: a case study from Mali*. Directions in Development. Washington, DC, World Bank. 156 pp.
- Berkoff, J. 2003 *A critical look at the irrigation and drainage sector*. Presentation for the 2003 World Bank Water Week
- Cai, X., Ringler, C. & Rosegrant, M.W. 2001. *Does efficient water management matter? Physical and economic efficiency of water use in the river basin*. Environment and Production Technology Division, IFPRI.
- Diao, X., P. Dorosh, & S. M. Rahman. 2003. *Market opportunities for African agriculture: an examination of demand-side constraints on agricultural growth*. DSGD Discussion Paper No. 1. IFPRI, Washington D.C.
- FAO. 1979. *Yield response to water*. Irrigation Drainage Paper No. 33. Rome.
- FAO. 1993. *Inter-country comparisons of agricultural output and productivity*, by D. Rao. FAO Economic and Social Development Paper No. 12. Rome.
- FAO. 1995. *Water resources of African countries: a review*. Rome.
- FAO. 1997. *Irrigation potential in Africa: a basin approach*. FAO Land and Water Bulletin No. 4. Rome.
- FAO. 2001. *Contract framing: partnerships for growth*, by C. Eaton & A.W. Shepherd. Agricultural Services Bulletin No. 145. Rome.
- FAO. 2002. *Zambia's irrigation potential, economic growth and the poverty alleviation challenge*, by L. Mbumwae & P.J. Riddell. Rome.
- FAO. 2003. *World agriculture: towards 2015/2030, an FAO perspective*, J. Bruinsma, ed. Earthscan Publications Ltd.
- FAO. 2004. *Review of the public sector irrigation in Nigeria*. Status Report, Vol I. The Main Report. Prepared by the Enplan Group. Abuja, November, 2004.
- FAO. 2005 (a). *Irrigation in Africa in figures. AQUASTAT survey 2005*. FAO Water Reports No. 29. Rome. 74 pp. + CD-ROM.
- FAO. 2005 (b). *Water productivity and vulnerable groups in the Mkoji sub-catchment*. A local case study in IWRM in the United Republic of Tanzania. FAO-Netherlands Partnership Programme. Rome 50 pp.
- FAO/World Bank. 2001. *Farming systems and poverty. Improving farmer's livelihoods in a changing world*. Rome and Washington D.C. 412 pp.
- International Land Development Consultants (ILACO). 1981. *Agricultural compendium for rural development in the tropics and sub-tropics*. Amsterdam, The Netherlands, Elsevier.
- IWMI. 2005. *Improving irrigation project planning and implementation process: diagnosis and recommendations*. S. Morardet, D. J. Merrey, J. Seshoka, and H. Sally. IWMI. Colombo, 87pp. available at <http://www.iwmi.cgiar.org/africanwaterinvestment/index.asp>.
- Jeffery, H.N. (ed). *Managing the Wetlands of Kafue Flats and Bangweulu Basin*. IUCN. Gland, Switzerland and Cambridge, UK. 113 pp.
- Loth, P. (ed.). 2004. *The Return of the Water: Restoring the Waza Logone Floodplain in Cameroon*. IUCN. Gland, Switzerland and Cambridge, UK. 156 pp.
- Morardet, S. , Merrey, D.J., Seshoka, J. & Sally, H. 2005. *Improving irrigation project planning and implementation processes in sub-Saharan Africa: diagnosis and recommendations*. Final Report submitted to IWMI, August 2005. Working Paper No. 99. 87 pp. Available at: [http://www.iwmi.cgiar.org/pubs/working/WOR99\\_1](http://www.iwmi.cgiar.org/pubs/working/WOR99_1).

- Riddell, P.J.** 1998. *Institutional responsibility in the context of participatory irrigation management*. International Network on Participatory Irrigation Management.
- Rosegrant, M.W. & Perez, N.D.** 1997. *Water resources development in Africa: a review and synthesis of issues, potentials and strategies for the future*. EPTD Discussion Paper No. 28. Washington, DC, IFPRI.
- Smith, L.D.** 2003. *Marketing issues relating to Swaziland's main crops: maize, sugar and cotton*. CASP Technical Paper No. 4. Government of Swaziland/FAO/UNDP, Mbabane.
- UNESCO.** 1997. *Atlas of world water balance: run-off coefficient map of Africa*.
- von Braun, J., Puetz, D. and Webb, P.** 1989. Irrigation Technology and Commercialisation of Rice in the Gambia: Effects on Income and Nutrition. *IFPRI, Research Report 75*.
- Westlake, M.J.** 1987. The measurement of agricultural price distortion in developing countries. *J. Dev. Stud.*, 23(3).

## Annex 1

# The FAO typology for areas under agricultural water management

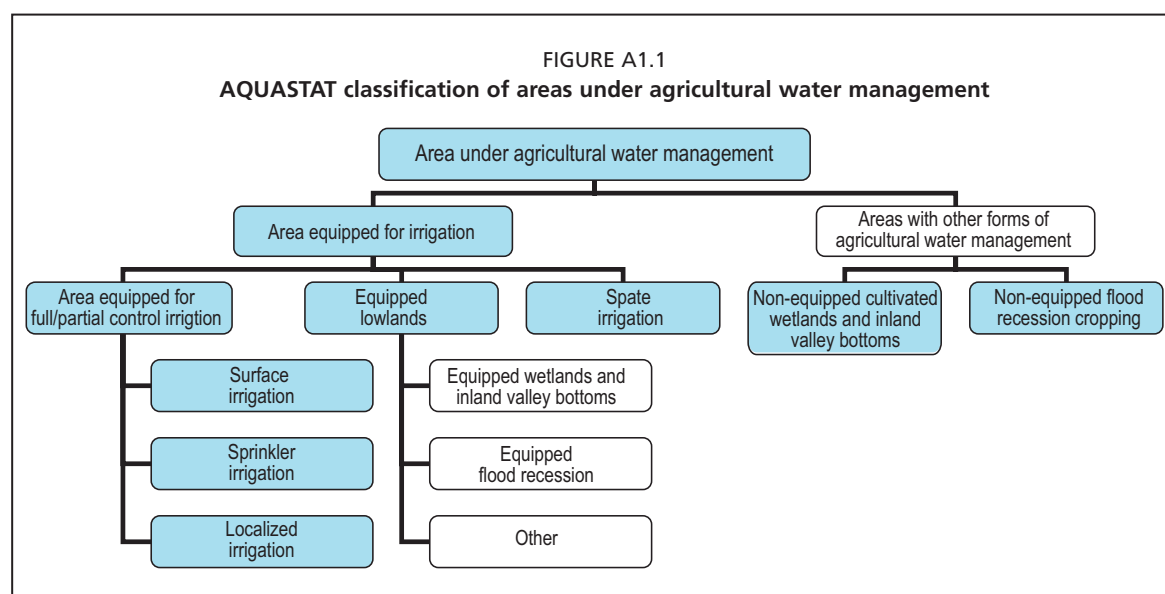
## AREA UNDER AGRICULTURAL WATER MANAGEMENT

This typology considers all the land to which, in addition to eventual rainfall, water is added and managed for agricultural purposes. The level of management and control of the water may vary considerably between the different agricultural water management types described under the variables. This section does not include water harvesting. However, while spate irrigation is sometimes considered a type of water harvesting (called floodwater harvesting), AQUASTAT prefers to include it as per Figure A1.1. The reason for this is that spate irrigation often requires the construction of heavy structures, using, for example, gabions or concrete. The figures should refer to the physical area equipped. Thus, areas with double cropping are only counted once.

### Irrigation potential (1 000 ha)

Area of land that is potentially irrigable. Country/regional studies assess this value according to different methods. For example, some consider only land resources suitable for irrigation, while others consider land resources plus water availability. Others include in their assessment economic aspects (such as distance and/or difference in elevation between the suitable land and the available water), environmental aspects, etc.

Details of the computation method should be included in the comments. In any case, the figure should include the area already under agricultural water management.



Note: Areas in light blue are the variables that are disseminated in the new AQUASTAT database, including the respective variable number.

### **Area equipped for irrigation: full control – surface (excluding equipped lowland areas (1 000 ha))**

Surface irrigation systems are based on the principle of moving water over the land by simple gravity in order to wet it, either partially or completely, before infiltrating. They can be subdivided into furrow, borderstrip and basin irrigation (including submersion irrigation of rice). Surface irrigation does not refer to a method of transporting the water from the source up to the field, which may be done by gravity or by pumping. Manual irrigation using buckets or watering cans should also be included here.

### **Area equipped for irrigation: full control – sprinkler (1 000 ha)**

A sprinkler irrigation system consists of a pipe network through which water moves under pressure before being delivered to the crop via sprinkler nozzles. The system basically simulates rainfall in that water is applied through overhead spraying. Therefore, these systems are also known as overhead irrigation systems.

### **Area equipped for irrigation: full control – localized (1 000 ha)**

Localized irrigation is a system where the water is distributed under low pressure through a piped network, in a predetermined pattern, and applied as a small discharge to each plant or adjacent to it. There are three main categories: drip irrigation (where drip emitters are used to apply water slowly to the soil surface); spray or microsprinkler irrigation (where water is sprayed to the soil near individual plants or trees); and bubbler irrigation (where a small stream is applied to flood small basins or the soil adjacent to individual trees). To refer to localized irrigation, the following other terms are also sometimes used: micro-irrigation, trickle irrigation, daily flow irrigation, drop irrigation, sip irrigation, and diurnal irrigation.

Detailed statistics per type of localized irrigation should be included in the comments column.

### **Area equipped for irrigation: full control – total (1 000 ha)**

This is the sum of surface irrigation, sprinkler irrigation and localized irrigation.

### **Area equipped for irrigation: lowland areas (1 000 ha)**

It includes:

- cultivated wetland and inland valley bottoms (IVBs), which have been equipped with water control structures for irrigation and drainage (intake, canals, etc.);
- areas along rivers where cultivation occurs making use of water from receding floods and where structures have been built to retain the receding water;
- developed mangroves.

Where separate figures for these three different categories are available, they should be placed in the comments column.

### **Area equipped for irrigation: spate irrigation (1 000 ha)**

Spate irrigation can also be referred to as floodwater harvesting. It is a method of random irrigation using the floodwaters of a normally dry watercourse or riverbed (wadi). These systems are generally characterized by a very large catchment upstream (200 ha – 50 km<sup>2</sup>) with a ratio of catchment area to cultivated area of 100:1 to 10 000:1. There are two types of floodwater harvesting or spate irrigation: (i) floodwater harvesting within streambeds, where turbulent channel flow is collected and spread through the wadi in which the crops are planted; cross-wadi dams are constructed with stones, earth, or both, often reinforced with gabions; and (ii) floodwater diversion, where the floods or spates from the seasonal rivers are diverted into adjacent embanked fields for direct application. A stone or concrete structure raises the water level within the wadi to be diverted to the nearby cropping areas.

**Area equipped for irrigation: total (1 000 ha)**

Area equipped to provide water to crops. It includes areas equipped for full control irrigation, equipped lowland areas, and areas equipped for spate irrigation. It does not include non-equipped cultivated wetlands and inland valley bottoms or non-equipped flood recession cropping areas.

As definitions and classifications on irrigation may vary between countries, any relevant comment should be added in the comments column.

**Area equipped for irrigation: part actually irrigated (1 000 ha)**

This is the part of the area equipped for irrigation that is actually irrigated in a given year. Often, part of the equipped area is not irrigated for various reasons, such as lack of water, absence of farmers, land degradation, damage, and organizational problems. It only refers to physical areas. Irrigated land that is cultivated twice a year is counted once.

**Non-equipped cultivated wetlands and inland valley bottoms (1 000 ha)**

This refers to wetlands and IVBs that have not been equipped with water control structures but are used for cropping when covered with water. They are often found in Africa. They have limited (mostly traditional) arrangements to regulate water and control drainage.

In some countries, a distinction is made between the part of wetlands and IVBs that are equipped and the part of the wetlands and IVB that are cultivated but are not considered equipped. In this case, the figure relative to the first part is included in the category “equipped lowland areas”, and the figure relative to the second part in this category “non-equipped cultivated wetlands and inland valley bottoms”.

In other countries, no distinction is made between the wetlands and IVBs that are equipped and those that are not. In this case, the total figure should be included in this category: “non-equipped cultivated wetlands and inland valley bottoms”.

**Non-equipped flood recession cropping area (1 000 ha)**

This refers to areas along rivers where cultivation occurs in the areas exposed as floods recedes and where nothing is undertaken to retain the receding water. The special case of floating rice is included in this category.

**Total area under agricultural water management (1 000 ha)**

It is the sum of total area equipped for irrigation and areas with other forms of agricultural water management.



## Annex 2

# Composition of sub-Saharan Africa regions

Composition of sub-Saharan Africa regions			
Central	Eastern	Gulf of Guinea	Indian Ocean Islands
Angola	Burundi	Benin	Mauritius
Cameroon	Ethiopia	Cote D'Ivoire	Madagascar
Central African Republic	Kenya	Ghana	Sub-Saharan Africa and others
Congo	Rwanda	Guinea	
Congo Democratic Republic	United Republic of Tanzania	Liberia	
Gabon	Uganda	Nigeria	
		Sierra Leone	
		Togo	
South Africa	Southern	Sudano-Sahelian	
South Africa	Botswana	Burkina Faso	
	Lesotho	Chad	
	Malawi	Eritrea	
	Mozambique	Gambia	
	Swaziland	Mali	
	Zambia	Mauritania	
	Zimbabwe	Niger	
	Namibia	Senegal	
		Somalia	
		Sudan	



Annex 3

## **The SUA commodity groups**

CEREALS											
Wheat			Paddy Rice			Maize			Barley		
Primary	ICS code	Processed	Primary	ICS code	Processed	Primary	ICS code	Processed	Primary	ICS code	Processed
wheat	0015	flour	paddy rice	0027	husked	maize	0056	flour	barley	0044	pot
	16					pop corn	0068	starch			pearled
	18	macaroni	milled/husked	29	milled paddy			beer			malt
	20	bread	31	32	34						extracts
	??	bulgur	broken								beer
	21	wholemeal	starch	38	41						
	22	pastry	flour								
	23	starch	breakfast cereals								
Millet			Sorghum			Other Cereals					
Primary	ICS code	Processed	Primary	ICS code	Processed	Primary	ICS code	Processed	Primary	ICS code	Processed
millet	0079	flour	sorghum	0083	flour	rye	0071	rye flour			
	80				beer	oats	0075	rolled oats			
	82	beer		84		buckwheat	0089	buckwheat flour			
				86		quinoa	0092	flour of fonio			
						fonio	0094	flour of triticale			
						triticale	0097	flour of mixed grain			
						canary seed	0101	flour of cereals nes			
						mixed grains	0103	cereal pre. Nes			
						cereals nes	0108				

NON-CEREAL STAPLE FOOD CROPS												
Potatoes			Sweet Potatoes			Cassava			Other Roots			
Primary	ICS code	Processed	ICS code	Primary	ICS code	Processed	ICS code	Primary	ICS code	Processed	ICS code	
potatoes	0116	flour	117	Sweet Potatoes	0122			cassava	0125	flour	126	
		frozen	118	yams	0137					tapioca	127	
		starch	119							dried	128	
		tapioca	121							starch	129	
											roots & tubers nes	0149
											roots & tubers nes flour	150
											roots & tubers dried	151
<b>Plantains</b>				<b>Pulses</b>								
<b>Primary</b>	<b>ICS code</b>	<b>Processed</b>	<b>ICS code</b>	<b>Primary</b>	<b>ICS code</b>	<b>Processed</b>	<b>ICS code</b>	<b>Primary</b>	<b>ICS code</b>	<b>Processed</b>	<b>ICS code</b>	<b>ICS code</b>
<b>plantains</b>	<b>0489</b>			<b>beans dry</b>	<b>0176</b>	<b>pulses; flour</b>	<b>212</b>					
				broad beans dry	0181							
				peas dry	0187							
				chick-peas	0191							
				cow peas dry	0195							
				pigeon peas	0197							
				lentils	0201							
				bambara beans	0203							
				vetches	0205							
				lupins	0210							



OTHER FOOD CROPS Cont'd						
Other Fruit	Vegetable oil and oil seeds in oil equivalent					
Primary	ICS code	Processed	ICS code	Primary	Processed	ICS code
apples	0515	applejuice single strength	518	oil of soyabeans	soyabeans	236
pears	0521	applejuice concentrated	519	oil of groundnuts	soyabeans sauce	239
quinces	0523	dry apricots	527	oil of coconuts	soyabeans paste	240
apricots	0526	plums dried	537	palm oil	soyabeans curd	241
sour cherries	0530	plumjuice single strength	538	oil of palm kernels	groundnuts in shell	242
cherries	0531	plumjuice concentrated	539	oil of olive	groundnuts shelled	243
peaches	0534	raisins	561	butter of karite nuts	prep.groundnuts	246
nectarines	0536	must of grapes	563	oil of castor beasn	coconuts	249
plums	0541	wine	564	oil of sunflower seed	coconuts desiccated	250
stone fruits nes fresh	0544	vermouths & similar	565	oil of rapeseed	copra	251
strawberries	0547	figs dried	570	tung oil	palm kernels	256
raspberries	0549	pineapples canned	575	oil of safflower	olives	260
gooseberries	0550	mango juice	583	oil of sesame seed	olives preserved	262
currants	0542	fruit tropical dried nes	604	oil of mustard seed	karite nuts	263
pome fruit nes fresh	0552	fruit dried nes	620	oil of poppy seed	castor beasn	265
blueberries	0554	fruit juice nes	622	vegetable tallow	sunflower seed	267
cranberries	0558	fruit prep. nes	623	stillingia oil	rapeseed	270
berries nes	0560	flour of fruit	642	oil of kapok	tung nuts	275
grapes	0567			oil of cottonseed	safflower seed	280
watermelons	0568			oil of linseed	sesame seed	289
cantaloupes	0569			oil of hempseed	mustard seed	292
other melons	0571			oil of vegetable origin nes	flour of mustard	295
figs	0572				poppy seed	296
mangoes	0571				kapok seed in shell	311
avocados	0572				kapok seed shelled	312
pineapples	0574				cottonseed	329
dates	0577				linseed	333
persimmons	0587				hempseed	338
cashewapples	0591				oilseeds nes	339
papaya	0600					
fruit tropical nes, fresh	0603					
fruit nes, fresh	0619					







## Annex 4

# AQUASTAT data for the sub-Saharan Africa regions

TABLE A4.1  
Agricultural water use typology for Central region

	TOTALS (ha)	
AREA UNDER AGRICULTURAL WATER MANAGEMENT>	455 939	
AREA EQUIPPED FOR IRRIGATION>	132 439	
Area equipped for full control irrigation	125 652	
Surface	120 221	
Sprinkler	5 430	
Localized	1	
Area under spate irrigation		2 800
Area of equipped lowlands		3 987
Equipped wetlands and inland valley bottoms		
Equipped flood recession		
Other		
Area with other forms of agricultural water management		323 500
Non-equipped cultivated wetlands and inland valley bottoms		322 500
Non-equipped flood recession		1 000

TABLE A4.2  
Agricultural water use typology for Eastern region

	TOTALS (ha)	
AREA UNDER AGRICULTURAL WATER MANAGEMENT>	849 338	
AREA EQUIPPED FOR IRRIGATION>	616 143	
Area equipped for full control irrigation	593 103	
Surface	522 520	
Sprinkler	68 571	
Localized	2 012	
Area under spate irrigation		0
Area of equipped lowlands		23 040
Equipped wetlands and inland valley bottoms		
Equipped flood recession		
Other		
Area with other forms of agricultural water management		233 195
Non-equipped cultivated wetlands and inland valley bottoms		233 195
Non-equipped flood recession		

TABLE A4.3  
Agricultural water use typology for Gulf of Guinea region

	TOTALS (ha)	
AREA UNDER AGRICULTURAL WATER MANAGEMENT>	1 443 777	
AREA EQUIPPED FOR IRRIGATION>	565 257	
Area equipped for full control irrigation	360 088	
Surface	311 348	
Sprinkler	47 220	
Localized	1 520	
Area under spate irrigation		0
Area of equipped lowlands		205 169
Equipped wetlands and inland valley bottoms		
Equipped flood recession		
Other		
Area with other forms of agricultural water management		878 520
Non-equipped cultivated wetlands and inland valley bottoms		196 606
Non-equipped flood recession		681 914

TABLE A4.4  
Agricultural water use typology for Indian Ocean Islands region

	TOTALS (ha)	
AREA UNDER AGRICULTURAL WATER MANAGEMENT>	1 117 653	
AREA EQUIPPED FOR IRRIGATION>	1 107 903	
Area equipped for full control irrigation	1 107 903	
Surface	1 086 413	
Sprinkler	19 468	
Localized	2 022	
Area under spate irrigation		0
Area of equipped lowlands		0
Equipped wetlands and inland valley bottoms		
Equipped flood recession		
Other		
Area with other forms of agricultural water management		9 750
Non-equipped cultivated wetlands and inland valley bottoms		
Non-equipped flood recession		9 750

TABLE A4.5  
Agricultural water use typology for the Republic of South Africa

	TOTALS (ha)		
AREA UNDER AGRICULTURAL WATER MANAGEMENT>	1 498 000		
AREA EQUIPPED FOR IRRIGATION>	1 498 000		
Surface	500 000		
Sprinkler	820 000		
Localized	178 000		
Area under spate irrigation		0	
Area of equipped lowlands			0
Equipped wetlands and inland valley bottoms			
Equipped flood recession			
Other			
Area with other forms of agricultural water management			0
Non-equipped cultivated wetlands and inland valley bottoms			
Non-equipped flood recession			

TABLE A4.6  
Agricultural water use typology for Southern region (excl. RSA)

	TOTALS (ha)		
AREA UNDER AGRICULTURAL WATER MANAGEMENT>	755 837		
AREA EQUIPPED FOR IRRIGATION>	565 427		
Area equipped for full control irrigation	464 902		
Surface	232 710		
Sprinkler	202 358		
Localized	29 834		
Area under spate irrigation		0	
Area of equipped lowlands			100 525
Equipped wetlands and inland valley bottoms			
Equipped flood recession			
Other			
Area with other forms of agricultural water management			190 410
Non-equipped cultivated wetlands and inland valley bottoms			181 900
Non-equipped flood recession			8 510

TABLE A4.7  
Agricultural water use typology for Sudano-Sahelian region

	TOTALS (ha)	
AREA UNDER AGRICULTURAL WATER MANAGEMENT>	2 945 290	
AREA EQUIPPED FOR IRRIGATION>	2 619 950	
Area equipped for full control irrigation	2 098 238	
Surface	2 090 384	
Sprinkler	7 654	
Localized	200	
Area under spate irrigation	299 520	
Area of equipped lowlands		222 192
Equipped wetlands and inland valley bottoms		
Equipped flood recession		
Other		
Area with other forms of agricultural water management		325 340
Non-equipped cultivated wetlands and inland valley bottoms		67 356
Non-equipped flood recession		257 984

## Annex 5

# Regional SUAs

The data in this annex are derived from the SUAs of the FAO perspective study  
– *World agriculture: towards 2015/2030. An FAO perspective.*

All data are nominal values as explained in Chapter 3.

The other data are as follows:

GDP: Gross domestic product in US\$ million

TOT POP: Total population in thousands

AG POP: Agricultural population in thousands

LAB FOR: Total labour force in thousands

AG LAB: Agricultural labour in thousands

TOT CAL: Calories in number per person per day

CENTRAL												
	FOOD	INDUSTRY	FEED	SEED	WASTE	DISCR.	DEMAND	IMPORT	EXPORT	TRADE	PRODN	SSR
1997/99												
Cereals	728	0	8	19	42	-13	783	283	1	-282	494	0.63
Non-cereal food crops	3 503	83	63	57	380	0	4 085	172	50	-121	3 934	0.96
Staple food crops	2 828	0	70	52	317	-13	3 253	306	3	-303	2 928	0.90
Non-food crops	32	138	0	0	7	-5	171	26	309	284	453	2.65
Livestock	1 293	0	1	4	9	0	1 306	249	2	-247	1 060	0.81
All food commodities	5 523	83	71	80	430	-13	6 175	703	54	-649	5 487	0.89
All agric. commodities.	5 555	221	71	80	437	-17	6 346	729	363	-366	5 941	0.94
<b>GDP</b>	<b>32 995</b>	<b>TOT POP</b>	<b>82 643</b>	<b>AG POP</b>	<b>49 511</b>	<b>LAB FOR</b>	<b>32 532</b>	<b>AG LAB</b>	<b>21 890</b>	<b>TOT CAL</b>	<b>1 870</b>	
2015												
Cereals	1 411	0	32	36	74	-23	1 530	621	0	-621	908	0.59
Non-cer. food crops	6 296	101	112	108	580	1	7 199	284	57	-227	6 971	0.97
Staple food crops	5 027	0	142	97	486	-23	5 728	635	1	-634	5 094	0.89
Non-food crops	57	290	0	0	8	-9	346	82	489	407	752	2.18
Livestock	2 376	0	1	9	15	0	2 401	499	0	-499	1 902	0.79
All food commodities	10 083	101	145	153	669	-22	11 129	1 405	57	-1 348	9 781	0.88
All agric. commodities	10 140	392	145	153	677	-32	11 474	1 487	546	-941	10 533	0.92
<b>GDP</b>	<b>64 232</b>	<b>TOT POP</b>	<b>136 431</b>			<b>LAB FOR</b>	<b>58 088</b>	<b>AG LAB</b>	<b>31 411</b>	<b>TOT CAL</b>	<b>2 072</b>	
2030												
Cereals	2 522	0	70	58	121	-26	2 744	1 310	0	-1 310	1 434	0.52
Non-cer. food crops	10 043	159	202	170	845	1	11 420	664	63	-602	10 818	0.95
Staple food crops	8 100	0	268	151	711	-26	9 204	1 329	1	-1 328	7 876	0.86
Non-food crops	95	502	0	0	9	-9	597	182	613	431	1 028	1.72
Livestock	4 382	0	2	23	28	0	4 434	1 053	0	-1 053	3 382	0.76
All food commodities	16 946	159	274	252	993	-25	18 598	3 027	63	-2 965	15 633	0.84
All agric. commodities	17 041	661	274	252	1 002	-35	19 195	3 209	676	-2 533	16 661	0.87
<b>GDP</b>	<b>11 9141</b>	<b>TOT POP</b>	<b>207 022</b>			<b>LAB FOR</b>	<b>83949</b>	<b>AG LAB</b>	<b>41874</b>	<b>TOT CAL</b>	<b>2265</b>	

EASTERN												
	FOOD	INDUSTRY	FEED	SEED	WASTE	DISCR.	DEMAND	IMPORT	EXPORT	TRADE	PRODN	SSR
<b>1997/99</b>												
Cereals	2 381	2	71	63	149	0	2 667	365	22	-342	2 271	0.85
Non-cereal food crops	5 732	158	274	131	553	-5	6 843	644	157	-487	6 322	0.92
Staple food crops	5 825	6	345	174	507	-3	6 855	399	44	-356	6 422	0.94
Non-food crops	123	132	0	0	15	0	270	19	977	958	1 242	4.60
Livestock	4 385	1	7	16	71	0	4 479	22	7	-14	4 465	1.00
All food commodities	12 497	160	353	210	774	-5	13 989	1 030	187	-844	13 059	0.93
All agric. commodities.	12 621	292	353	210	788	-5	14 259	1 050	1 164	114	14 300	1.00
<b>GDP</b>	<b>44 383</b>	<b>TOT POP</b>	<b>157 304</b>	<b>AG POP</b>	<b>119 149</b>	<b>LAB FOR</b>	<b>69 523</b>	<b>AG LAB</b>	<b>58 291</b>	<b>TOT CAL</b>	<b>1 912</b>	
<b>2015</b>												
Cereals	3 857	2	160	105	217	0	4 340	640	0	-640	3 700	0.85
Non-cer. food crops	10 104	100	363	243	838	-7	11 641	974	52	-922	10 719	0.92
Staple food crops	9 627	7	523	305	761	-5	11 218	656	5	-651	10 567	0.94
Non-food crops	232	324	0	0	20	0	575	17	1 233	1 217	1 792	3.11
Livestock	7 155	2	11	32	103	0	7 304	44	3	-42	7 262	0.99
All food commodities	21 116	104	534	380	1 157	-7	23 285	1 658	54	-1 604	21 681	0.93
All agric. commodities	21 348	428	534	380	1 178	-7	23 860	1 675	1 288	-387	23 473	0.98
<b>GDP</b>	<b>91 380</b>	<b>TOT POP</b>	<b>238 187</b>	<b>LAB FOR</b>	<b>123 087</b>	<b>LAB FOR</b>	<b>123 087</b>	<b>AG LAB</b>	<b>85 694</b>	<b>TOT CAL</b>	<b>2 115</b>	
<b>2030</b>												
Cereals	5 875	2	279	160	312	0	6 628	1 023	0	-1 023	5 605	0.85
Non-cer. food crops	15 268	88	569	385	1 176	-7	17 479	1 479	52	-1 427	16 052	0.92
Staple food crops	14 266	8	847	464	1 090	-5	16 672	1 054	4	-1 049	15 622	0.94
Non-food crops	362	568	0	0	29	0	958	30	1 550	1 520	2 478	2.59
Livestock	11 155	2	16	58	141	0	11 372	85	3	-82	11 290	0.99
All food commodities.	32 299	92	863	604	1 629	-7	35 479	2 587	55	-2 532	32 947	0.93
All agric. commodities.	32 660	660	863	604	1 657	-7	36 437	2 617	1 604	-1 013	35 425	0.97
<b>GDP</b>	<b>177 070</b>	<b>TOT POP</b>	<b>330 141</b>	<b>LAB FOR</b>	<b>171 233</b>	<b>LAB FOR</b>	<b>171 233</b>	<b>AG LAB</b>	<b>113 374</b>	<b>TOT CAL</b>	<b>2 317</b>	



GULF OF GUINEA												
	FOOD	INDUSTRY	FEED	SEED	WASTE	DISCR.	DEMAND	IMPORT	EXPORT	TRADE	PRODN	SSR
<b>1997/99</b>												
Cereals	3 863	44	255	104	799	0	5 066	918	21	-897	4 189	0.83
Non-cereal food crops	10 054	317	360	1 174	3 158	9	15 072	388	291	-97	14 973	0.99
Staple food crops	8 180	99	615	1 200	3 356	-1	13 448	925	25	-901	12 568	0.93
Non-food crops	41	528	0	0	41	0	610	52	1 901	1 849	2 473	4.05
Livestock	2 973	7	18	37	35	-1	3 069	638	7	-632	2 438	0.79
All food commodities	16 890	368	633	1 315	3 992	9	23 206	1 944	318	-1 626	21 600	0.93
All agric. commodities	16 931	896	633	1 315	4 033	9	23 817	1 995	2 219	224	24 072	1.01
<b>GDP</b>	<b>67 671</b>	<b>TOT POP</b>	<b>166 522</b>	<b>AG POP</b>	<b>76 172</b>	<b>LAB FOR</b>	<b>68 071</b>	<b>AG LAB</b>	<b>30 255</b>	<b>TOT CAL</b>	<b>2 684</b>	
<b>2015</b>												
Cereals	6 295	39	510	163	1 029	0	8 036	1 604	1	-1 603	6 433	0.80
Non-cer. food crops	16 077	740	694	740	3 376	19	21 646	597	267	-330	21 316	0.98
Staple food crops	12 640	93	1 204	764	3 578	-2	18 277	1 617	1	-1 616	16 661	0.91
Non-food crops	75	776	0	0	47	0	898	66	2 490	2 424	3 322	3.70
Livestock	5 480	0	36	70	61	-1	5 645	916	0	-916	4 729	0.84
All food commodities	27 853	779	1 239	973	4 465	18	35 327	3 117	269	-2 848	32 479	0.92
All agric. commodities	27 927	1 555	1 239	973	4 512	18	36 225	3 183	2 759	-425	35 800	0.99
<b>GDP</b>	<b>129 374</b>	<b>TOT POP</b>	<b>253 210</b>			<b>LAB FOR</b>	<b>118 751</b>	<b>AG LAB</b>	<b>34 851</b>	<b>TOT CAL</b>	<b>2 800</b>	
<b>2030</b>												
Cereals	9 015	39	1 023	231	1 196	0	11 504	2 460	1	-2 459	9 045	0.79
Non-cer. food crops	23 112	1 427	1 246	956	3 730	20	30 491	1 036	346	-690	29 801	0.98
Staple food crops	17 412	93	2 268	965	3 837	-2	24 573	2 482	1	-2 481	22 092	0.90
Non-food crops	107	1 065	0	0	54	0	1 227	115	3 111	2 996	4 223	3.44
Livestock	9 545	0	71	125	104	-1	9 843	1 386	0	-1 385	8 457	0.86
All food commodities	41 671	1 467	2 339	1 312	5 030	19	51 837	4 882	348	-4 534	47 303	0.91
All agric. commodities	41 778	2 532	2 339	1 312	5 084	19	53 063	4 997	3 459	-1 538	51 526	0.97
<b>GDP</b>	<b>237 529</b>	<b>TOT POP</b>	<b>336 728</b>			<b>LAB FOR</b>	<b>161 834</b>	<b>AG LAB</b>	<b>38 131</b>	<b>TOT CAL</b>	<b>2 984</b>	

INDIAN OCEAN ISLANDS												
	FOOD	INDUSTRY	FEED	SEED	WASTE	DISCR.	DEMAND	IMPORT	EXPORT	TRADE	PRODN	SSR
<b>1997/99</b>												
Cereals	543	5	40	21	73	0	682	138	5	-133	546	0.80
Non-cereal food crops	724	72	39	14	66	-2	914	159	104	-55	851	0.93
Staple food crops	802	13	78	32	101	0	1 025	149	8	-141	882	0.86
Non-food crops	29	50	0	0	6	0	85	21	29	8	100	1.17
Livestock	877	5	0	5	9	0	896	105	17	-89	807	0.90
All food commodities	2 144	83	79	39	149	-2	2 492	403	126	-277	2 204	0.88
All agric. commodities	2 173	133	79	39	155	-2	2 577	423	155	-269	2 304	0.89
<b>GDP</b>	<b>8 040</b>	<b>TOT POP</b>	<b>19240</b>	<b>AG POP</b>	<b>12968</b>	<b>LAB FOR</b>	<b>8 398</b>	<b>AG LAB</b>	<b>6 036</b>	<b>TOT CAL</b>	<b>7 223</b>	
<b>2015</b>												
Cereals	870	6	72	32	98	0	1 079	231	0	-231	848	0.79
Non-cer. food crops	1 294	127	68	25	99	-6	1 606	304	95	-209	1 397	0.87
Staple food crops	1 310	11	137	51	140	0	1 648	245	0	-245	1 403	0.85
Non-food crops	47	94	0	0	8	0	148	32	30	-2	146	0.99
Livestock	1 465	8	0	8	13	0	1 495	132	0	-132	1 362	0.91
All food commodities	3 629	141	140	65	210	-6	4 180	667	95	-572	3 608	0.86
All agric. commodities	3 676	234	140	65	218	-6	4 328	699	125	-574	3 754	0.87
<b>GDP</b>	<b>15 770</b>	<b>TOT POP</b>	<b>29712</b>	<b>LAB FOR</b>	<b>15 844</b>	<b>LAB FOR</b>	<b>15 844</b>	<b>AG LAB</b>	<b>9 045</b>	<b>TOT CAL</b>	<b>7 765</b>	
<b>2030</b>												
Cereals	1 302	6	115	48	122	0	1 594	319	0	-319	1 275	0.80
Non-cer. food crops	1 904	160	104	36	133	-5	2 331	448	90	-357	1 974	0.85
Staple food crops	1 930	10	214	76	176	0	2 405	338	0	-338	2 067	0.86
Non-food crops	66	138	0	0	9	0	214	41	29	-12	201	0.94
Livestock	2 219	8	0	13	17	0	2 257	182	0	-182	2 075	0.92
All food commodities	5 425	174	219	96	273	-5	6 182	949	90	-859	5 323	0.86
All agric. commodities	5 491	312	219	96	282	-5	6 395	990	119	-871	5 525	0.86
<b>GDP</b>	<b>28 470</b>	<b>TOT POP</b>	<b>41 465</b>	<b>LAB FOR</b>	<b>21 982</b>	<b>LAB FOR</b>	<b>21 982</b>	<b>AG LAB</b>	<b>11 652</b>	<b>TOT CAL</b>	<b>8 343</b>	

REPUBLIC OF SOUTH AFRICA												
	FOOD	INDUSTRY	FEED	SEED	WASTE	DISCR.	DEMAND	IMPORT	EXPORT	TRADE	PRODN	SSR
<b>1997/99</b>												
Cereals	1 136	21	480	23	48	-7	1 701	294	191	-104	1 417	0.83
Non-cereal food crops	1 807	248	47	15	117	11	2 245	447	701	254	2 518	1.12
Staple food crops	1 324	30	512	34	59	-7	1 951	338	202	-136	1 635	0.84
Non-food crops	45	141	0	0	0	-1	184	150	65	-85	100	0.54
Livestock	3 351	12	26	28	36	0	3 453	385	100	-285	3 166	0.92
All food commodities	6 293	282	552	66	201	5	7 399	1 126	992	-135	7 101	0.96
All agric. commodities	6 338	422	552	66	201	4	7 583	1 276	1 057	-219	7 200	0.95
<b>GDP</b>	<b>22 149</b>	<b>TOT POP</b>	<b>54 794</b>	<b>AG POP</b>	<b>36 005</b>	<b>LAB FOR</b>	<b>24 063</b>	<b>AG LAB</b>	<b>18 238</b>	<b>TOT CAL</b>	<b>2 033</b>	
<b>2015</b>												
Cereals	1 245	43	766	26	58	-9	2 128	292	101	-191	1 937	0.91
Non-cer. food crops	2 099	265	60	20	128	18	2 590	161	728	568	3 158	1.22
Staple food crops	1 457	58	806	39	70	-9	2 421	331	102	-229	2 192	0.91
Non-food crops	55	268	0	0	0	0	323	202	0	-202	121	0.38
Livestock	4 298	5	31	45	47	1	4 426	448	29	-419	4 007	0.91
All food commodities.	7 642	313	857	91	233	10	9 144	900	858	-42	9 103	1
All agric. commodities	7 697	581	857	91	233	10	9 468	1 102	858	-244	9 224	0.97
<b>GDP</b>	<b>155 276</b>	<b>TOT POP</b>	<b>44 616</b>			<b>LAB FOR</b>	<b>2 5343</b>	<b>AG LAB</b>	<b>1 067</b>	<b>TOT CAL</b>	<b>2 996</b>	
<b>2030</b>												
Cereals	1 273	64	1024	28	67	-10	2 446	312	124	-188	2 258	0.92
Non-cer. food crops	2 331	278	75	24	141	23	2 872	49	844	796	3 668	1.28
Staple food crops	1 495	86	1074	43	81	-10	2 768	357	124	-233	2 536	0.92
Non-food crops	59	374	0	0	0	0	434	290	0	-290	144	0.33
Livestock	5216	2	36	54	49	2	5 359	448	29	-419	4 941	0.92
All food commodities	8 821	345	1 135	106	258	14	10 677	809	998	189	10 866	1.02
All agric. commodities	8 880	719	1 135	106	258	14	11 111	1 098	998	-101	11 010	0.99
<b>GDP</b>	<b>241 915</b>	<b>TOP POP</b>	<b>43 938</b>			<b>LAB FOR</b>	<b>31 047</b>	<b>AG LAB</b>	<b>736</b>	<b>TOT CAL</b>	<b>3 209</b>	

SOUTHERN												
	FOOD	INDUSTRY	FEED	SEED	WASTE	DISCR.	DEMAND	IMPORT	EXPORT	TRADE	PRODN	SSR
<b>1997/99</b>												
Cereals	1 053	5	100	24	77	-1	1 258	276	65	-211	934	0.74
Non-cereal food crops	1 761	63	45	67	199	-9	2 125	344	233	-111	1 995	0.94
Staple food crops	1 812	5	144	64	220	-3	2 242	295	79	-216	1 912	0.85
Non-food crops	21	136	0	0	0	-1	156	48	684	636	814	5.22
Livestock	1 112	0	13	9	16	0	1 150	152	282	131	1 289	1.12
All food commodities.	3 926	68	157	100	292	-11	4 532	772	580	-192	4 218	0.93
All agric. commodities	3 946	204	157	100	292	-12	4 688	820	1 264	444	5 032	1.07
<b>GDP</b>	<b>24 931</b>		<b>56 485</b>		<b>3 6819</b>		<b>24 699</b>		<b>18 528</b>		<b>4 124</b>	
<b>2015</b>												
Cereals	1 605	4	162	40	102	-1	1 912	394	15	-379	1 533	0.80
Non-cer. food crops	2 706	118	74	103	247	-14	3 235	403	164	-239	2 996	0.93
Staple food crops	2 720	4	235	97	272	-3	3 325	413	20	-394	2 931	0.88
Non-food crops	35	240	0	0	0	0	275	33	701	668	943	3.43
Livestock	1 725	0	17	18	23	0	1 783	153	306	153	1 936	1.09
All food commodities	6 036	122	254	161	372	-15	6 930	950	485	-465	6 465	0.93
All agric. commodities	6 071	362	254	161	372	-15	7 206	983	1 186	203	7 409	1.03
<b>GDP</b>	<b>4 6214</b>		<b>77 517</b>				<b>40 634</b>		<b>24 579</b>		<b>4 529</b>	
<b>2030</b>												
Cereals	2 295	4	292	58	136	-1	2 784	551	13	-538	2 246	0.81
Non-cer. food crops	3 963	221	129	164	308	-15	4 769	587	200	-387	4 382	0.92
Staple food crops	3 814	4	418	137	330	-3	4 700	579	18	-561	4 140	0.88
Non-food crops	51	374	0	0	0	0	425	53	920	867	1 292	3.04
Livestock	2 800	0	25	31	35	0	2891	202	365	163	3 054	1.06
All food commodities	9 057	224	446	253	479	-16	10 443	1 339	578	-761	9 682	0.93
All agric. commodities	9 108	598	446	253	479	-16	10 868	1 392	1 498	106	10 974	1.01
<b>GDP</b>	<b>81 628</b>		<b>10 1423</b>				<b>54 427</b>		<b>32 095</b>		<b>4 935</b>	

SUDANO-SAHELIAN												
	FOOD	INDUSTRY	FEED	SEED	WASTE	DISCR.	DEMAND	IMPORT	EXPORT	TRADE	PRODN	SSR
1997/99												
Cereals	2 348	51	52	72	211	0	2 734	612	19	-593	2 083	0.76
Non-cereal food crops	2 800	347	3	187	292	-3	3 625	567	342	-225	3 414	0.94
Staple food crops	2 788	51	54	155	281	-1	3 328	642	25	-617	2 689	0.81
Non-food crops	239	234	0	0	0	0	474	65	514	449	913	1.93
Livestock	5 113	75	26	13	161	0	5 388	128	320	192	5 563	1.03
All food commodities.	10 260	473	80	273	664	-3	11 747	1 307	681	-626	11 060	0.94
All agric. commodities	10 499	707	80	273	665	-3	12 221	1 372	1 194	-178	11 973	0.98
<b>GDP</b>	<b>57 324</b>	<b>TOT POP</b>	<b>91 983</b>	<b>AG POP</b>	<b>67 203</b>	<b>LAB FOR</b>	<b>39 413</b>	<b>AG LAB</b>	<b>30 302</b>	<b>TOT CAL</b>	<b>2 202</b>	
2015												
Cereals	3 944	51	120	124	311	0	4 550	1 039	16	-1 023	3 527	0.78
Non-cer. food crops	4 996	439	4	291	372	-3	6 100	713	128	-585	5 515	0.90
Staple food crops	4 732	51	124	249	400	-1	5 556	1 068	19	-1 049	4 507	0.81
Non-food crops	370	449	0	0	0	0	819	90	603	512	1 331	1.63
Livestock	9 037	75	43	29	248	0	9 431	201	376	176	9 607	1.02
All food commodities	17 976	566	168	443	931	-3	20 081	1 952	520	-1 432	18 649	0.93
All agric. commodities	18 346	1014	168	443	931	-3	20 900	2 042	1 122	-920	19 980	0.96
<b>GDP</b>	<b>138 593</b>	<b>TOT POP</b>	<b>147 602</b>	<b>LAB FOR</b>	<b>67 795</b>	<b>LAB FOR</b>	<b>67 795</b>	<b>AG LAB</b>	<b>44 579</b>	<b>TOT CAL</b>	<b>2 347</b>	
2030												
Cereals	6 054	51	213	191	426	0	6 936	1 601	16	-1 586	5 350	0.77
Non-cer. food crops	7 934	571	7	447	480	-3	9 436	1 308	124	-1 184	8 252	0.87
Staple food crops	7 310	51	219	394	547	-1	8 521	1 650	16	-1 635	6 886	0.81
Non-food crops	483	718	0	0	1	0	1 202	159	721	562	1 764	1.47
Livestock	14 394	75	61	51	330	0	14 911	288	443	155	15 066	1.01
All food commodities	28 382	697	281	689	1 237	-3	31 282	3 197	582	-2 615	28 667	0.92
All agric. commodities.	28 865	1415	281	689	1 237	-3	32 484	3 356	1 303	-2 053	30 431	0.94
<b>GDP</b>	<b>299 228</b>	<b>TOT POP</b>	<b>212 192</b>	<b>LAB FOR</b>	<b>9 2428</b>	<b>LAB FOR</b>	<b>9 2428</b>	<b>AG LAB</b>	<b>58 628</b>	<b>TOT CAL</b>	<b>2 530</b>	

Annex 6

## **Trade data for sub-Saharan Africa – wheat; rice; coarse grains; oils and fats; sugar**

TABLE A6.1  
Wheat data for sub-Saharan Africa 1990-2003

Wheat	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Imports (million tonnes)	4 873 202	5 605 338	5 708 596	5 640 756	6 254 744	5 314 820	5 538 890	6 558 602	8 508 680	7 600 125	9 840 546	9 489 315	10 009 540	10 694 000
Import value (US\$000)	973 410	905 419	1 051 764	982 219	1 085 488	1 145 637	1 301 376	1 244 803	1 537 158	1 255 057	1 489 217	1 486 474	1 626 317	1 984 333
Exports (million tonnes)	211 934	70 531	161 996	220 389	84 740	309 086	203 764	242 874	318 858	212 518	240 051	270 657	286 911	365 712
Export value (US\$000)	51 349	15 879	36 349	29 289	15 240	56 266	47 543	64 293	66 302	39 788	51 470	48 360	40 132	70 733
Import unit value (US\$)	200	162	184	174	174	216	235	190	181	165	151	157	162	186
Export unit value (US\$)	242	225	224	133	180	182	233	265	208	187	214	179	140	193
Domestic supply (million tonnes)	6 296 677	6 927 692	7 503 312	7 761 008	7 771 092	7 669 479	8 216 762	8 888 247	9 961 894	10 122 840	11 557 380	12 119 710	13 336 550	13 336 550
Food (million tonnes)	5 995 884	6 580 856	7 127 319	7 381 723	7 363 538	7 272 302	7 804 799	8 429 343	9 258 322	9 583 798	10 997 740	11 563 020	12 649 010	12 649 010
Supply/capita/year (kg)	13	14	14	15	14	14	14	15	16	16	18	19	20	20
Food calories/capita/day	102	109	114	115	113	109	114	119	127	128	143	147	158	158
Calories per 100 g	291	291	290	289	292	294	293	291	290	289	289	291	292	299
Food calories (million)	17 423 831	19 143 235	20 636 414	21 341 433	21 512 243	21 406 398	22 839 469	24 554 609	26 893 378	27 707 284	31 776 224	33 623 688	36 905 759	37 801 382
Domestic calories (million)	18 297 925	20 152 156	21 725 063	22 437 991	22 702 894	22 575 509	24 045 012	25 891 393	28 937 099	29 265 684	33 393 215	35 242 467	38 911 780	39 856 086
Domestic supply value (US\$million)	1 258	1 119	1 382	1 351	1 349	1 653	1 931	1 687	1 800	1 672	1 749	1 899	2 167	2 475
Food aid (million tonnes)	1 545 970	2 293 041	2 076 744	1 165 095	1 554 479	1 156 227	682 719	1 002 251	1 328 282	1 162 061	2 117 514	1 545 674	1 172 970	2 436 319
Share of calories (%)	5	5	5	5	5	5	5	6	6	6	7	7	7	7
Commercial imports (million tonnes)	3 327 232	3 312 297	3 631 852	4 475 661	4 700 265	4 158 593	4 856 171	5 556 351	7 180 398	6 438 064	7 723 032	7 943 641	8 836 570	8 257 681
Imported calories (million)	14 161 356	16 305 523	16 528 648	16 308 092	18 272 952	15 644 448	16 208 657	19 105 155	24 715 834	21 972 377	28 432 696	27 593 636	29 204 631	31 958 864
Imports value/domestic supply value (%)	77	81	76	73	80	69	67	74	85	75	85	78	75	80
Derived value (US\$000)	664 606	535 029	669 140	779 342	815 714	896 406	1 140 969	1 054 579	1 297 194	1 063 158	1 168 763	1 244 349	1 435 737	1 532 260
Aid bill (US\$)	308 804	370 390	382 624	202 877	269 774	249 231	160 407	190 224	239 964	191 899	320 454	242 125	190 580	452 073
Share of aid (%)	41	39	25	23	27	30	25	35	37	36	43	41	31	47
Share of import bill (%)	14	12	12	14	15	14	17	16	17	16	18	17	18	18
Share of comm. imp. cereal bill (%)	53	50	45	49	50	50	55	51	55	58	61	54	55	58
Share of export earnings (%)	1	0	0	0	0	0	0	1	1	0	1	0	0	1

Source: FAO Trade and Food Security Database (2005).



TABLE A6.2  
Rice trade data for sub-Saharan Africa 1990–2003

Rice	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Imports (million tonnes)	2 714 254	3 092 970	3 478 864	3 382 145	3 539 753	3 341 572	3 170 283	3 709 137	3 905 992	4 065 190	4 177 678	5 978 784	5 805 532	5 039 302
Import value (US\$000)	806 873	908 434	1 044 567	930 779	961 376	1 042 291	1 069 037	1 112 709	1 221 078	1 197 740	1 087 085	1 302 054	1 190 699	1 127 493
Exports (million tonnes)	20 666	5 141	184 062	65 387	46 027	7 205	46 042	27 971	33 267	29 672	18 263	48 477	131 233	79 239
Export value (US\$000)	6 961	2 191	25 440	18 840	14 986	3 027	16 584	11 686	12 499	11 247	6 386	13 962	24 888	19 115
Import unit value (US\$)	297	294	300	275	272	312	337	300	313	295	260	218	205	224
Export unit value (US\$)	337	426	138	288	326	420	360	418	376	379	350	288	190	241
Domestic supply (million tonnes)	9 259 668	9 593 241	9 888 421	9 972 887	9 469 178	9 883 727	10 417 430	11 245 840	11 387 830	12 062 150	12 561 770	13 618 840	13 100 810	13 100 810
Food (million tonnes)	7 923 760	8 224 940	8 398 240	8 497 667	8 061 700	8 562 079	9 073 209	9 851 771	9 966 295	10 575 770	11 066 300	11 926 560	11 388 240	11 388 240
Supply/capita/year (kg)	17	17	17	17	16	16	17	18	17	18	18	19	18	18
Food calories/capita/day	169	170	169	166	153	159	164	174	171	177	180	190	177	177
Calories per 100 g	363	363	364	363	362	363	364	364	364	363	363	363	363	372
Food calories (million)	28 787 051	29 874 755	30 551 065	30 857 857	29 203 495	31 056 117	33 015 809	35 838 464	36 240 970	38 388 146	40 140 380	43 272 820	41 372 031	42 376 042
Domestic calories (million)	33 640 410	34 844 720	35 972 036	36 214 871	34 302 082	35 849 959	37 907 192	40 909 765	41 410 174	43 783 438	45 564 842	49 412 874	47 593 581	48 748 575
Domestic supply value (US\$million)	2 753	2 818	2 971	2 745	2 572	3 083	3 513	3 374	3 560	3 554	3 269	2 966	2 687	2 931
Food aid (million tonnes)	290 905	538 950	656 184	445 990	392 200	184 705	232 229	221 515	193 528	174 395	237 578	349 247	259 071	286 554
Share of calories (%)	8	8	8	8	7	7	8	8	8	8	8	9	8	8
Commercial imports (million tonnes)	2 423 349	2 554 020	2 820 680	2 936 155	3 147 553	3 156 867	2 938 054	3 487 622	3 712 464	3 890 795	3 940 100	5 629 537	5 546 461	4 752 748
Imported calories (million)	9 860 895	11 234 334	12 648 114	12 281 694	12 822 749	12 120 450	11 536 101	13 492 982	14 203 567	14 755 910	15 153 536	21 692 663	21 090 761	18 751 420
Imports value/domestic supply value (%)	29	32	35	34	37	34	30	33	34	34	33	44	44	38
Derived value (US\$000)	720 395	750 139	847 427	808 041	854 856	984 678	990 728	1 046 256	1 160 578	1 146 357	1 025 264	1 225 995	1 137 564	1 063 379
Aid bill (US\$)	86 478	158 295	197 140	122 738	106 519	57 613	78 309	66 453	60 500	51 383	61 821	76 059	53 135	64 114
Share of aid (%)	11	16	13	14	10	7	12	12	9	10	8	13	9	7
Share of import bill (%)	15	16	15	15	16	15	15	15	15	17	16	17	14	13
Share of comm. imp. cereal bill (%)	39	39	35	32	33	38	33	32	29	35	31	38	35	34
Share of export earnings (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: FAO Trade and Food Security Database (2005).

TABLE A6.3  
Coarse grain trade data for sub-Saharan Africa 1990–2003

Coarse grains	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Imports (million tonnes)	1 223 367	1 731 657	4 978 784	3 268 015	3 197 174	2 152 952	1 664 101	2 401 384	2 815 020	1 438 734	1 687 738	1 980 556	2 644 261	1 997 994
Import value (US\$000)	225 334	286 699	875 595	563 573	534 130	436 241	343 436	466 831	603 706	285 572	298 403	304 690	472 075	346 238
Exports (million tonnes)	1 196 112	655 080	176 789	1 522 993	1 761 632	1 048 277	643 997	600 239	632 348	563 965	328 140	255 672	449 190	350 615
Export value (US\$000)	171 020	80 228	30 879	197 309	225 007	163 304	110 952	92 390	78 394	68 950	34 554	39 040	72 841	56 597
Import unit value (US\$)	184	166	176	172	167	203	206	194	214	198	177	154	179	173
Export unit value (US\$)	143	122	175	130	128	156	172	154	124	122	105	153	162	161
Domestic supply (million tonnes)	51 483 075	52 702 187	53 933 047	56 009 615	59 745 110	62 180 544	63 496 338	63 295 453	64 711 526	66 198 830	65 819 090	66 271 790	68 353 250	68 353 250
Food (million tonnes)	39 167 276	39 952 004	40 764 501	42 170 520	45 054 332	46 684 079	47 944 432	48 220 296	49 069 753	50 287 822	50 257 690	50 753 550	52 069 480	52 069 480
Supply/capita/year (kg)	84	83	83	83	87	87	87	86	85	85	83	82	82	82
Food calories/capita/day	706	701	696	700	726	733	733	719	714	714	696	686	686	686
Calories per 100 g	308	308	308	308	307	308	308	308	308	308	308	308	308	316
Food calories (million)	120 503 736	123 185 073	125 640 352	129 883 962	138 494 004	143 584 609	147 444 345	148 410 855	151 144 806	154 957 160	154 881 549	156 395 772	160 390 824	164 283 166
Domestic calories (million)	158 395 055	162 498 050	166 227 155	172 507 968	183 652 473	191 246 551	195 271 391	194 808 682	199 324 644	203 985 424	202 837 866	204 214 834	210 550 098	215 659 698
Domestic supply value (US\$million)	9 483	8 726	9 485	9 659	9 981	12 599	13 104	12 305	13 878	13 140	11 637	10 195	12 203	11 845
Food aid (million tonnes)	686 465	1 024 969	3 371 424	1 567 667	1 631 498	1 158 495	676 087	624 319	742 041	612 823	731 258	789 916	968 349	859 451
Share of calories (%)	34	33	33	33	34	34	34	33	33	33	32	31	31	31
Commercial imports (million tonnes)	536 902	706 688	1 607 360	1 700 348	1 565 676	994 457	988 014	1 777 065	2 072 979	825 911	956 480	1 190 640	1 675 912	1 138 543
Imported calories (million)	3 763 864	5 339 264	15 345 120	10 065 390	9 827 899	6 621 760	5 117 639	7 390 901	8 670 833	4 433 323	5 201 184	6 103 033	8 145 178	6 303 823
Imports value / domestic supply value (%)	2	3	9	6	5	3	3	4	4	2	3	3	4	3
Derived value (US\$000)	98 893	117 002	282 679	293 227	261 567	201 501	203 905	345 463	444 569	163 934	169 112	183 169	299 197	197 301
Aid bill (US\$)	126 441	169 697	592 916	270 346	272 563	234 739	139 530	121 368	159 137	121 638	129 291	121 521	172 878	148 937
Share of aid (%)	17	18	39	30	27	28	22	22	25	23	17	20	28	15
Share of import bill (%)	2	3	5	5	5	3	3	5	6	2	3	2	4	2
Share of comm. imp. cereal bill (%)	9	11	20	19	17	12	11	16	16	7	8	8	10	8
Share of export earnings (%)	2	1	0	3	2	1	1	1	1	1	0	0	1	0

Source: FAO Trade and Food Security Database (2005).

TABLE A6.4  
Oils and fats trade data for sub-Saharan Africa 1990–2003

Element – unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Imports (million tonnes)	1 028 776	1 080 107	1 330 756	1 153 259	1 272 441	1 250 992	1 454 867	1 468 582	1 502 497	1 708 936	1 802 360	2 202 773	2 306 693	2 578 851
Import value (US\$000)	650 208	662 865	824 369	724 828	813 574	985 055	1 082 801	998 683	1 141 211	1 251 050	1 059 590	1 159 475	1 308 066	1 611 068
Exports (million tonnes)	873 386	710 838	868 983	968 534	1 079 777	866 797	1 171 492	1 243 109	1 299 192	1 067 248	1 440 292	1 113 835	1 138 750	1 254 866
Export value (US\$000)	430 574	331 204	351 830	357 182	469 016	454 207	585 168	594 010	604 955	519 264	547 891	430 566	422 338	522 296
Import unit value (US\$)	632	614	619	629	639	787	744	680	760	732	588	526	567	625
Export unit value (US\$)	493	466	405	369	434	524	500	478	466	487	380	387	371	416
Domestic supply (million tonnes)	13 350	13 800 918	13 750 292	14 084 296	14 721 665	15 496 213	16 511 914	17 131 237	17 337 134	18 334 512	18 312 284	19 428 382	20 230 794	20 230 794
Food (million tonnes)	5 892 399	6 086 329	6 294 276	6 541 095	6 707 793	6 795 311	6 978 357	7 182 240	7 498 865	7 842 842	8 047 774	8 311 322	8 602 779	8 602 779
Supply/capita/year (kg)	13	13	13	13	13	13	13	13	13	13	13	13	14	14
Food calories/capita/day	239	243	246	249	248	243	243	244	248	252	251	252	255	255
Calories per 100 g	691	700	705	706	706	699	699	701	700	698	695	692	694	711
Food calories (million)	40 734	42 622 278	44 353 213	46 168 015	47 341 044	47 506 460	48 760 789	50 338 909	52 508 236	54 741 587	55 920 545	57 509 281	59 681 176	61 129 511
Domestic calories (million)	92 293	96 647 179	96 892 747	99 409 052	103 899 904	108 335 026	115 375 870	120 069 478	121 397 353	127 971 497	127 244 242	134 432 559	140 349 709	143 755 696
Domestic supply value (US\$million)	8 438	8 470	8 518	8 852	9 413	12 202	12 289	11 650	13 168	13 422	10 766	10 227	11 472	12 639
Food aid (million tonnes)	130 390	130 686	182 901	166 852	176 571	118 386	121 349	82 086	105 718	91 946	185 317	128 656	132 950	172 735
Share of calories (%)	11	11	12	12	12	11	11	11	11	12	11	11	12	12
Commercial imports (million tonnes)	898 386	949 421	1 147 855	986 407	1 095 870	1 132 606	1 333 518	1 386 496	1 396 779	1 616 990	1 617 043	2 074 117	2 173 743	2 406 116
Imported calories (million)	7 111 926	7 563 938	9 377 299	8 139 873	8 980 406	8 745 765	10 165 783	10 293 003	10 520 722	11 928 058	12 523 831	15 241 844	16 002 520	18 324 764
Imports value/domestic supply value (%)	8	8	10	8	9	8	9	9	9	9	10	11	11	13
Derived value (US\$000)	567 799	582 663	711 067	619 961	700 678	891 835	992 485	942 862	1 060 914	1 183 740	950 644	1 091 754	1 232 673	1 503 156
Aid bill (US\$)	82 409	80 202	113 303	104 867	112 896	93 219	90 315	55 821	80 297	67 310	108 946	67 721	75 393	107 912
Share of aid (%)	11	8	7	12	11	11	14	10	12	13	15	11	12	11
Share of import bill (%)	12	13	13	11	13	14	15	14	14	17	14	15	15	18
Share of export earnings (%)	5	4	5	5	5	4	5	5	5	5	5	4	4	4

Source: FAO Trade and Food Security Database (2005).

TABLE A6.5  
Sugar data for sub-Saharan Africa 1990–2003

Sugar	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Imports (million tonnes)	1 297 815	1 413 481	1 705 846	1 659 104	1 905 278	2 206 382	2 071 481	2 269 967	3 100 968	2 935 984	2 805 675	3 584 252	3 956 390	3 751 812
Import value (US\$000)	540 811	467 939	569 539	546 405	664 070	834 575	807 612	783 525	958 355	704 861	680 190	923 334	941 797	846 250
Exports (million tonnes)	1 709 203	1 509 175	1 581 425	1 320 790	1 579 265	1 375 964	1 525 104	1 657 919	1 646 357	1 459 010	2 082 398	1 613 732	1 515 986	1 512 669
Export value (US\$000)	856 339	749 619	811 890	678 189	815 978	821 876	874 533	798 294	802 721	683 044	568 399	612 792	554 267	701 211
Import unit value (US\$)	417	331	334	329	349	378	390	345	309	240	242	258	238	226
Export unit value (US\$)	501	497	513	513	517	597	573	482	488	468	273	380	366	464
Domestic supply (million tonnes)	3 954 314	4 219 188	4 248 336	4 288 526	4 382 558	5 028 734	4 805 363	5 211 009	5 781 222	5 865 607	6 260 180	6 796 988	7 470 330	7 470 330
Food (million tonnes)	3 817 559	4 067 784	4 102 200	4 179 729	4 253 660	4 845 050	4 690 581	4 973 470	5 472 061	5 550 716	5 991 408	6 532 053	6 957 447	6 957 447
Supply/capita/year (kg)	8	8	8	8	8	9	9	9	9	9	10	10	11	11
Food calories/capita/day	79	82	81	80	79	88	83	85	92	91	96	102	106	106
Calories per 100 g	354	355	355	355	354	355	354	354	355	355	355	355	355	363
Food calories (million)	13 524 553	14 428 109	14 571 341	14 838 791	15 073 633	17 198 353	16 621 489	17 626 252	19 416 998	19 681 442	21 284 306	23 201 257	24 687 197	25 286 303
Domestic calories (million)	14 009 038	14 965 127	15 090 428	15 225 040	15 530 407	17 850 371	17 028 229	18 468 103	20 514 021	20 797 966	22 239 110	24 142 282	26 507 066	27 150 336
Domestic supply value (US\$million)	1 648	1 397	1 418	1 412	1 528	1 902	1 873	1 799	1 787	1 408	1 518	1 751	1 778	1 685
Food aid (million tonnes)	29 722	26 285	22 268	20 201	26 734	10 151	13 964	8 532	8 869	6 198	16 151	5 794	7 377	19 199
Share of calories (%)	4	4	4	4	4	4	4	4	4	4	4	4	5	5
Commercial imports (million tonnes)	1 268 093	1 387 196	1 683 578	1 638 903	1 878 544	2 196 231	2 057 517	2 261 435	3 092 099	2 929 786	2 789 524	3 578 458	3 949 013	3 732 613
Imported calories (million)	4 597 799	5 013 506	6 059 301	5 890 118	6 751 706	7 831 939	7 340 476	8 044 888	11 003 439	10 410 260	9 967 080	12 730 937	14 038 509	13 635 670
Imports value/domestic supply value (%)	33	34	40	39	43	44	43	44	54	50	45	53	53	50
Derived value (US\$000)	528 426	459 237	562 104	539 752	654 752	830 736	802 168	780 580	955 614	703 373	676 275	921 841	940 041	841 920
Aid bill (US\$)	12 385	8 702	7 435	6 653	9 318	3 840	5 444	2 945	2 741	1 488	3 916	1 493	1 756	4 330
Share of aid (%)	2	1	0	1	1	0	1	1	0	0	1	0	0	0
Share of import bill (%)	11	10	10	10	12	13	12	12	12	10	10	13	12	10
Share of export earnings (%)	10	9	10	9	9	7	7	7	6	6	6	6	5	6

Source: FAO Trade and Food Security Database (2005). Table 25

## Annex 7

# Analysis of annual regional calorie surpluses and shortfalls by staple crop group, 1997/99

1997/99	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>CENTRAL REGION</b>						
Wheat	3 384	92	3 476	45	-3 431	0.01
Rice	2 032	148	2 180	1 117	-1 063	0.51
Maize	7 127	1 112	8 239	7 818	-421	0.95
Barley	358	0	358	1	-357	0.00
Millet	574	57	632	602	-29	0.95
Sorghum	1 640	-187	1 453	1 429	-23	0.98
Other	20	0	20	0	-20	0.00
<b>TOTAL</b>	<b>15 135</b>	<b>1 222</b>	<b>16 357</b>	<b>11 012</b>	<b>-5 344</b>	<b>0.67</b>
Potato	74	28	102	90	-12	0.88
Sweet potato	1 375	367	1 743	1 744	1	1.00
Cassava	19 849	2 760	22 609	22 489	-121	0.99
Other root crops	802	392	1 195	1 196	1	1.00
Plantain	2 374	513	2 887	2 887	0	1.00
<b>TOTAL</b>	<b>24 475</b>	<b>4 061</b>	<b>28 536</b>	<b>28 405</b>	<b>-131</b>	<b>1.00</b>

\* SSR = Self-sufficiency ratio

1997/99	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>EASTERN REGION</b>						
Wheat	7 463	547	8 010	4 336	-3 674	0.54
Rice	2 605	278	2 883	2 122	-761	0.74
Maize	26 017	3 465	29 482	26 175	-3 307	0.89
Barley	2 543	314	2 857	2 643	-214	0.93
Millet	2 982	517	3 499	3 443	-56	0.98
Sorghum	7 148	925	8 074	7 838	-236	0.97
Other	5 200	478	5 678	5 666	-13	1.00
<b>TOTAL</b>	<b>53 959</b>	<b>6 524</b>	<b>60 483</b>	<b>52 223</b>	<b>-8 260</b>	<b>0.86</b>
Potato	861	286	1 147	1 151	4	1.00
Sweet potato	4 688	547	5 235	5 202	-33	0.99
Cassava	9 319	1 349	10 668	10 679	11	1.00
Other root crops	3 751	405	4 156	4 156	0	1.00
Plantain	7 317	3 063	10 380	10 380	0	1.00
<b>TOTAL</b>	<b>25 937</b>	<b>5 650</b>	<b>31 586</b>	<b>31 568</b>	<b>-18</b>	<b>1.00</b>

\* SSR = Self-sufficiency ratio

1997/99						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>GULF OF GUINEA REGION</b>						
Wheat	6 497	275	6 772	256	-6 516	0.04
Rice	18 411	3 009	21 420	14 622	-6 798	0.68
Maize	15 571	9 991	25 562	25 476	-86	1.00
Barley	193	0	193	0	-193	0.00
Millet	12 859	4 880	17 740	17 708	-32	1.00
Sorghum	16 855	6 503	23 359	23 342	-17	1.00
Other	611	153	764	684	-79	0.90
TOTAL	70 997	24 812	95 809	82 088	-13 721	0.86
Potato	72	30	101	91	-11	0.89
Sweet potato	15 935	18 619	34 554	34 564	10	1.00
Cassava	22 289	21 785	44 074	44 093	19	1.00
Other root crops	2 587	3 431	6 018	6 024	6	1.00
Plantain	4 082	435	4 517	4 517	0	1.00
TOTAL	44 964	44 300	89 264	89 289	25	1.00

\* SSR = Self-sufficiency ratio

1997/99						
<b>SOUTH AFRICA AND INDIAN OCEAN REGIONS</b>						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>SOUTH AFRICA</b>						
Wheat	7 870	541	8 411	5 752	-2 660	0.68
Rice	1 941	0	1 942	7	-1 934	0.00
Maize	13 757	12 535	26 292	27 047	755	1.03
Barley	435	556	990	417	-574	0.42
Millet	25	15	40	34	-6	0.85
Sorghum	670	319	989	975	-14	0.99
Other	21	150	171	95	-75	0.56
TOTAL	24 719	14 116	38 835	34 326	-4 508	0.88
Potato	854	278	1 132	1 148	16	1.01
Sweet potato	46	7	53	56	2	1.05
Cassava	0	4	4	0	-4	0.00
Other root crops	0	77	77	0	-77	0.00
Plantain	0	0	0	0	0	-
TOTAL	900	366	1 266	1 204	-62	0.95
<b>INDIAN OCEAN ISLANDS</b>						
Wheat	844	120	964	24	-940	0.02
Rice	5 922	1 497	7 419	6 495	-924	0.88
Maize	612	332	944	614	-329	0.65
Barley	46	2	49	0	-49	0.00
Millet	70	20	91	91	0	1.00
Sorghum	74	7	80	74	-6	0.92
Other	10	12	22	6	-17	0.25
TOTAL	7 579	1 990	9 570	7 303	-2 266	0.76
Potato	148	82	230	215	-16	0.93
Sweet potato	305	215	520	520	0	1.00
Cassava	1 969	449	2 418	2 418	-1	1.00
Other root crops	193	102	295	293	-2	0.99
Plantain	23	6	29	29	0	1.00
TOTAL	2 639	854	3 493	3 475	-18	0.99

\* SSR = Self-sufficiency ratio

1997/99						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>SOUTHERN REGION</b>						
Wheat	2 805	130	2 935	1 189	-1 746	0.41
Rice	926	77	1 003	658	-345	0.66
Maize	18 498	4 512	23 010	18 160	-4 850	0.79
Barley	103	19	123	28	-94	0.23
Millet	687	98	785	773	-12	0.98
Sorghum	1 477	188	1 666	1 473	-193	0.88
Other	155	-6	149	3	-146	0.02
TOTAL	24 652	5 019	29 671	22 284	-7 387	0.75
Potato	851	279	1 131	1 089	-42	0.96
Sweet potato	102	11	114	114	0	1.00
Cassava	5 483	1 564	7 047	7 047	0	1.00
Other root crops	327	68	395	395	0	1.00
Plantain	145	16	161	161	0	1.00
TOTAL	6 909	1 938	8 847	8 805	-42	1.00

\* SSR = Self-sufficiency ratio

1997/99						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>SUDANO-SAHELIAN REGION</b>						
Wheat	5 549	886	6 435	1 470	-4 965	0.23
Rice	6 632	456	7 088	3 080	-4 008	0.43
Maize	3 661	501	4 163	3 677	-486	0.88
Barley	146	36	182	101	-81	0.55
Millet	11 367	3 121	14 488	14 526	37	1.00
Sorghum	17 117	2 502	19 619	18 256	-1 363	0.93
Other	732	82	814	568	-246	0.70
TOTAL	45 204	7 586	52 790	41 678	-11 112	0.79
Potato	65	12	77	55	-22	0.72
Sweet potato	483	86	569	567	-2	1.00
Cassava	461	58	520	506	-14	0.97
Other root crops	212	21	233	143	-90	0.61
Plantain	0	0	0	0	0	-
TOTAL	1 222	177	1 398	1 271	-127	0.91

\* SSR = Self-sufficiency ratio

## Annex 8

# Analysis of regional calorie surpluses and shortfalls by staple crop group, 2030

2030						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>CENTRAL REGION</b>						
Wheat	12 582	317	12 898	199	-12 700	0.02
Rice	7 784	411	8 195	2 587	-5 608	0.32
Maize	25 647	4 595	30 241	25 595	-4 646	0.85
Barley	976	0	977	1	-976	0.00
Millet	1 389	139	1 528	1 527	-1	1.00
Sorghum	3 496	-346	3 150	2 928	-221	0.93
Other	54	0	54	0	-54	0.00
TOTAL	51 927	5 116	57 043	32 837	-24 206	0.58
Potato	212	76	288	285	-3	0.99
Sweet potato	4 029	854	4 883	4 884	1	1.00
Cassava	53 404	7 392	60 796	60 796	0	1.00
Other root crops	1 527	671	2 198	2 200	2	1.00
Plantain	6 151	975	7 126	7 126	0	1.00
TOTAL	65 322	9 969	75 291	75 292	1	1.00

\* SSR = Self-sufficiency ratio

2030						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>EASTERN REGION</b>						
Wheat	21 637	1 343	22 980	12 390	-10 590	0.54
Rice	8 389	699	9 088	6 168	-2 921	0.68
Maize	60 751	10 452	71 204	65 698	-5 506	0.92
Barley	5 766	626	6 393	5 700	-693	0.89
Millet	6 219	1 032	7 251	7 244	-7	1.00
Sorghum	16 151	2 050	18 201	17 837	-364	0.98
Other	12 062	1 224	13 286	13 178	-108	0.99
TOTAL	130 975	17 427	148 402	128 213	-20 188	0.86
Potato	2 836	822	3 658	3 658	0	1.00
Sweet potato	11 614	1 077	12 691	12 691	0	1.00
Cassava	21 073	3 772	24 845	24 841	-4	1.00
Other root crops	8 704	896	9 599	9 599	0	1.00
Plantain	16 973	5 876	22 850	22 785	-64	1.00
TOTAL	61 199	12 443	73 643	73 574	-68	1.00

\* SSR = Self-sufficiency ratio



2030						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>GULF OF GUINEA REGION</b>						
Wheat	18 190	641	18 831	682	-18 150	0.04
Rice	46 642	4 971	51 613	32 715	-18 898	0.63
Maize	37 685	25 618	63 303	62 459	-844	0.99
Barley	650	0	650	0	-650	0.00
Millet	26 346	9 668	36 013	36 034	20	1.00
Sorghum	32 524	11 781	44 305	44 305	0	1.00
Other	1 308	235	1 544	1 361	-183	0.88
<b>TOTAL</b>	<b>163 345</b>	<b>52 914</b>	<b>216 259</b>	<b>177 555</b>	<b>-38 704</b>	<b>0.82</b>
Potato	185	64	249	228	-21	0.92
Sweet potato	31 351	12 530	43 881	43 881	0	1.00
Cassava	42 983	28 378	71 361	71 342	-20	1.00
Other root crops	3 751	2 761	6 512	6 512	0	1.00
Plantain	7 015	569	7 585	7 585	0	1.00
<b>TOTAL</b>	<b>85 286</b>	<b>44 302</b>	<b>129 588</b>	<b>129 547</b>	<b>-41</b>	<b>1.00</b>

\* SSR = Self-sufficiency ratio

2030						
<b>SOUTH AFRICA AND INDIAN OCEAN ISLANDS REGIONS</b>						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>SOUTH AFRICA</b>						
Wheat	8 827	809	9 636	8 184	-1 452	0.85
Rice	2 603	0	2 603	7	-2 596	0.00
Maize	14 568	26 890	41 458	44 606	3 148	1.08
Barley	603	1 000	1 603	835	-769	0.52
Millet	16	15	32	32	0	1.00
Sorghum	643	596	1 239	1 247	8	1.01
Other	10	74	84	49	-35	0.58
<b>TOTAL</b>	<b>27 271</b>	<b>29 385</b>	<b>56 656</b>	<b>54 960</b>	<b>-1 696</b>	<b>0.97</b>
Potato	1 028	465	1 493	1 490	-3	1.00
Sweet potato	41	10	51	51	0	1.00
Cassava	0	4	4	0	-4	0.00
Other root crops	0	123	123	0	-123	0.00
Plantain	0	0	0	0	0	-
<b>TOTAL</b>	<b>1 068</b>	<b>603</b>	<b>1 671</b>	<b>1 540</b>	<b>-131</b>	<b>0.92</b>
<b>INDIAN OCEAN ISLANDS</b>						
Wheat	1 859	123	1 982	52	-1 930	0.03
Rice	14 180	3 039	17 219	15 022	-2 197	0.87
Maize	1 690	1 015	2 704	1 635	-1 069	0.60
Barley	122	3	125	1	-124	0.01
Millet	163	64	226	226	-1	1.00
Sorghum	204	19	222	214	-9	0.96
Other	22	42	63	16	-47	0.26
<b>TOTAL</b>	<b>18 238</b>	<b>4 305</b>	<b>22 543</b>	<b>17 166</b>	<b>-5 377</b>	<b>0.76</b>
Potato	404	190	594	564	-29	0.95
Sweet potato	881	533	1 415	1 417	2	1.00
Cassava	4 512	920	5 432	5 432	0	1.00
Other root crops	382	209	591	591	0	1.00
Plantain	36	6	42	42	0	1.00
<b>TOTAL</b>	<b>6 216</b>	<b>1 857</b>	<b>8 073</b>	<b>8 046</b>	<b>-27</b>	<b>1.00</b>

\* SSR = Self-sufficiency ratio

2030						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>SOUTHERN REGION</b>						
Wheat	6 642	229	6 871	2 838	-4 033	0.41
Rice	2 602	202	2 803	1 840	-964	0.66
Maize	38 008	10 730	48 738	42 672	-6 066	0.88
Barley	216	29	245	61	-184	0.25
Millet	1 647	281	1 928	1 929	1	1.00
Sorghum	3 535	492	4 027	3 911	-116	0.97
Other	243	24	268	8	-260	0.03
<b>TOTAL</b>	<b>52 893</b>	<b>11 988</b>	<b>64 881</b>	<b>53 259</b>	<b>-11 621</b>	<b>0.82</b>
Potato	2 089	552	2 641	2 583	-58	0.98
Sweet potato	204	22	226	226	0	1.00
Cassava	10 751	2 931	13 682	13 681	0	1.00
Other root crops	482	69	552	552	0	1.00
Plantain	281	31	312	312	0	1.00
<b>TOTAL</b>	<b>13 807</b>	<b>3 605</b>	<b>17 413</b>	<b>17 354</b>	<b>-58</b>	<b>1.00</b>

\* SSR = Self-sufficiency ratio

2030						
	Demand (billion calories)			Production (billion calories)		
	Food	Other	Total	Food/others	Surplus/Deficit	SSR*
<b>SUDANO-SAHELIAN REGION</b>						
Wheat	16 244	1 282	17 527	3 844	-13 683	0.22
Rice	18 651	1 406	20 056	10 928	-9 128	0.54
Maize	11 071	1 453	12 523	10 644	-1 879	0.85
Barley	482	29	511	177	-334	0.35
Millet	30 471	6 995	37 466	37 041	-425	0.99
Sorghum	35 596	6 011	41 607	41 593	-14	1.00
Other	1 886	177	2 063	1 496	-567	0.73
<b>TOTAL</b>	<b>114 401</b>	<b>17 354</b>	<b>131 754</b>	<b>105 724</b>	<b>-26 030</b>	<b>0.80</b>
Potato	291	52	342	271	-71	0.79
Sweet potato	1 264	189	1 453	1 450	-3	1.00
Cassava	1 322	138	1 460	1 460	0	1.00
Other root crops	319	41	360	333	-26	0.93
Plantain	0	0	0	0	0	-
<b>TOTAL</b>	<b>3 195</b>	<b>420</b>	<b>3 615</b>	<b>3 515</b>	<b>-100</b>	<b>0.97</b>

\* SSR = Self-sufficiency ratio

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