FIGURE 2
Irrigation density in Africa, 2002

Legend

**Irrigation in percentage
of land area**

☐ 0
☐ 0 – 0.1 %
☐ 0.1 – 1 %
☐ 1 – 5 %
☐ 5 – 10 %
☐ 10 – 30 %
☐ 30 – 60 %
☐ 60 – 100 %
☐ Inland water bodies
— Country boundaries
— Rivers
— Basin boundaries

FAO - AQUASTAT, 2006
Projection: Lambert Azimuth

Source: FAO, 2006 AQUASTAT Global Map of Irrigation Areas v.4 (in collaboration with the University of Frankfurt).

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there is demand, but clearly the price depends on the interaction of demand with supply. Thus, demand constraints cannot be addressed in isolation and there can be no meaningful answers to questions such as: "Is irrigated production in sub-Saharan Africa constrained by demand?"

Irrigated produce may differ in quality from rainfed produce, but irrigated and rainfed produce are typically substitutes that compete in final markets. Thus, it is not possible to analyse markets for irrigated

BOX 1
FAO AQUASTAT update: rate of the annual increase in irrigation areas and areas under water management, 1992–2000 (weighted index)

Region	Rate of annual increase (%)	
	Areas under irrigation	Areas under water management
Northern Africa	0.67	0.67
Sub-Saharan Africa	1.17	0.80
Africa	0.88	0.73

Source: http://www.fao.org/ag/agl/aglw/aquastat/regions/africa/index.stm

TABLE 2
Sub-Saharan Africa (incl. South Africa) Rainfed and Irrigation production data (for 1997/99)

Crop	Rainfed land			Irrigated land			Total			
	Area (1000ha)	Yield (t/ha)	Prod (1000 t)	Area (1000 ha)	Yield (t/ha)	Prod (1000 t)	Area (1000ha)	Yield (t/ha)	Prod (1000 t)	% irrigated production
Sugar cane	715	20.1	14372	484	66.96	32411	1199	39.02	46783	69
Wheat	1944	1.44	2802	558	3.04	1697	2501	1.8	4498	38
Rice	5564	1.39	7716	1514	2.51	3800	7077	1.63	11516	33
Fruit	1279	6.88	8797	372	10.69	3975	1649	7.75	12773	31
Vegetables	2504	5.63	14102	637	9.79	6239	3137	6.48	20335	31
Potatoes	539	7	3775	56	28.28	1583	595	9.01	5359	30
Citrus	899	4.9	4409	107	15.71	1681	1007	6.05	6090	28
Cotton	3960	0.81	3213	362	1.14	413	4325	0.84	3626	11
Groundnut	8361	0.83	6909	444	1.1	491	8805	0.84	7400	7
Bananas	925	6.28	5805	21	16.73	351	947	6.52	6170	6
Sorghum	21834	0.81	17755	514	1.46	750	22348	0.83	18506	4
Tobacco	363	1.22	443	19	0.95	18	382	1.21	460	4
Teas	379	1.46	552	8	2.59	21	387	1.48	573	4
Barley	1119	1.07	1202	14	2.96	41	1133	1.1	1244	3
Sunflower	827	1.03	850	17	1.63	28	844	1.04	878	3
Soybean	882	0.91	804	8	2.84	23	890	0.93	827	3
Pulses	15733	0.43	6785	131	1.4	184	15864	0.44	6969	3
Maize	24083	1.4	33732	333	2.49	830	24417	1.42	34561	2
Coconut	612	2.75	1685	3	3	9	615	2.75	1694	1

Source: FAO, 2003.

> Thus, it is not possible to analyse markets for irrigated commodities in isolation. It is necessary to analyse the joint market for irrigated and rainfed output.

commodities in isolation. It is necessary to analyse the joint market for irrigated and rainfed output. The extent of demand that is then satisfied by rainfed and by irrigated production depends mainly on their relative unit production, processing and marketing costs.

Final consumers are typically unaware of whether produce derives from irrigated or rainfed sources. However, irrigation normally has an impact on quality and on the structure and efficiency of the processing and marketing systems between the producer and final consumer. This in turn affects the relative farmgate prices of irrigated and rainfed production and is a factor in determining the extent to which there is scope for the expansion of irrigated output.

THE STRUCTURE OF MARKETS AND PRICE FORMATION
Globally, large numbers of farming units – both households and commercial enterprises – are involved in the growing of each major agricultural commodity. The producer prices they obtain are typically the result of the interaction of the supply of large numbers of other producers and of the demand of large numbers of consumers. Frequently, the majority of these producers and consumers are in other countries, often in other continents.

As the output of most producers is small relative to total supply, they are normally price takers, who individually have little or no impact on market prices. However, this is not always the case. Where commodities are perishable and transport infrastructure is poor, the producer price is necessarily determined by supply and demand within a limited distance of the farm. In this case, supply is restricted to a relatively small number of producers, and the sales of an individual producer may affect the market price. At macroscale, dominant producer countries (such as Brasil in the case of its predominantly rainfed sugar) effectively determines global prices, leaving smaller producers as price takers.

Markets are dynamic. Their spatial coverage varies both within and between years as supply, demand and relative prices change. At any point in time, the extent of coverage of the markets for the majority of agricultural commodities falls somewhere between the extremes of full globalization and high localization. Markets for single commodities