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## **Globalisation, regionalisation and quality: the socio-economic reconstitution of food in the San Francisco Valley, Brazil.**

*Terry K. Marsden, Josefa Salete Barbosa Cavalcanti and José Ferreira Irmão\**

### **1 Globalisation - regionalisation in agrarian change**

Over recent years there has been considerable efforts made in tracing the significance of new patterns of globalisation in the agrarian sphere (Buttel, 1994; Bonanno et al., 1994; McMichael, 1994). A major dimension to this work has been to examine the construction of what might be called a "third food regime"; given the increasing inadequacies of the earlier colonial and industrial models of agro-food development (see Friedmann, 1991). Such debates have led several writers to question the significance of "Fordist - post Fordist" trajectories (Goodman and Watts, 1994), and the

validity of over-arching world-systems analysis in assessing the diversity of food experiences in the late twentieth century (see Arce and Marsden, 1993; Marsden and Arce, 1995). Despite the considerable dissatisfaction with macro models of new agrarian development, and the problems of linking these meaningfully to empirical experiences, it is clear that the new globalisation and regionalisation of agriculture and food is having dramatic social, political and economic consequences in both the North and the South. As such it is creating new challenges and questions about rural development. Moreover, more than ever, it can be argued, it is necessary to link North-South experiences, given the interconnectivities between them as well as within regions and nation-states. These tendencies extend far beyond the effects of GATT, trade liberalisation, or the regionalisation of markets (e.g. EU, NAFTA, MERCOSUL etc.). It involves seeing how these interact with production-consumption supply networks, and how combinations of both shape new forms of uneven agrarian development.

It is not our intention in this paper to critically review this increasingly large literature. Rather, we wish to attempt to

progress what we see as a significant stand of it (following Arce and Marsden, 1993). This concerns the following features:

(i) What are some of the key features and dimensions of these new rounds of globalisation (between North and South) with respect to export oriented agricultures such as fruits and vegetables?

(ii) How and to what extent are they socially based upon networks of relationships and dependencies which transgress but shape regions and spaces;

(iii) What are the effects of these new globalised agrarian relationships for particular regions. Scott and Storper (1986), for example, propose the notion of "a global mosaic of regions", whereby the mosaic stands between a global economy made up of specialised production systems (each with a dense system of intra-regional transactional arrangements), and individual regions intertwined with a world-wide web of inter-industrial linkages, investments flow and population movements.

We aim to examine these broad questions by reference to the case of fruiticulture in San Francisco Valley in North East Brazil . This is a rapidly expanding agro-industrial region geared to both national and international markets. We will argue that it is crucial to relate these broader arguments to empirical cases and to explore the discontinuities between the two in more effectively developing concepts which assists comparative analysis.

## **2 Quality, regulation and consumption: key concepts in the reshaping of the new agrarian spaces**

We and our colleagues (see Arce and Marsden, 1993; Marsden and Arce, 1995), in developing critiques of recent accounts of agrarian globalisation, have placed emphasis upon what might be regarded as the more socialised nature of global and regional systems of food supply and consumption. We have argued for example that:

*"Globalisation has conventionally been stud-*

*ied in aggregated terms. However, critical issues, such as the global transformation of agriculture, the new role of international capital, and the increasing differentiation and marginalisation of rural sectors in the Third World, and in advanced economies, cannot be explained by reference to structural conditions, dominant power configurations or ideological irrationalities. This obscures the analysis of social process and action, and it cannot, therefore, explain fully how things may change. Instead, we must examine the interests, actor strategies and the conflict of values of those parties involved in its making. This requires the building of a knowledge base of empirical studies that represents the heterogeneity of the farm-based context and different networks of food. This implies monitoring the changing role of the state, the outcomes of policy dissonance, and the new patterns of agricultural globalisation, putting social actors at the centre of this approach.(p17). "*

Implicit in this approach is a conceptualisation of globalisation which involves the differential processes of social translation. That is, global processes have actual translations at different spatial and social levels of interaction. They are not simply imposed upon local

populations. Rather, they are constantly internalised and added upon by different actors in networks of relationships. Our particular focus of concern is with actors and agencies in food networks; in the ways in which actors, agencies interrelate, and reinterpret and shape food goods along their networks of supply. Within this socio-spatial and actor-oriented conceptualisation we can begin to identify from previous empirical works the increased significance of the ways in which foods are constructed, not only through the agricultural production process, but also as they flow and deviate through the networks of supply, processing, distribution and consumption. Social actors, whether farmers, marketeers, or distributors, are not just concerned with the quantitative production and shifting of foods, they are constantly monitoring, redefining and shaping the value of them (see Arce and Marsden, 1993). Increasingly then, particularly with concern for the new agricultural export sectors (see Friedland, 1994), the base of social action in globalised food networks is associated with quality, regulation and consumption criteria. These features represent the power of the near-consumer end of food

networks (usually located in retailing, food processing and distribution firms in the North).

However, to say this does not explain how globalised food networks come into being; how they may be perpetuated or adapted; or what the differing local and regional effects of these transactions and relationships might be. In posing these questions we have to begin to look at both **the people and the foods in the networks of supply** and how these, and particular segments of them, share or allocate power and responsibility; re-locate risk and penalties; and begin to construct international markets and uneven forms of regional development. As Feierman (1990:36) argues more generally: "The wider world is not external to the local community, it is at the heart of the community's internal processes of differentiation."

Relating directly to food networks and agrarian regional development this places emphasis on: a) those key networks of actors and agencies involved in both these processes of globalisation and social differentiation through their actions with foods; b) those substantive areas of concern (e.g. quality, regulation and consumption) which provide the basis for act-

ing in certain ways rather than in others.

The expansion of fresh fruit and vegetable chains during the 1980's and 1990's is of course, broadly linked to the macro political economy of neo-liberalism which has implicated shifts in the agrarian sector as elsewhere (see McMichael, 1994). Latin American and Caribbean countries have, to a large degree, been forced into investing in cash crop fruit and vegetables for export as part of their strategy for securing foreign exchange; placating IMF and World Bank demands, and in generally addressing domestic balance of payments problems. Simultaneously, new agricultural exports from the South have been matched by high rates of consumer demand from the North, mediated through the latter's corporate food sector (see Arce and Marsden, 1993). These producer and consumption conjunctions have been stimulated by a state policy of neo-liberalism. This tends to set the seeds for the privatised transactional networks of supply and consumption (such as those developed in the San Francisco Valley), leaving individual nation-states and their particular regions in a weaker as well as in a more competitive position with each other.

When we begin to explore not so much the overall architecture of these ten-

dencies, in what Friedland calls "the cool chain", but the substance of the relationships and networks within them, one begins to see the ascendancy of new mechanisms of re-regulation, based upon quality of food products. In a situation where "Fordist" or "Keynsian" systems of global trade regulation are diminishing in significance (Marsden and Flynn, 1994), our evidence from the retailing sectors of the North suggest an ascendancy in new (private interest) quality regulatory mechanisms. These have considerable and differential effects. They can affect the location of sourcing; affect the durability and reproducibility of the supply chain, and involve sets of actors and agencies in the construction and provision of quality supply. In addition, whilst the new agricultural commodities have restructured consumption by providing all-the-year-round produce, such that not only were they in the eye's of the consumer 'exotic' (see Cook, 1994) but also more immediately available; they also have been increasingly competitively refined and reshaped to suit different nationally based groups of consumers. Differences in the size, shape, water content, acidity and durability of fruits and vegetables are con-

ditioned by translated knowledges about consumers in different nation states. And these become mediated backwards along the networks to producers and marketing agencies as quality criteria and regulation. These knowledges about quality of foods are embedded into the highly competitive global markets for fresh fruits and vegetables; and, being constantly subject to change and modification, can quite rapidly lead to the abandonment of some producers and marketing frameworks over others. Thus the "new" agro-industrial food networks are both highly volatile both spatially and over time. As a result of this, the often planned and strategic development of agro-industrial districts which are developed (often with considerable initial state support) to compete and succeed in these global networks of exchange, have to withstand and absorb the considerable risks as well as rewards of agro-food globalisation. As we shall see from the substantial case of the San Francisco Valley development in Brazil, these tendencies, and particularly the provision and construction of food quality, gives important insights in the ways in which the new agro-food networks are implicating new forms of regional agrar-

ian development in highly competitive sets of global conditions. In this sense the construction and maintenance of quality foods provides a new basis for spatial agrarian uneven development.

Exploring globalised food networks with regard to the social regulation of food quality, however, implicates others spheres which need to be incorporated. Whilst external pressures to deliver the right size, shape and content of fruit may increasingly dictate the monetary value and hence the eventual spatialised value captured by the producing region: i.e.

$$QV = MV / SP$$

where

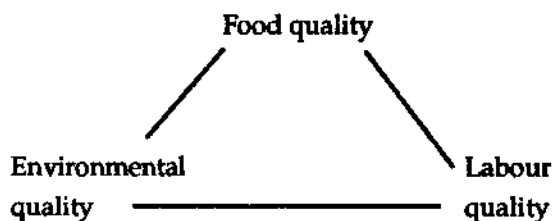
**QV** = shifting quality value of product (which in itself is constituted from the knowledges of external and internal regulators and producers)

**MV** = overall monetary value gained/captured in the producer region having produced the necessary standard of quality

**SP** = Spatial distribution value. i.e. how that value gain is translated and distrib-

uted in the producer region.

Internally, within producer regions an increasingly crucial element becomes how quality is regulated, which actors and agencies are involved in the process, and finally, by what means are the specific food quality factors traded-off against other types of quality concerns. Two significant other quality concerns here - as an increasing literature suggests (May, 1995) are those associated with (i) the transformation and value of the labour process; (ii) the transformation and value of the natural environment in which the quality products are grown (see figure 1).



This suggests:

$$QV = \frac{MV/SP}{LV+EV}$$

Where: LV= the quality of labour necessary to produce quality products  
 EV= the quality of environment necessary to produce quality products

Figure 1: Interactions and trade-offs in the regulation of quality

These are traditionally and in a contemporary sense in San Francisco seen as separate and technically distinct quality concerns.

In the majority the literature thus far the suggestion is that in these latter spheres less value is placed in the maintenance of quality for working and natural environments and greater emphasis is placed on the provision of food quality/value criteria. This represents the power of the importing agencies and external markets and agents. All three of these spheres have the capacity to be traded-off from each other and all are heavily implicated into the externalised world of competitive global food markets.

As we shall see below, by exploring how actors and agencies are creating and redefining these quality spheres - and particularly in observing how the regulation of food quality is interacting with labour and environmental relations - we will begin to assess how globalisation and regional uneven development begin to unfold as socially active forces. Such an approach necessarily focuses centrally on the social construction of VALUE under globalised and regional conditions, and it does so by significantly problematising

value as a socialised attribute, associated with the specific combinations of food, labour and environmental resources in specific places; but under globalised conditions.

In addition, it has to be stressed that these spheres of value construction have to be created and maintained over time if they are to meet various global conditions. Hence they lie at the heart of the social dynamic implicit in globalisation of agro-food networks. After discussing some of the key features of the San Francisco development, each of the sphere of quality construction (i.e. food, labour, environment) will be assessed in turn.

### **3 The Agro-Food Systems of the San Francisco Valley**

The San Francisco Valley is located in Northeast Brazil covering a significant portion of its territory (see figure 2). The San Francisco river which spreads from South to Northeast bathes a vast proportion of the semi-arid lands of Brazil. This paper is written on the basis of a field work carried out on the lower-middle San



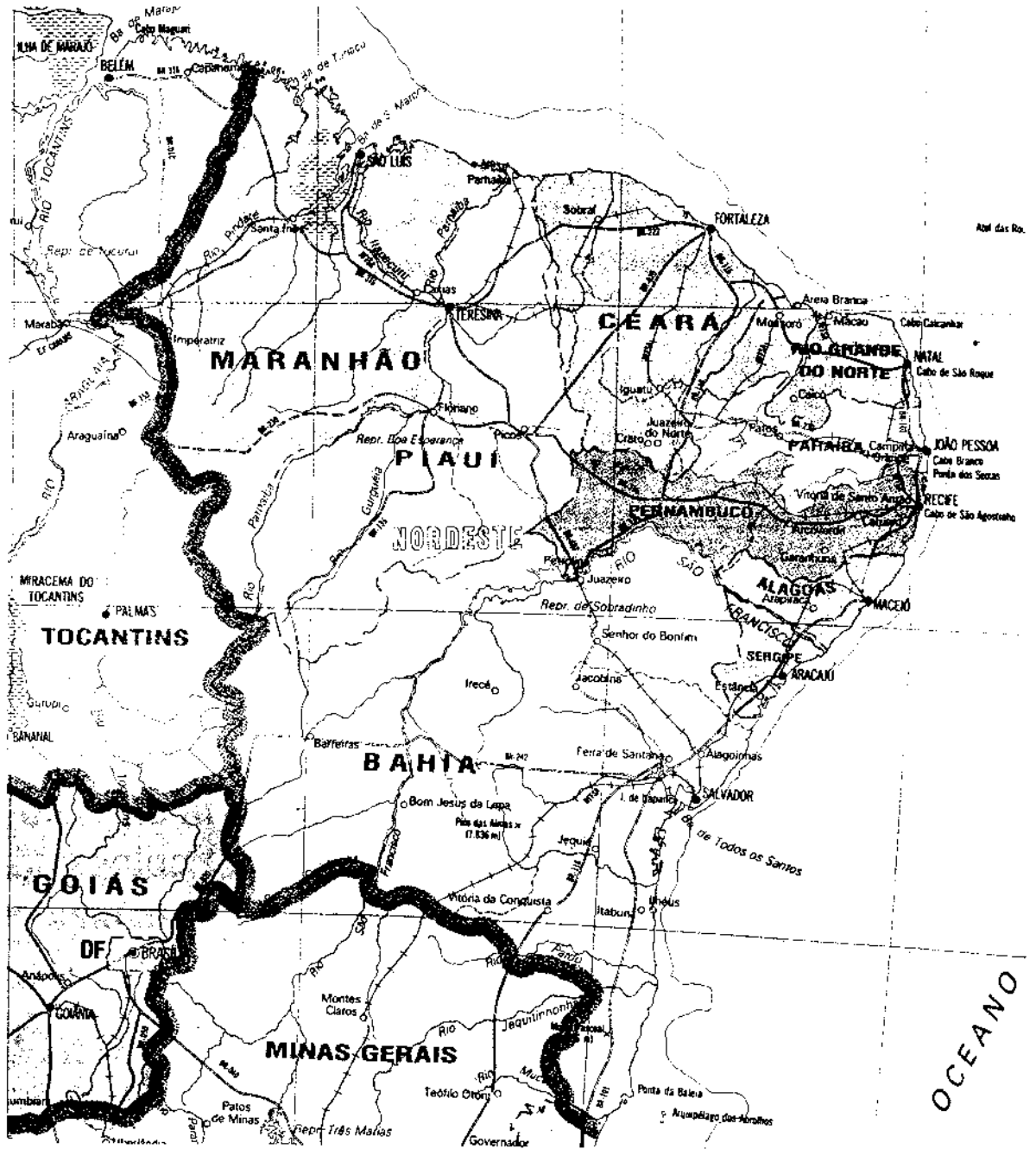


Figure 2: Map of San Francisco Valley

Francisco Valley, in the location of the twin-cities Petrolina/Juazeiro which constitutes the most important agroindustrial district in Northeast.

The development boom of the lower-middle San Francisco Valley is a recent experience stemming from the 1970s. Until this date, the region was dominated by large cattle ranches which historically constituted the strong rural elites of the Northeast Sertao (Chilcote, 1990). The region is located in the drought polygon with a very low annual rainfall ranging from 347mm to 600mm, and an average yearly temperature of 26 degrees centigrade. With a vegetation constituted mainly of scrub cactus, agro-ecological conditions become very inappropriate to agricultural production without the use of technology to transform the natural environment.

The development process was stimulated by the construction of the Sobradinho dam inaugurated in 1977 and it was promoted on the basis of irrigated technology both in public and private projects of production. There are actually six big public irrigated projects with a planted irrigated area of 44,463.57 hectares, and an estimated private irrigated

area of approximately the same size.

The agricultural development of the region has been processed on the basis of irrigated agriculture and a few agricultural systems of high valued commercial crops. Irrigation was promoted by state investments in land and infrastructure. State intervention took place under the coordination of CODEVASF - Companhia de Desenvolvimento do Vale do Sao Francisco -, a state public enterprise created in 1973. CODEVASF is progressively passing the management of the projects to private initiatives, as the Cooperatives in the cases of the Mandacaru (CAMPIM) and Bebedouro (CAMPID) projects and the Agroindustrial District in the case of the Nilo Coelho project.

Originally, the lower-middle San Francisco was dominated by the production of onions as its main system of production. During the 1970s, onions, maize and beans constituted the main system of production under the domain of onions as the main crop. During the 1980s, this structure of production began to diversify in terms of two or three main crops and the systems of production had the following characteristics:

- a) onions - tomatoes - watermelon  
melons  
beans
- b) tomatoes - onions - melons  
watermelon  
beans
- c) beans - tomatoes - melons

These were the dominant production systems during the 1980s. CPATSA, the Semi-arid Tropic Research Institute, advised producers to adopt the first system as the most appropriate to the conditions of the region. They constituted a rather specialized agriculture, producing for both final consumer products and raw-materials. At the same time, a few agroindustrial undertakings were installed in the region for the industrialisation of agriculture, favouring a substantial integration between agriculture and industry. Two crops, tomatoes and onions, were the most important crops in generation of income and employment.

In the second half of the 1980s, this structure of production started to change again in view of a disease which affected the tomato system, causing severe losses to heavily invested producers. The crisis opened the way for producers to look for

different investment alternatives, and to discover the fruitcrop system as the most appropriate to the conditions of the region. The fruitcrop system was the alternative found by producers to diversify production and recover capital and income losses.

The first half of the 1990s saw the development and growth of the fruitcrop system constituted by a set of crops but dominated mainly by grapes and mangoes. The system is more integrated into the national and international markets, bringing the region into a more sustainable process of development. Tomatoes has recently revived again as an important production system, cultivated under strong technical recommendations, but it has not yet achieved the market value of the end of the seventies. The systems of production which now dominate the actual scenery of the San Francisco Valley are the following: a) Grapes; b) Bananas; c) Mangoes; d) Sugar cane; e) Tomatoes - watermelons - onions; f) Tomatoes - melons - beans; g) Pepper; h) Acerola; i) Goiaba; j) Coconut (see table 1). These systems of production respectively surpass the value of one million dollars a year. Of course, the most important ones are those

whose production value reaches more than ten million dollars a year. Tomatoes still appear as the most important system in view of its spread of production in the region.

The most important production systems are those constituted by tomatoes, grapes, bananas, sugar cane and mangoes. Bananas is a very prosperous system bringing a rapid and sustainable income to producers, both family and entrepreneur producers. Production has been sold completely in regional and national markets. Sugar cane is a special system under the domain of a big agroindustrial enterprise - AGROVALE - which dominates 99.0% of sugar production in the Valley. Technology is thus of a very high level; and productivity has reached the highest performance in Brazil. From the fruitcrop system, grapes and mangoes are the two products which interest us most in the aims of this study by their forms of integration into the national and international markets.

Grapes are produced mainly in enterprise plots (61.0%). Curaçá and Nilo Coelho projects concentrate 77.6% of enterprises in grape production. Family plots production is concentrated in Nilo

Coelho and Bebedouro perimeters (97.0%). Family plots have presented a good performance in grapes production in view of the role of family labour in the production process. Their production is being directed almost entirely to the regional and national markets. A few colonos have had access to the necessary technological skills to produce for export, namely in view of quality requirements.

Mangoes is a crop typically of enterprise producers. They control 94.4% of its production in the lower-middle valley. Its production is concentrated in a few big agricultural enterprises, over fifty per cent being located in the Curaçá project. Fruitfort - Curaçá Agrícola e Exportação - is the biggest mango producer in the region. Most of its production is directed to external markets.

#### **4 Constructing Food Quality in new agrarian spaces**

The realities of significantly increasing exports, partly through the expansion of irrigated lands but more significantly through productivity increases (see table 1)

have to be conditioned and underpinned by constructing and maintaining specific quality conditions of the fruits (i.e. mango, tomato, grapes and more recently, acerola). The nature of these quality designs and conditions extend from planting to the actual point of human consumption in distant parts of the world. They are not simply associated with achieving the criteria set down by either the domestic Ministries of Agriculture (i.e. EMBRAPA) nor those of importing nations (such as the USDA). Even though these do have increasingly strict criteria - involving on-site inspections - it is important to recognise that surrounding these legal or formal values lie a series of conditions which are set by other external and local agencies alike. The construction of these quality definitions, their implementation and their ability to allocate risks and responsibilities to different parts of the food network means that they play a significant role in constructing and maintaining the fruit supply networks themselves. In highly regional and local competitive conditions where overall aggregate supply becomes less a concern to importing nations than specific design and quality, producers and regional exporters have to

be geared to providing a "quality product". Amongst other things, the attainment of increasingly regulated quality criteria become a main vehicle for international market entry. The criteria may vary between importing countries and it may demand different production, packing and quality control treatments. Additionally, at the local level those actors and agencies that can attempt to control these diverse quality forms begin to play a pivotal "social carrier" role in the agricultural region. They become the conduits of globalised quality knowledges, and internally, the gate keepers to globalised market entry for the more numerous and variable producer sector.

Hence, through the allocation of powers and responsibilities concerning globalised quality control, food networks and the markets and strategies which underpin them, come into being and may be maintained. This regulation begins to shape the nature of agrarian development in this agro-industrial region. To sustain themselves as a quality globalised food network the allocation of power, responsibilities, of value risks have to be somehow agreed upon by all the parties involved. If they are not, some producers

Table 1: Lower-middle San Francisco: value of production of the agro-food systems  
( In US\$ 1,000.00), 1994

	Public irrigation projects systems					Total	
	Tourão	Mandacaru	Maniçoba	Curaçá	Nilo Bebedouro Coelho		
Sugar	26,144		506			26,6	
Grapes	1,423		4,085	8,201	17,966	8,000	39,6
Tomatoes	1,705		331	640	62,869	163	65,7
Mans. Pass	296		547	37	62,869	163	8
Maize	13		4	6	281	98	4
Melon	1,792	1,361	1,167	122	154	526	5,1
Onions	1,380	464	552	301	328	70	3
Beans	32	49	804	713	6,997	202	8,7
Watermelon	31		1,938	1,778	2,691	204	6,6
Mangoes	126		3,037	10,174	6,297		19,6
Pepper			823	166	1,398	156	2,5
Guava	225		59	22	537	229	1,0
Quiabo	946		39	2			9
Bananas			209	40	28,004		28,2
Abobora					723		7
Sweet Potatoes					382		3
Cenoura					267		2
Manioc					613		6
Acerola					3,117		3,1
Citrus					309		3
Coco					1,554		1,5

Source: CODEVASF. Relatório Anual de Monitoria - Exercício de 1994. Brasília, Abril de 1995

may find themselves excluded from lucrative destinations of their products, or exporters may be unable to convince foreign agencies of the uniformity of their quality management. While the criteria for quality tend to cascade down the networks from the non-local agencies, the risks involved in managing these become more a product of local social and economic organisation.

At the heart of these processes of food network construction then is the differential construction of value through the coming together of different actors, and their knowledges, to produce and shape nature. This produces a major social process. In the San Francisco Valley the gradual divestment of state responsibility for the agricultural development associated with irrigation (under CODEVASF) has been leading over recent years to the growth of large agricultural production enterprises that have developed an export function. Fruit exports can be sold through farm co-operative organisations (such as VALEXPORT), but increasing the scale of the agricultural development in the region has spawned new private enterprises which focus specifically on promoting and gaining entry to

export markets (e.g. FRUITFORT, MAPEL). Whilst most of these have initially benefited from the state-supported development projects (e.g. Nilo Coelho) in terms of infrastructure and initial technical assistance, they are effectively privatised firms which control extensive hectares of production and recruit other smaller producers in order to export their products and meet their growing export markets. These large enterprise producers/exporters are located in pivotal positions in the globalised food networks; and their social position in the new and evolving agrarian structures cannot be usefully explained by a recourse to conventional property and labour based social categories (e.g. share-holding, private property owners, petty producers etc. (see Collins, 1991). They can place strict quality control criteria on smaller family producers and balance the proportion of fruit which comes from them vis-à-vis their own estate. In addition, because of their modern packing house facilities they are well placed to translate the increasingly volatile international knowledges concerning consumer preferences, and retailers requirements, concerning the colour, size, shape and content of the specific export

crop. This information is then transmitted to local producers who may have agreed an export contract with the exporter enterprise. As one of the largest exporter firms (with control over 1,015 ha of irrigated land, largely devoted to mangoes and grapes) argued:

*"Quality control is very severe. We have to follow the product process. We go onto the farm and inspect regularly. ... Nevertheless, possibilities are wonderful. Conditions are good. I cannot see any bottlenecks to this production. We have the most qualified and technological status. In São Paulo they are being eradicated."*

This company is currently arranging an export arrangement to Japan, with most of current production going to the U.S. and Europe respectively. By 1994 it exported 1 million boxes of fruit. In 1998 it expects the volume to have increased to 2,5 million.

As well as the degree of arms-length control these enterprises place on their enrolled diaspora of smaller producers, they have to take particular care of the harvesting and handling of the fruit from the trees to the packing houses. Additionally, the

timing of this process has to be modulated to fit with gaps in market supply of the importing countries and the maturation of the fruit (e.g. mangoes or grape), such that it reaches the consumers table in the correct condition. This process of **time synchronisation** - not only regarding market entry but also in the maturation and quality of the fruit - is crucial to the continuation of the food network itself. For the exporters and producers alike, a particularly vulnerable "time-quality episode"(Arce and Marsden, 1993) is that concerning **the handling and packaging of the fruit**. Quality and its risks can change with the mobility and handling of the product. Also, big differences can emerge between family farms and large enterprises in this process, which can lead to the rejection of some fruits. One exporting firm had now stopped taking other farmers produce because of this variability in control and the effects it was having particularly on the appearance of the mango. It is necessary to achieve a regulated time period of 23 days between harvest and actual consumption of the mango. The appearance and quality can severely change after 30 days. Most exporters are responsible for the fruits, right



until they are landed in the host country. Also, they may not know, exactly, who the buyers of the consignments of fruit are until they have left Brazilian shores. Dealing with these global contingencies, but at the same time maintaining quality surveillance of the products is the responsibility and major concern of the export enterprise. Moreover, the links in the networks are not necessarily complete nor clear during these critical time-quality episodes. In some cases, the whole network does not always exist at the one time. Rather different time-quality episodes are progressed from farm production, through harvesting, packaging, transporting and distributing the products.

In the production-harvesting-packaging stage the inevitable handling and carrying of products comes with its own risks. As we shall see below this implicates a gendered labour force in different ways. However, within the protocols concerning the limits on pesticide and herbicide uses, the problems of biological risks to the fruits is a real one. In particular, American importers have recently become concerned about the incidence of "fruit-fly" in the mangoes. This has resulted in a

more stringent quality control procedure being instituted in the packing houses of the San Francisco exporters. This involves the drenching of mangoes in water and petroleum bees-wax; with the grading process being literally followed by USDA officials who are rotated on monthly intervals. They have to be paid for by the exporter firm. For the European market and packing process there is a more rudimentary system with little checking or external monitoring. It is argued by producers and the exporters that the drenching process will change the inherent quality of the mango, but that the effect of more effectively communicating and signifying safety, standardisation and aesthetic pleasure (the process adds value to the product) ensures the maintenance of the American market.

The example of how one significant importer countries concerns for quality, demonstrate the lack of fixed quality parameters and the point that the fruits can be malleable to different importer and exporter conditions. In addition, it also shows how the different quality conditions influences the labour process, both in the packing house -which also as we see incorporates different grading and

treatment processes- and in the fields.

This suggests that the constraints inherent in the much discussed disparities in production and labour time in agriculture vis-à-vis industry (see Mann and Dickinson, 1982; Mooney, 1985, etc.) are now only one set of social constraints which give fruitculture a distinctive position in modern capitalist agrarian development. The malleability and the sensitivity of many of the products (in this case particularly grapes and mangoes) coupled with the externalised demands for specific quality conditions, means that the management in the food networks of the specific time- quality episodes from harvesting to point of sale provide a significant and distinctive bases for social action and the continual reconstruction of value in food networks. In such regions as San Francisco, where irrigated systems can establish a harvesting pattern which continues for eight months of the year at least, this constant process, of managing and coordinating time-quality episodes is a major and dominant feature of the agro-industrial region and the networks of food which flows through it. Those actors and agencies who are closest to the definition and implementation of quality conditions

begin to accumulate power in these food networks. This leads to a growing social and economic differentiation in the region, with smaller producers, not exclusively, but certainly prone to the exclusion of globalised food networks.

### 5 Constructing Labour Quality

The social and economic processes of quality regulation are far from independent of effects upon the valuation and social organisation surrounding labour and the natural environment. Agricultural enterprises and family farms units tend to organise their production to fulfil the demand of consumers from the North. This contributes to a new set of relationships between the North and the South. The national boundaries are minimised in favour of the power of transnational corporations which are carriers of a global process that may come to introduce changes in the daily diet of the countries involved in it. This creates an interesting relationship between global and local, which are part of a same axis.

Food networks bring closer produc-

tion and consumption sites, naturalising, therefore, exotic foods, by intervention in the production through regulations that define taste, colour, shape and weight that fruits and vegetables have to have. This, on the other hand, comes to introduce changes in the consumption patterns at the local level. If we consider the growth of a class of consumers of imported goods, or at least produced according to international regulations, we may explain the increase in imported goods in Brazilian supermarkets shelves, that indicates a new pattern of local consumption is also being established. The introduction of these problems bring together new questions on the relations between agriculture and new conditions of the international market. Nevertheless, of more relevance to understand are the new forms of sociability created by the articulation between the global and the local by the social actors, in answering to the growing externalisation of demands and decision-making on what, when and where to produce. That articulation tends to transform, equally, the arena of labour, off-setting the traditional division of labour and particularly the sexual division of labour. The need of specialised labour and changes in the ag-

ricultural calendar allow for new forms of organisation of production that has to be adjusted to the new consumers demands and holds a strong impact on the types of control on quality of commodities and the labour. Following from this, the level of specialisation of the labour has to be accounted for.

Qualifications for the work to be done emerges as a very important concern for producers in the area. Accordingly, there are changes in the social relations of production; for example, there develops an internal differentiation of producers, indicating that from the inception of the "colono" irrigated plots, up to the present, changes in the market conditions, technology used and new forms of management gave opportunity to newcomers in the agriculture sector. These newcomers are **university educated entrepreneurs**, most of them from Southeast Brazil who came to the area aiming at getting started as a family farm or in a successful enterprise. They understand that they have to have new views on the business to attain competitive goals. Also, there are those farmers who are **agricultural technicians** or **agronomists** who are nowadays included within a new classification of the Valley

producers. Of course, the type of proprietors and or managers of those agricultural units are very important indicators of quality of labour required to assure part of the sustainability and competitiveness of the Valley in the markets (Cavalcanti, 1994b). However, we must account for what is expressed among workers, as well, according to the required specialisation of labour and the new relations in the production (Buroway, 1987).

In the study area there is an accentuated gender division of labour, to attend to the patterns of quality of commodities produced; male or female tasks are thus related to certain quality production requirements to make the region's commodities competitive at the international market. The outline of the difference by gender in the work, to use Abreu's (1995) idea, is especially significant theoretically. The flexibilisation as applied to modern enterprises may find in the social division of fruitculture labour, new types of distinctive development. Male and female labour may experience examples of both new and old forms of work and remuneration of labour. This is relevant to understand the foundations of new power relations among producers and workers

in these type of activities.

Moreover, the highly specialised labour is necessary to bring commodities to the market standards in a competitive manner. Labour has to be qualified or taught to do right tasks at the right time. This also suggests that they may pursue higher remuneration to that usually paid to non-skilled labour. The workers in fruitculture receive a monthly minimum wage plus 10% for the work done, a result of a resistance movement that occurred in 1994. But, there are other ways by which the workers are paid, as for example, per task, per diem.

Male workers usually do heavy work, such as preparing the plot, clearing up the areas to be cultivated, and all those services to prepare the production fields. Female labour is used as 'favourite' labour in some areas of production such as in the grape fields. It is striking to consider that for the production of 1 ha. of grapes, is necessary to use 200 man-days, and 80 man-days for the harvest and packing, although marked as man-days is in fact female labour. The activities related to the presentation of grapes to the exporters and consumer/markets are, therefore, under the responsibilities of

women. The large use of female labour has changed women's position in the agricultural labour market. It has created an area of work which is considered very specialised.

Additionally, this feminisation process brings with it new views on the role played by women in and out of their domestic units, as well as concerning the relationship between men and women in society more generally. As such, it becomes crucial to analyse changes in the traditional spheres of labour socialisation, given the influence of new ways of living and life styles emerge.

As mentioned earlier in the paper the establishment of the CODEVASF created the background for public projects of irrigation and later for the development of private enterprises. This is the beginning of the transformation of the semi-arid region into an important global "niche" for the production of fresh fruit and vegetables, through the emergence of new networks of food. But it is in the 1980s that this region experienced a deepened change, with the speeding up of the urbanisation process. This is particularly so for the Municipalities of Petrolina and Juazeiro which together have a popula-

tion of 400,000. In the case of Petrolina, the proportion of urban population to rural population is 75% of the total.

Additionally, one has to consider public investment to make this region workable according to international market requirements. According to the 1994 report of CODEVASF the amount of irrigated area in the SFV comes to 73.000 hectares, 63% of which is occupied by family units of production. There are 7,171 colonos plots, 16 technicians plots and 405 enterprise units. The cultivated area is of 23149,83 ha. in Pernambuco and 29527,97 in Bahia (CODEVASF, Relatorio do Administrador 1994:1, 28- 29). The irrigation schemes have changed the old seasonal schedules of production and labour organisation. The provision of irrigated infra-structure allows for the establishment of an agricultural calendar according to international market demands. This allows for very interesting and complex spatial dynamics in the production timetable as well as in the use of labour. Multiple production time and harvests come to supply jobs all the year around for the local and migrant population. This attracts labour to the area, hired as permanent or temporary workers but largely

residing in the sprawling suburbs of Petrolina-Juazeiro. According to PIMES (1991: 220) the proportion of labour supply per hectare is 6.4 jobs per hectare. Much of this is female labour; responsible for tasks required to assure the competitiveness of the Valley production in the international market. Levels of quality defined by international regulations create patterns of labour specialisation at local level, requiring a qualified labour to fulfil the consumers expectations.

There are some activities which are preferentially defined as female tasks, such as: control of the quality of mangoes for packing, and in the whole production process of grapes, from when the first fruits come out. The participation of women in the viticulture sector varies from 60% to 85%, of the labour in this sector. This is an inversion of the actual proportion of men to women in the Brazilian active population. But is also important to study the social symbols and stereotypes that legitimate the qualification of women to do those activities. For the producers in the area: Grapes are seen to require care, sense of beauty, softness, qualities that only women have.

The women do the following work:

*Raleio, Desbaste, Repasse de Desbaste, Pinicagem, Colheita e Pós-colheita*, which are a set of activities, to deal with grapes according to certain rules, to produce a 'beautiful bough' and to follow up that until the last phases before the harvest.

*Pinicagem* is a later phase of 'raleio', when the fruits are bigger and close to the time to be picked. "Colheita" is the harvest time; also this requires handling the fruits with care; what they call "pós-colheita". After harvest time is the packing of grapes according to the required numbers of boughs, weight, colour and aesthetics to attend to the consumers, retailers, export requirements. These are tasks that require not only ability but specialisation. This means control of "timing" and "knowledge" (Cavalcanti, 1994), which are important tools to manage production and markets. The women labourers have to embody these externalised values into their labour practises.

This calls attention to the relative empowerment of women, for to them is left the power of micro quality control. Also, it may create opportunities for new forms of resistance, as the type of remuneration not always takes those skills into consideration. Although labour unions

are not yet well developed, the participation of women as representatives in syndicates has now outnumbered men. Male work, on the other hand, relates to mechanical tasks of viticulture fields, practices of environment management, plague control, by the spreading of herbicides and pesticides, management of water and irrigation schemes; they also participate in the harvest of other commodities such as mangoes. Of course, as analysed by Cavalcanti (1994a), the contingent link with food networks creates a complex division of labour in this area, with the multiple services required to produce and to trade quality commodities in sector being vulnerable and dependent on newly specialised practices of production, packing and transportation.

## 6 Re-Constructing Environmental Quality

However much the powerful actors in the food networks and markets attempt to commodify food, or the relations of production, time and quality associated with it, our preceding discussion has demonstrated that it remains very much part of

nature. This is particularly true when dealing with fruits, for, as we have seen, significant efforts are made to co-ordinate and manage the natural properties of products such that they arrive on consumers tables in particularised and geographically differentiated conditions. They have to be seen increasingly as natural despite the distancing and complexities they have survived. At the production and exporting segments of the network, environmental conditions are inherently intertwined within this supply system. "The environment" is not some separate or discrete sphere associated with physical conditions alone. Rather as producers and exporters admit, it is an active context in the production of globalised quality food products. The essential 'hybridity' of food is realised at the local level even though some of its features (perishability, environmental intensity) have to be managed through the social organisation of production and labour. In particular, it provides a basis from which our earlier discussion on the derivation of food quality can be built and maintained. Its management (or, reconstruction) is a central element in conditioning who does and who does not participate in globalised food networks.

Within conditions of considerable natural water deficit the development of irrigation has effectively created completely new but considerably vulnerable environmental conditions. The original climax bush vegetation tends naturally towards increasing desertification in the region; with average precipitation of 500 millimetres per annum and evapotranspiration of 2000 millimetres a year. Under these natural conditions, and indeed with the incidence of large irrigated areas, the natural environmental conditions move towards desertification if left unchecked. Within these conditions the irrigation schemes developed over the past twenty years have created nothing less than a new and socially reconstructed micro-climate which allows not only for the production of a range of fruits and vegetables, but increasingly their continuous production all-the-year-around. Indeed, one of the goals of many of the agricultural projects in the region is to achieve productivity gains by evening out all-the-year round production. This increases the intensity of production on particular land areas, and greatly increases production levels, allowing more export market penetration, when other regions

are unable to supply export markets. This has recently been the case for the ACEROLA - a high vitamin C fruit seen to have great export potential. By 1994 in the NILO COELHO project, production was based on 500 hectares on a constant monthly harvesting basis.

Agricultural development projects such as these put emphasis upon increasing yields as plants (such as the mango growth over a 5 year period) and through multiple harvesting throughout the year. Under these conditions the lack and preferable absence of natural rain becomes an environmental advantage. For it allows complete irrigated management of crops, completely regulating water supply to the plant. Having created and reshaped an artificial environment, the incursion of the real volatilities of nature (i.e. periodic rainfall volatilities in humidity) becomes a resource burden rather than a gain. It is also seen as an added risk to quality control and products. When the few days of rain do come they can, somewhat paradoxically, upset these nicely controlled conditions providing unpredictable surfeits of water which can damage leaf growth and, eventually reduce production levels. Completely redrawing nature



in this way does not come without considerable risks therefore, and it is well recognised that in order to maintain levels of production- sensitive irrigation, herbicide and pesticide strategies have to be put in place for the system to be maintained over the medium term (see figure 3).

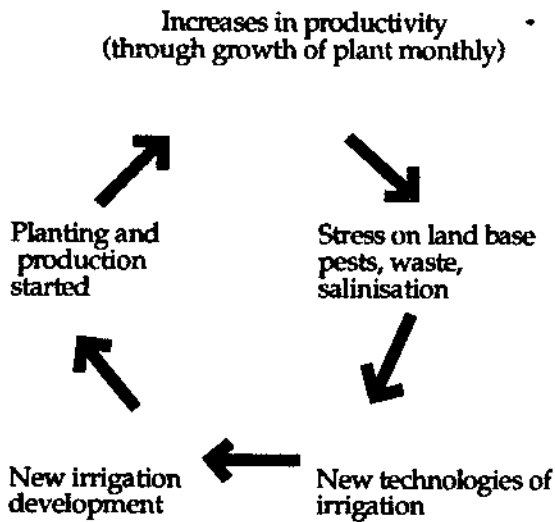


Figure 2 : Cycle of environmental change

Questions of food quality and environmental quality interact directly around some of the risks associated with this superintensive management of the land. To maintain the former the latter has to be constantly and increasingly managed. Because of the recent nature of many of

these developments, producers, exporters and development planners are only beginning to recognise these as significant threats to the long term economic and environmental sustainability of the overall agricultural development. Nevertheless, considering some of the earlier agro-industrial developments (which have now been operating for over twenty years) one can begin to obtain an insight into how agricultural management practices have been increasingly attuned to the risks of pests, disease and salinisation of soils, resulting from poor drainage of irrigated waters, particularly on thin soils.

One agro-industrial complex had been established for over twenty years, principally in the production of table and wine grapes for the Southern Brazilian market. It employed over 800 people with 5 agronomists and 25 technicians. It was currently expanding its production to over 600 hectares but it was still dependent upon what was seen to be some of the earlier, more traditional irrigation technology associated with channel irrigation and more undirected forms of water placement. The limits between the types of irrigation management, the incidence of environmental risks such as pest and

disease, salinisation and their consequences on fruit quality are particularly significant in the grape sector. Moreover, susceptibility to these risks and problems cross-cuts scale factors concerning the type and size of farm; and it relates particularly to the types of irrigation technology adopted and the level of care and control over the growth of the crop. For instance, some small family farms (6-10 has) were producing high quality grapes with new spray and sprinkler irrigation systems, relying on almost completely family labour, and packing the products on the farm for the domestic and export market. Our larger agribusiness, however, was experiencing some problems due to the longevity of intensive production. A major problem with the older systems of irrigation has been that there are differences in introducing and directing the water to the grape plant. Increased knowledge about growth rates has revealed that the timing of water dressings can influence both quantity of production and quality. The less these timing systems are controlled the more room for deterioration in quality there is likely to be.

A second increasing problem concerns the incidence of diseases in the

grape. Vagaries again in the natural weather (particularly high humidity and unstable temperatures) can cause infestation and mildew formation in the plant. On the agribusiness the agronomists argued that this "was a continual battle". A general problem in the valley, especially because of monoculture". It was estimated that this was representing an annual loss of at least 5% of the grape crop despite the targeted application of the government registered herbicides, fungicides, and insecticides (for example, Paraltion, Sumazinia, Tricolorfan and Zuvaim). These losses were down to 1% for those newly irrigated systems, where the water dressings could be better regulated and directed.

Under the new sets of managed (rather than sustainable) environmental equilibria which are necessarily established under such total irrigation systems as those developed in the San Francisco Valley, a major management concern becomes fending off or resistance to new sets of emergent disequilibria broadly associated with the well known risks of intensive and monocultural fruitculture. These trade-offs begin to preoccupy the agronomists and technicians, particularly

on the more established agro-industrial enterprises, and increasingly the small family producers. The emphasis, however, is not to radically question the basis of the super-productivist model of globalised agriculture where new varieties can be tried and tested, and irrigation systems made more sensitive to the regulation and quality of plant growth. Rather, emphasis is on developing new technological fixes which stave off the risks and maintain quality production levels over the medium term. The priorities are to enhance the management of the product, then labour, then the environment, as a hierarchy of quality concerns relevant to sustaining this new model of intensive agrarian development (see table 2).

Type of environmental risks	Main causes	Actors involved	Time frame of effects
Pests, diseases of plants	Rudimentary irrigation systems combined with natural vagaries in humidity and temperature	producers and agronomists	Monthly/ annually
Salinisation of soils and Desertification	Irrigation systems being used on soils without adequate drainage, run off facilities, broken drains, poor management of drainage and /or lack of investment for infrastructure.	Producers CODEVASF	Gradual build up effects long term to effect yields
Breakdown of organic contents of soils	Super-intensive use, year-on year of irrigation and fruit production; application of artificial fertilisers	Systemic	Long term?
Pollution effluents in drainage systems/ pollution of SF river	Intensive application of chemicals, herbicides, pesticides	Systemic	Long term
Modifications in micro climate brought about by increasing extensive irrigation vegetation cover	New vegetation cover with high water content/ increasing humidity and evapotranspiration rates; more micro- climate variability	Systemic	Long term but some indication it is now having effect in terms of humidity and micro rainfall variations

Table 2: Managing Environmental Risk in the San Francisco Valley

## 7 Conclusions

Overall these environmental risks seem somewhat incidental to the overall drift of the agricultural development. For instance, it is estimated that there are some 500 hectares of salinised soil in the valley by CODEVASF; largely areas where soils are thin. Moreover, it is argued there are, over 1 million square kilometres contaminated with salt. However, simply to focus on the outcomes like this obscures the point that the environmental risks are having to be managed day-on-day, and month by month by producers and their technical advisors; indeed, by the food networks as a whole. Hence, there are real management risks to both food quality, and the medium and long term quality of the regional environment. These risks have to be managed and acted upon in the context of globalised food networks which place a logic of competitive quality production onto producers and on the region as a whole. Producers and exporters have to compete with each other for market entry, the region has to compete with the fruiticulture regions of Chile, Mexico, etc. to supply the larger proportions of their produce. In this sense the

actors and agencies involved in fruiticulture in the region have to balance, trade off, and construct strategies for managing short-term quality demands from importers on the one hand, and environmental risks of intensive supply systems on the other.

Exploring the actions of these actors and agencies, embedded as they are in these globalised food networks, demonstrates how they have to become a part of nature. That is, a part of the process of making quality foods and specific quality environments. Hence the making, manipulating and modifying of nature, through the foods and networks themselves and the environments in which they are fostered and nurtured, provides the life-blood of the new agrarian spaces of which the San Francisco Valley represents.

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### Notes

\* Terry K. Marsden is Professor in the Department of City & Regional Planning at the University of Wales Cardiff;

Josefa Saete Barbosa Cavalcanti is Professor in the Department of Social Sciences at UFPE;

José Ferreira Irmão is Professor in the Department of Economics at UFPE.