

Mangoes from North East Brazil

Staying afloat

Unprecedented rainfall at the start of 2004 in Brazil's normally semi-arid North East has added further pressure to producers already dealing with falling prices, the US Bioterrorism Act and the investment and operational changes needed to implement EUREPGAP.

In a little more than 10 years, mango exports from the semi-arid interior of North East Brazil, the *Sertão*, which means « backwoods » in Portuguese (see Box), have increased from a few thousand tonnes to supply a third of the European market.

Mango production in the region is concentrated around Petrolina in Pernambuco and Juazeiro in Bahia, in an area called the *Sub-Médio do São Francisco* or the Lower-Middle Valley of the São Francisco River (see Box).

Annual rainfall in the *Sertão* is between 400 and 500 mm, so large-scale commercial agriculture is only possible with irrigation that draws water from reservoirs on the river created by dams like the one at Sobradinho (see Box). Autonomous irrigation projects pump the water through extensive networks of canals and provide roads and other infrastructure, setting water tariffs

based on energy costs and fixed overheads (see Box).

Apart from abundant irrigation water, the area is ideal for growing mangoes and other fruits, because it gets more than 3 000 hours of sunshine per year, average humidity is less than 60% and the average annual temperature is 26°C.

Under these conditions crop growth and development are quick and disease pressure is low during both the production and postharvest phases. For table grapes, for example, this means that two harvests per year can be produced, and for mango, that year-round cropping is possible, although in practice production is timed to coincide with specific market windows in North America and Europe.

In 2003, mango exports of 125 thousand tonnes to North America and Europe contributed US\$ 68 million to the local economy.

Developing the Backwoods

Development in the São Francisco basin is managed by CODEVASF, the Development Company of the São Francisco and Parnaíba River Valleys. Created in 1974, CODEVASF has implemented 25 self-governing irrigation projects throughout the São Francisco basin, which together occupy 217 521 ha. Of the 121 180 ha that are irrigable, 103 277 ha are under cultivation, 47 934 ha by 8 963 small producers and 54 328 ha by 1 231 medium and large agribusinesses. A further 89 734 ha are farmed by traditional methods. CODEVASF is currently developing irrigation projects on a further 99 516 ha and is conducting feasibility studies on 280 575 ha more.

Inequality in Brazil: the north south divide

The North East is Brazil's poorest region. Despite proportionately greater progress there in health, education and economic development during the 1990s compared with the rest of Brazil, much of the region's interior away from the state capitals, which are all coastal, remains impoverished and poorly developed. In 2000, the combined population of the nine north-eastern states was 47.9 million, making it Brazil's second most populous region after the South East (population 73 million). Regional GDP was 3 014 reais per

person (about 900 euro) compared with 8 774 reais per person in the South East, which includes the states of São Paulo and Rio de Janeiro. In 2002, the UNDP Human-Development Index (HDI) for Brazil was 0.76 compared with 0.94 for Norway, the world's most developed country. Nevertheless, 75% of North Eastern municipalities had HDIs of between 0.47 and 0.64, comparable to conditions in sub-Saharan Africa and Central America. Brazil's most prosperous municipalities in the South, the South East and the capital, Brasília, have HDIs above 0.9, reflecting the continuing inequality between Brazil's richest and poorest citizens.

Record January rainfall

This year, however, will be one of the most difficult ever faced by the region's producers. In January, torrential rainfall over practically the entire North East, some central areas and São Paulo state exceeded anything recorded since records began in 1910.

Petrolina is typical of what has happened over much of the *Sertão*. January saw 428.5 mm of rain, six times the monthly average of 72 mm and close to the average rainfall for an entire year. Roads were swept away, communities isolated and 2,360 people forced to leave their homes, which were either destroyed or damaged by floods. The roads out of the city to the airport and to the

state capital, Recife, were made impassable by a night of heavy rain on January 29. Traffic was restored six days later, but the roads will not be properly rebuilt for many weeks.

President Luiz Inácio Lula da Silva visited the area on February 4, but Governors of the affected states, like Jarbas Vasconcelos of Pernambuco, criticised the Federal Government for being too slow to respond to the emergency and claimed that the 32 million reais in relief funds promised by the Ministry for National Integration for the whole country was inadequate. Vasconcelos estimates that the damage to property and infrastructure in his state alone is already at 40 million reais (about 11 million euro).

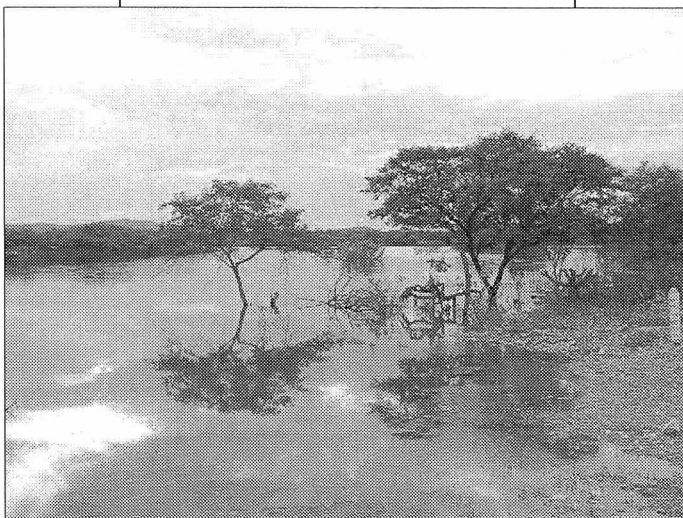
Water stress

The flooding has had an immediate impact on agriculture in the region. Large areas of crops, such as rice, beans and vegetables were destroyed and many roads were damaged, making it difficult to transport the produce that was available to market. This has led to price increases. At the beginning of February, the wholesale price of an 18 kg box of tomatoes in Recife was 12 reais compared to 7 reais the month before and by February 10 was 18 reais. The prices of meat, dairy products, fruits and grains also increased.

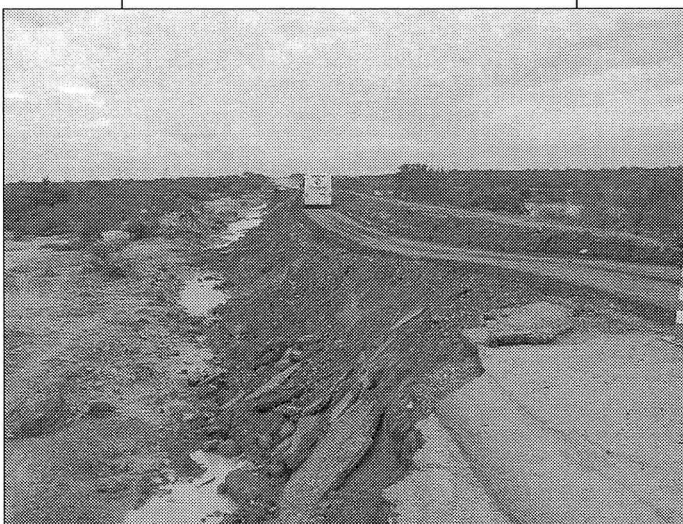
The immediate impact of the flooding on mango producers was to prevent them from harvesting fruit and carrying out routine cultural operations in the field. Producers will also face increased costs of weed control and of rebuilding damaged

irrigation systems, access roads and other infrastructure. The offices of one farm were flooded and computer equipment and documents damaged.

The immediate effect of the flooding and waterlogged soils on trees will



be a temporary check to growth. For fruit produced during the first half of the year, there are likely to be problems with maturity, low sugar levels, internal breakdown and possibly greater susceptibility to mechanical damage. The incidence of anthracnose (*Colletotrichum*



gloeosporioides) has already increased as a result of the high humidity and will be a major problem for the next few months. Stem-end rot (*Lasiodiplodia theobromae*) is also likely to be a problem, while

alternaria rot (*Alternaria alternata*) may become a problem if fruits are stored for long periods. Though the mango is considered to be moderately flood-tolerant, the response of individual trees is variable; some dying within days while others survive prolonged water logging. So it is too early to know how many trees producers will eventually have to replace.

In the short term, the manipulation of flowering, and thus harvest time, to avoid competition with other exporting countries, like Mexico, will be disrupted. Flowering is manipulated by applying paclobutrazol, an expensive growth retardant, to the soil around the trees and withholding water to check vegetative growth.

Three months later, potassium nitrate is sprayed on the leaves to promote flowering. Without the period of water stress, flowering is more difficult to induce and is less synchronised making it more difficult to plan production for export.

Flowering will be even harder to manage for those producers, mostly smaller ones, who cannot afford paclobutrazol and rely entirely on withholding water to check growth. In 2003, heavier than normal rains in April and May broke the period of water stress and together with lower than normal temperatures in June and July led to a flush of flowering rather than the intended progression and therefore a glut of fruit in October to December. This depressed local and export prices to the point that fruits were left on the tree rather than

harvested.

Much this year will now depend on the rainfall until the end of the rainy season in March or April, but the most likely outlook is for reduced

fruit volumes throughout the year, initially with fungal problems and variable quality, improving as the year progresses.

Sink or swim

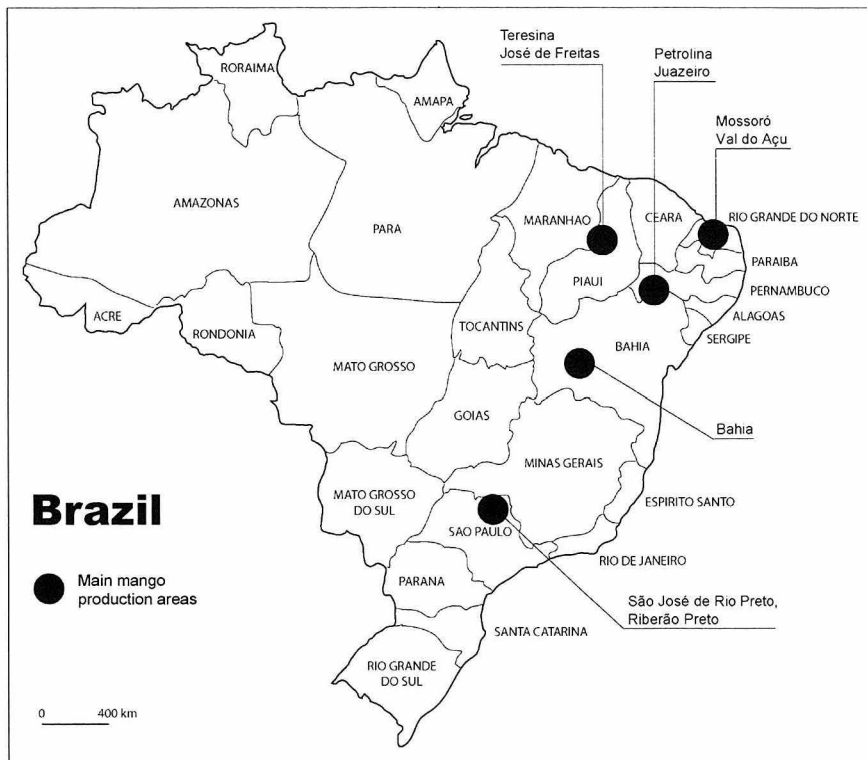
This set-back comes at a time when the industry has had to invest heavily over the past year to upgrade field and packing facilities and operations to implement European quality schemes, such as EUREPGAP, and the new Brazilian code for integrated fruit production.

Exporters to the US have also had to implement the requirements of the *Public Health and Bioterrorism Preparedness and Response Act*, which requires them to register with the US Food and Drug Administration (FDA), to have an agent resident in the US, to notify the FDA in advance of all shipments and to keep detailed records of product movements for two years.

All this in a year when Brazil's economy shrank in the second and third quarters, interest rates reached more than 25% and inflation peaked

O Velho Chico

The São Francisco River, known locally as *O Velho Chico*, « The Old Boy », is, at 2 700 km, the longest river to rise and discharge entirely within Brazil. The river basin covers 640 000 km², an area larger than France and Portugal combined. From the National Park of the *Serra da Canastra* it flows north through Minas Gerais and Bahia, about 700 km inland parallel to the Atlantic coast. In northern Bahia, it turns east in a broad arc to flow between the cities of Petrolina and Juazeiro, joined by a bridge across the river. It continues east, defining the southern border of Pernambuco and the northern border of Bahia, before turning southeast and continuing between the states of Alagoas and Sergipe, finally discharging into the Atlantic Ocean at Pontal da Barra near Piaçabuçu in Alagoas.



at more than 15%, because of the Government's policy to assure investors of its fiscal responsibility.

In addition, 80% of the region's production is still Tommy Atkins, a variety that is losing favour in both the US and Europe to less fibrous and tastier varieties such as Kent, Keitt and Palmer, which attract higher prices. Producers and exporters are beginning to show more interest in these varieties, like Agropecuária Roriz Dantas Ltda, which has 20 ha of Palmer coming into production this year.

Though interest rates and inflation are predicted to fall and the economy to grow by 3.6% in the coming year, 2004 will be a test of the mango industry's resilience ■

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Sobradinho: putting the Old Boy to work

The dam and reservoir at Sobradinho, about 25 km from Petrolina and Juazeiro, built between 1973 and 1977, is one of three major hydroelectric complexes on the São Francisco River. The reservoir is one of the largest man-made lakes in the world, 350 km long with a surface area of 4 200 km² (three and a half times the size of Paris) and a capacity of 34.1 billion m³. The turbines at Sobradinho have a capacity of 1 GW and generate

4 million GW of power per year. Despite the torrential rains in the North East, upstream reservoirs including Sobradinho are currently only at a third of their capacity, because rainfall in Minas Gerais and southern Bahia has been less than normal. Downstream reservoirs, like the one at Itaparica, are, not surprisingly, full. For the region as a whole, reservoirs are at 36% capacity, up from 14% at the start of the year. This means that by the end of the rainy season in April, reserves should exceed 40%, which is enough to ensure that the region has power for the next two years.

Mango — Intra and extra European imports from 1997 to 2002

Tonnes	1997	1998	1999	2000	2001	2002	Variation (%) 2002/2001
Total intra, of which	45 857	46 122	65 736	65 422	57 367	64 241	+ 12
France	9 784	8 186	8 478	9 685	9 233	10 854	+ 18
Belgium-Lux.	5 993	4 792	7 629	5 290	3 305	3 991	+ 21
Netherlands	23 060	26 552	39 670	37 171	34 312	36 384	+ 6
Germany	2 211	2 248	2 477	3 715	3 475	4 114	+ 18
Italy	317	155	329	423	276	909	+ 229
United Kingdom	1 058	770	1 103	597	523	587	+ 12
Portugal	5	209	538	233	266	465	+ 75
Spain	3 381	3 072	5 342	7 985	5 506	6 708	+ 22

Total extra, of which	75 924	84 511	116 293	119 364	135 593	135 004	0
Brazil	9 174	24 473	38 408	39 636	60 338	63 804	+ 6
South Africa	6 589	8 216	9 898	9 291	10 595	14 439	+ 36
Côte d'Ivoire	8 022	5 984	10 265	10 306	10 842	11 147	+ 3
Peru	5 853	1 813	7 347	9 304	7 749	10 760	+ 39
United States	10 166	8 446	9 844	10 314	6 731	6 944	+ 3
Pakistan	4 479	4 490	5 608	7 094	8 750	6 263	- 28
Israel	5 640	7 463	8 932	8 454	6 595	4 117	- 38
Ecuador	637	1 548	3 981	3 258	6 217	2 602	- 58
Mexico	5 866	8 481	5 658	3 648	2 117	2 569	+ 21
Costa Rica	3 276	2 104	3 334	3 092	1 734	1 852	+ 7
Guatemala	792	1 039	1 031	3 152	1 803	1 654	- 8
Senegal	123	280	678	618	822	1 650	+ 101
India	1 095	1 107	2 134	1 746	2 625	1 077	- 59
Dominican Rep.	334	346	333	583	690	748	+ 8
Mali	1 450	1 006	814	1 141	886	708	- 20
Venezuela	6 635	3 382	3 183	1 517	1 140	706	- 38
Guinea	433	482	154	510	308	549	+ 78
Thailand	297	349	364	420	693	511	- 26
Zimbabwe	711	488	781	1 236	643	455	- 29
Gambia	494	490	724	555	554	325	- 41
Burkina Faso	867	160	188	182	338	260	- 23
Nicaragua	395	6	0	353	572	220	- 61
Colombia	27	312	114	294	702	201	- 71
Cameroon	34	87	95	100	215	177	- 18
Egypt	71	53	158	154	283	160	- 44
Jamaica	587	334	420	268	215	130	- 39
Australia	73	109	66	117	113	128	+ 14
Philippines	78	67	216	392	143	117	- 18

Source: Eurostat, Customs code 08045000

Mango — United States imports from 1998 to 2003

Tonnes	1998	1999	2000	2001	2002	2003	Variation (%) 2003/2002
Total, of which	198 467	220 046	239 051	240 278	266 280	282 360	+ 6
Mexico	161 709	163 504	166 767	156 548	164 193	173 630	+ 6
Brazil	7 049	12 719	16 984	26 937	36 040	39 034	+ 8
Ecuador	5 422	10 392	20 428	19 797	21 602	27 350	+ 27
Peru	3 673	11 381	12 297	15 553	20 515	20 582	0
Guatemala	10 231	9 549	8 284	10 314	9 550	8 259	- 14
Haiti	7 134	9 144	10 159	5 878	8 376	6 070	- 28
Nicaragua	1 468	678	1 546	1 826	1 429	2 183	+ 53
Philippines	169	280	151	514	1 315	2 166	+ 65
Costa Rica	421	1 096	1 464	2 025	1 367	1 416	+ 4
Thailand	502	597	552	682	1 195	1 239	+ 4
Honduras	82	179	74	0	482	279	- 42
India	20	26	26	47	80	62	- 22

Source: USDA