

for the epoch 1974. It is hoped that the air photogrammetric survey of the Lewis Glacier will be repeated by the early 1980's.

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RECENT INDUSTRIALISATION IN SARDINIA: REBIRTH OR NEO-COLONIALISM?

With 4 figures and 1 table

RUSSELL KING

Zusammenfassung: Moderne Industrialisierung in Sardinien: Wiedergeburt oder Neo-Kolonialismus?

Früher eine der industriell unterentwickeltesten Regionen Italiens mit einer im Niedergang begriffenen Wirtschaft, die auf Viehzucht und dem Kohlen-, Blei- und Zinkbergbau basierte, ist Sardinien jetzt die zweit-dynamischste Region Italiens, was die Wachstumsrate des regionalen Nettoeinkommens betrifft. Drei Antriebe liegen dieser jüngsten Entwicklung zugrunde: Der Einschluß der Region in den Bereich der *Cassa per il Mezzogiorno* (Fond für Süditalien), die Gründung einer besonderen industriellen Kreditagentur (*Credito Industriale Sardo*) und der „Wiedergeburtspian“ (*Piano di Rinascita*) der Insel. Die junge ökonomische Entwicklung ist in bestimmten Wachstumspolen (Cagliari, Porto Torres und Ottana) konzentriert, und zwar auf Industrien mit Ölbasis wie Ölraffinerien, Petrochemie und Kunstfasern, obwohl sich auch einige Manufakturen und Dienstleistungsindustrien entwickelt haben. Darüber hinaus haben sich Industrien in Porto Vesme (Metallverarbeitung), Arbatax (Papierherstellung), Oristano (neuer Hafenkomplex), Villacidro und Macomer (Textilien) niedergelassen. So eindrucksvoll sie auch sein mögen, haben diese Industrien doch nicht die Emigration aufgehalten oder genügend Arbeitsplätze für die aus dem Agrarsektor Zuströmenden geschaffen. Nur ein Teil des Budgets des „Wiedergeburtspians“ ist ausgegeben worden. Die Arbeitsplätze in der Industrie haben auf Grund des kapitalintensiven Charakters dieser Betriebe zehnmal mehr als vorgesehen gekostet. Kritiker reden von einer Invasion der nationalen und multinationalen Petrochemie-Giganten auf die Insel. Diese Si-

uation ist eine Wiederholung eines bekannten Musters der Geschichte Sardinien, nämlich der ständigen Kontrolle der Insel durch Kräfte von außen.

The Saga of Southern Italy – the Mezzogiorno – has many interesting aspects, not the least of which are the marked geographical contrasts within the region. Unfortunately, students of Italy's 'southern problem' frequently fail to bring out the differential spatial impact of the string of policies that have been applied since the mid 1950s to develop the Mezzogiorno industrially. In particular, the peripheral region of Sardinia is often ignored. Yet this island has witnessed over the past decade and a half the most profound economic changes of any other region in Italy. A traditional economic geography, based on pastoralism and mineral exploitation, has been radically altered by a mushrooming of oil-based refining, petro-chemical and artificial fibre complexes. Generous financial incentives to incoming industry and the rapid development of transport infrastructures have stimulated this industrial development, aided by the island's strategic location on major oil routes from North Africa and the Middle East. The results of this development, however, have not been entirely unequivocal. The highly capital-intensive nature of the industry leaves a considerable shortfall in planned employment; the effects of the development are highly

localised; and there is a fundamental problem of the 'externalisation' of the island's economy, with crucial decisions regarding Sardinia's economic future now in the hands of persons and interests foreign to the island. This last point has all the more force in the context of Sardinia's strong regional culture and local political movements¹).

This article has three main parts. First the economic and administrative background to recent industrial development will be reviewed. Second, the new industrial geography of Sardinia will be examined. Finally, some analysis of the efficacy of Sardinia's model of industrialisation will be attempted.

1. Background to recent industrial development

Southern Italy's development represents the greatest single commitment of E.E.C. regional policy. Within the context of the *Questione Meridionale*, Sardinia's development is of particular interest. For long the 'forgotten region' of Italy, Sardinia has recently emerged as one of the most dynamic and rapidly developing parts of the country: 'at what cost to the region's ecology and strong insular culture, we shall see later.

a. Decline of the Traditional Economy

For centuries Sardinia's traditional economy rested on the products of pastoralism. This itself was a natural adaptation of the sparse population to its rugged and rock-strewn habitat; the grazing of sheep and goats on the unimproved maquis gave both the basis for subsistence, and, in the form of cheese, some commercially useful surplus for export. Cropping was limited, and still is today, to the Campidano, the trough-like lowland which crosses the south-west part of the island, and a few other pockets of plain and plateau, chiefly in the west. Cork oaks have always been important in the north-central region, around Tempio.

Sardinia's other main traditional economic activity is mining, its importance enhanced by Italy's general paucity of mineral resources. Coal in the Sulcis coal-field, lead and zinc ores in the crystalline Iglesias massif (both in south-west Sardinia), and scattered mining and quarrying elsewhere have given employment to up to 33,000 men or 9% of the employed

population, the peak of mining employment reached in 1939 (GENTILESCHI 1972, p. 77).

Both of these traditional activities are now in decline. Most mining activities, unrealistically expanded by Mussolini during his autarchy policy of the 1930s, are now impossibly uneconomic. Mine closures and lay-offs of miners have reduced those employed in coal mining from 10,120 in 1951 to 1,200 in 1971, and in the lead-zinc mines from 8,840 in 1951 to 3,130 in 1971. Emigration of unemployed miners made the south-western region of the island lose population steadily during the 1950s and early 1960s (GENTILESCHI 1974).

The rural economy has also contracted markedly. Pastoral products contributed 24% of Sardinia's exports by value in 1960, but only 5% in 1970. The postwar national agricultural policies of land reform, land consolidation and capital grants to larger-scale crop farmers have had almost no relevance to the pastoral economy of Sardinia (KING 1971). Outmigration from the rural sector has been intense since about 1963; numbers employed in agriculture fell from 190,000 in 1961 to 113,000 in 1971, or from 46% to 29% of the employed population.

A measure of the overall decline of the Sardinian economy immediately prior to the recent phase of industrialisation is the fact that between 1953 and 1963 the Sardinian contribution to the gross national product fell from 2.3% to 1.9%. Regional income grew at only 4% per year compared to 4.5% in the rest of the Mezzogiorno and to 6% in the centre-north of Italy (SATTA and SINI 1971, p. 195). The 1961 Italian Industrial Census showed Sardinia to be at the bottom rung of Italy's twenty regions: 13,017 industrial concerns employed 36,369 manufacturing workers in a population of 1.4 million. Only Umbria and Basilicata had fewer industrial workers, but these regions had much smaller populations. Moreover 87% of the island's industrial concerns employed fewer than five workers; only 26 (0.2%) employed more than 50 persons each. Most of the 'industry' therefore was artisan activity (e.g. cheese, wine, cork, furniture) produced in tiny workshops and cellars in villages scattered all over the island. The Economic Commission of the Sardinian Rebirth Plan organisation reported in 1958 that 'a modern and properly organised industrial structure has not existed... Sardinian manufacturing industry consists of nothing more than scattered artisans of rudimentary technical and administrative efficiency' (MORI 1966, pp. 453-454).

b. Three Vital Stimuli

In the immediate post-war years the conviction took root that significant industrial development in Sardinia and the Mezzogiorno would not take place unless and until the government provided an appropriate range of incentives and privileges to potential

¹ Sardinia, it has been said, is the Ireland of Italy (BERGERON 1969 p. 278). Although generally included in the Mezzogiorno Sardinia possesses a number of unique features which differentiate it from the rest of the Italian South. Its isolation, in both geographical and psychological terms, increases transport costs and lends an aura of remoteness which has habitually led to lack of concern for the island's welfare on the part of national governments. For further analysis of the regional personality of Sardinia see LE LANNOU (1941) and LEVI (1943).

industrial entrepreneurs locating in the South. Government intervention was also thought necessary to provide infrastructures essential to factory development and to rationalise agriculture so as to bring about an appreciable increase in income generated by this sector.

The most important response to this set of conditions, on the scale of the whole Mezzogiorno, was the creation in 1950 of the *Cassa per il Mezzogiorno*, or Fund for the South. The work of the Cassa has been described in a number of recent studies (e. g. WATSON 1970, pp. 10–67) so only the briefest outline is in order here. The early years of the Fund's operation were marked by a concerted attempt to improve infrastructure, particularly in the fields of agriculture (land reclamation, erosion control), transport (especially roads) and public services (notably water). Only in the late 1950s did a firm practical commitment to aiding industrial development emerge. This followed from the Vanoni Plan of 1954 which contained a major policy recognition of the need to extend the industrial system to the southern regions where most of the excess labour supply was, and is, located. Cassa aid to industry falls under three main heads: a) tax and other fiscal concessions; b) capital grants and low interest credit extensions; and c) the creation of 'areas' and 'nuclei' of industrial development, with aid given to the consortia in charge of these zones.

The second stimulus to sardinian industrial development was the creation in 1953 of *Credito Industriale Sardo* (C.I.S.). The Cassa provided 40% of the initial capital of C.I.S., allocated foreign loans to it, and assigned certain special funds, thereby controlling fairly closely its operations (WATSON 1970, p. 18). Theoretically, C.I.S. was to favour medium and small industrial concerns, aiding new plants rather than expanding existing ones. Preference was also to be afforded labour-intensive enterprises located in the most backward areas. Credit policy was taken one stage further by the creation in 1959 of *Finsarda*, a regional government agency authorised to provide technical assistance to, and acquire shares (up to 49%) in, private industrial companies being formed or already in existence.

The third stimulus resulted from Sardinia's status as a 'special statute' region (along with Sicily, Trentino-Alto Adige and Friuli-Venezia Giulia, the island was awarded its own parliament and a measure of regional autonomy in recognition of its strong separatist tradition). After 14 years of debate and planning, the Sardinian regional government in 1962 launched its *Piano di Rinascita*, a plan for the 'rebirth' of the island, considered in more detail below. Four principal objectives were central to the operation of the plan: a) achievement of a stable and high employment level; b) a rapid increase in incomes; c) equalisation of incomes from different sectors of the eco-

nomy; and d) transformation of the socio-economic infrastructures. A rapid development of industry – especially small and medium concerns linked to local resources – was seen as the chief mechanism for the achievement of these aims. Law 588 setting up the Rebirth Plan assigned to it a special fund of 400 billion lire for a 12 year period; this fund was additional to the finance for Sardinian development already detailed under national, regional and Cassa headings²⁾. The basic target was an annual growth rate in real terms of 9% for the regional economy.

c. The Piano di Rinascita

The administration and operation of this piece of regional and industrial planning deserves to be looked at in some detail as it was the first concrete attempt at such planning in Italy. WATSON (1970, ch. 5), who has made a special study of the Sardinian Rebirth Plan, describes its significance under two heads: firstly that it is an organic policy integrating all the funds and directives concerned with the development of Sardinia; secondly that it is a genuine and fully-fledged economic plan, truly comprehensive in nature, placing Sardinia in fact in the forefront of Italian regional economic planning. For the execution of the rebirth policy and of the five year plans into which the policy is organised the Sardinian government set up a Regional Planning Office (*Centro Regionale di Programmazione*) in Cagliari (the island's capital), with 25 experts in the social, economic, statistical, technical and administrative fields. The Cassa also opened a local office in Cagliari to work in close liaison with this regional planning group. However, in contrast to the Cassa's policy of favouring agrarian and infrastructural investments first, moving later to the support of industrial development through cheap

²⁾ The total finance anticipated under the Rebirth Plan period (1962/3 to 1974/5) – 1800–2000 billion lire – is detailed as follows; as can be seen, only one quarter of the capital comes from private sources. The sectoral apportionment of spending was intended as approximate.

a) Source	billion lire
Central government contribution under Law 588	400
Regional government contribution	300– 350
Contributions by various ministries	400– 450
Cassa per il Mezzogiorno investments	200
Private sector investments	500– 600
Total	1800–2000
b) Expenditure	
Agriculture	500
Industry	550– 650
Housing	250– 300
Public works	300
Tertiary activities, including tourism	200– 250
Total	1800–2000

Source: PINNA 1965 pp. 126–127.

credit and other incentives, the rebirth policy makes industry play the leading role, backed, not preceded, by a programme of infrastructural works. It is also evident that the Sardinian authorities prefer outright grants to cheap credit in promoting the desired industrial development.

Local participation in rebirth policy was initially assured through the creation of *zone omogenee*: 'territorially homogenous zones delineated according to prevailing economic structure, social conditions and development possibilities'. Originally 18 in number, they were subsequently reduced to 15 (Fig. 1). The

territorial basis was used in any piece of Italian economic planning (PINNA 1965, p. 125). The function attributed to the committees in charge of the *zone omogenee* was to indicate to the Sardinian Minister for Development the requirements and possibilities of each zone. Considerable discussion has nevertheless been generated by the partial conflict between the necessity for a 'growth pole' approach to industrial development and the policy of achieving a balanced growth throughout the island on the basis of the homogenous zones.

The first quinquennial plan (1965–69) involved the identification of so-called *punti di forza* (points of strength) in the Sardinian economy. Such an analysis soon took on a spatial significance when areas benefiting from pre-existing dynamic development (as revealed by population and other trends) were identified. In agriculture the strong point was the irrigated area which covered, in the mid-1960s, 300,000 hectares (12% of the agricultural area) and occupied 23% of the farming population. In industry the strong points were focussed around Cagliari and Porto Torres, with more local-scale development at Sassari, Olbia, Oristano, Sulcis-Iglesiente, Tortolì-Arbatax, Macomer, Villacidro and Siniscola. These industrial zones covered 20% of the island's area but embraced 45% of the population. Thirdly, touristic zones were delineated: these included 40% of the island's coastline, and the Gennargentu range of mountains in the east-centre, location of a proposed national park. The geographical location of these 'strong points' led to the identification of two major geographical-developmental realities in Sardinia (CLEMENTE and BIASCO 1968, p. 20): a) the western coastal belt, centred around Cagliari, Iglesias, Oristano, Macomer, Alghero and Sassari, with a denser population and a more dynamic, mixed economy; and b) the central and eastern belt, with a declining economy and only limited possibilities of development. Yet throughout the two decades 1951–71 evidence accumulated of an increasing economic and demographic polarisation at the two extremes of the island – Cagliari and Sassari-Porto Torres. Elsewhere, only Olbia appears to be growing fast, but this is measured against a low base-level. Most of the *zone omogenee* (13 out of the 15) lost population during the 1961–71 intercensal period (SERRA 1973). Geographically, three major objectives were aimed at by the 1965–69 quinquennial plan: a) to increase the diffusion effects of growth from the two major poles, especially from Cagliari; b) to develop a spatially intermediate pole around Oristano (but still in the 'favoured' west of the island); and c) to resolve the regional problem of the eastern part by rationalising and modernising the pastoral sector, improving communications, and developing where possible (e.g. Olbia, Nuoro, Tortolì) islands of industrial development (CLEMENTE and BIASCO 1968, p. 30).

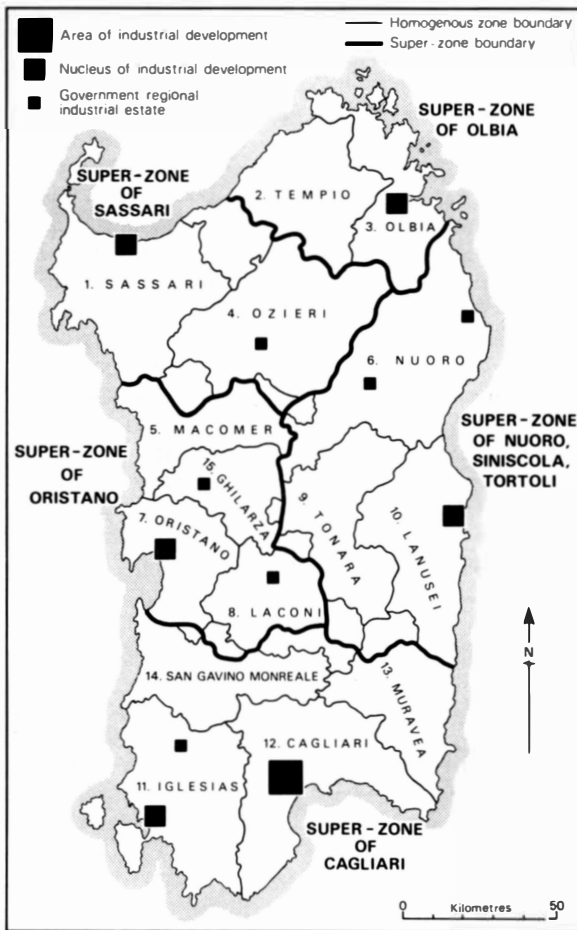


Fig. 1: Regional planning under the Sardinian Rebirth Plan (1965): homogenous zones and super-zones

zones were seen as the appropriate spatial scale (intermediate between the commune or parish on the one hand, and the province on the other³) for spending under the Rebirth Plan. They are also significant in that this was the first time that such an explicitly

³ Sardinia has three provinces: Cagliari, Nuoro and Sassari; a fourth, based on Oristano, is being instituted.

It therefore came as no surprise when, in the execution phase, regional planning was forced to go beyond the scale of the *zone omogenee* to the creation of 'super-zones of economic-territorial gravitation'. These five super-zones (Fig. 1) are primarily based on the leading towns' hinterlands: namely Cagliari, Oristano, Sassari-Porto Torres, Olbia, and Nuoro-Tortolì-Siniscola. The last-named of these, however, scarcely represented a zone of gravitational focus, but rather what was left after the radii of economic attraction of the other major centres had been drawn (WATSON 1970, p. 91). Nevertheless, it is significant that each of the five super-zones has one or more Cassa-sponsored area or nucleus of industrialisation, and at least one of the regional government-sponsored industrial nodes, whilst the island's five leading ports are likewise conveniently distributed equally between them. The significance of this is that within the framework of the super-zones the planning authorities can claim that broadly speaking they are fulfilling the Rebirth Plan's injunction to promote spatially balanced growth, whereas within the framework of the 15 homogenous zones development cannot be considered as anything but unevenly distributed (WATSON 1970, pp. 93-94).

II. The new industrial geography of Sardinia

The geography of Sardinian industrial expansion is somewhat complex (Fig. 2). In common with the rest of the Mezzogiorno recent development is articulated into industrial 'areas' and 'nuclei', the former being larger than the latter. Within the areas and nuclei industrial development is concentrated in one or more estates called *agglomerati*. In addition the regional government have identified a number of zones of 'local' industrial interest – these have been the subject of a detailed study by the Italian geographer LO MONACO (1965). The existence, however, of a designated industrial zone does not signify that anything has necessarily happened: numerous *agglomerati* are merely dots on the map with not a factory in sight. Attention will here be concentrated on the three areas of large-scale development – Cagliari, Porto Torres and Ottana – with a briefer description of the smaller developments in the industrialisation nuclei of Oristano, Porto Vesme, Olbia and Tortolì.

a. Cagliari

The first area of industrial development in Sardinia to be approved by the *Cassa per il Mezzogiorno* was Cagliari, in 1962. Consisting of the city and 22 adjacent communes, it covers 1,600 sq. km. and contains a population of 400,000, 59% of whom (235,000) live in Cagliari itself. Industrial expansion is concentrated in three estates: Elmas, 3 km. north-west of Cagliari; Macchiareddu, 14 km. to the west across the Stagno di Gilla (a salt lagoon); and Sar-

roch, 20 km. to the south-west of the city. In 1975 about 7,700 people were employed in these three estates; this is planned to rise to 33,000 (28,000 at Macchiareddu) by 1986. Although at present smaller in employment terms than the Porto Torres estate in northern Sardinia, Macchiareddu is destined to become the major industrial centre in the island, with a mixture of petrochemicals, manufacturing and service industries. The Elmas estate, on the city outskirts, is reserved for locally-oriented small firms; at present there are nine concerns collectively employing 370 workers. Sarroch is dominated by the Saras oil refinery and associated Saras Chimica chemicals plant, each with 500 workers.

Separated from the main fabric of the city by the lagoon and with an abundance of flat, unoccupied land, Macchiareddu is an ideal site for a major industrial expansion (Fig. 3). The main problems – pollution, passenger and freight transport, the social impact on nearby villages – are capable of being overcome, although little has happened yet by way of their solution. Present employment at Macchiareddu is 5,300, though plants in course of construction will soon increase this to about 13,000. To date the consortium in charge of the estate has provided industrial water via a 30 km. aqueduct leading off from the Flumendosa water scheme to the north, a 15 km. pipeline system for drinking water, a supplementary water plant for raising water from the Riu Mannu for emergency use, power and telephone lines, and 15 km. of connecting roads, including a new bridge over the lagoon outlet. Further projects planned include more feeder roads to and within the estate, drainage and sewage systems, a purifying plant for industrial effluent, and a community services area. Generally there is a division within the estate into the north-west sector where the smaller plants are concentrated, and the south-east, reserved for big plants. This segregation is not absolute, but is related to the future canal-port which will penetrate the estate's eastern flank.

At present the largest industry at Macchiareddu is the north Italian-owned Rumianca petro-chemical works, consisting of eight major plants producing chemicals, plastics and resins for industrial, household and cosmetic use. Employment in these plants (1,100 in 1975) will double by 1978 with the completion of further processing units currently under construction or expansion. Rumianca's most important raw material, virgin naphta, used to be supplied by the nearby Saras refinery at Sarroch, but after an argument over supplies during the recent oil crisis the majority is now imported via a newly built 1.6 km. jetty. Salt, the other main raw product needed, is supplied locally by the Conti Vecchi saltworks, taken over by Rumianca in 1974. Some 220,000 tons of materials are produced annually by the Rumianca complex; 30,000 tons of acrylonitrile are sent to the

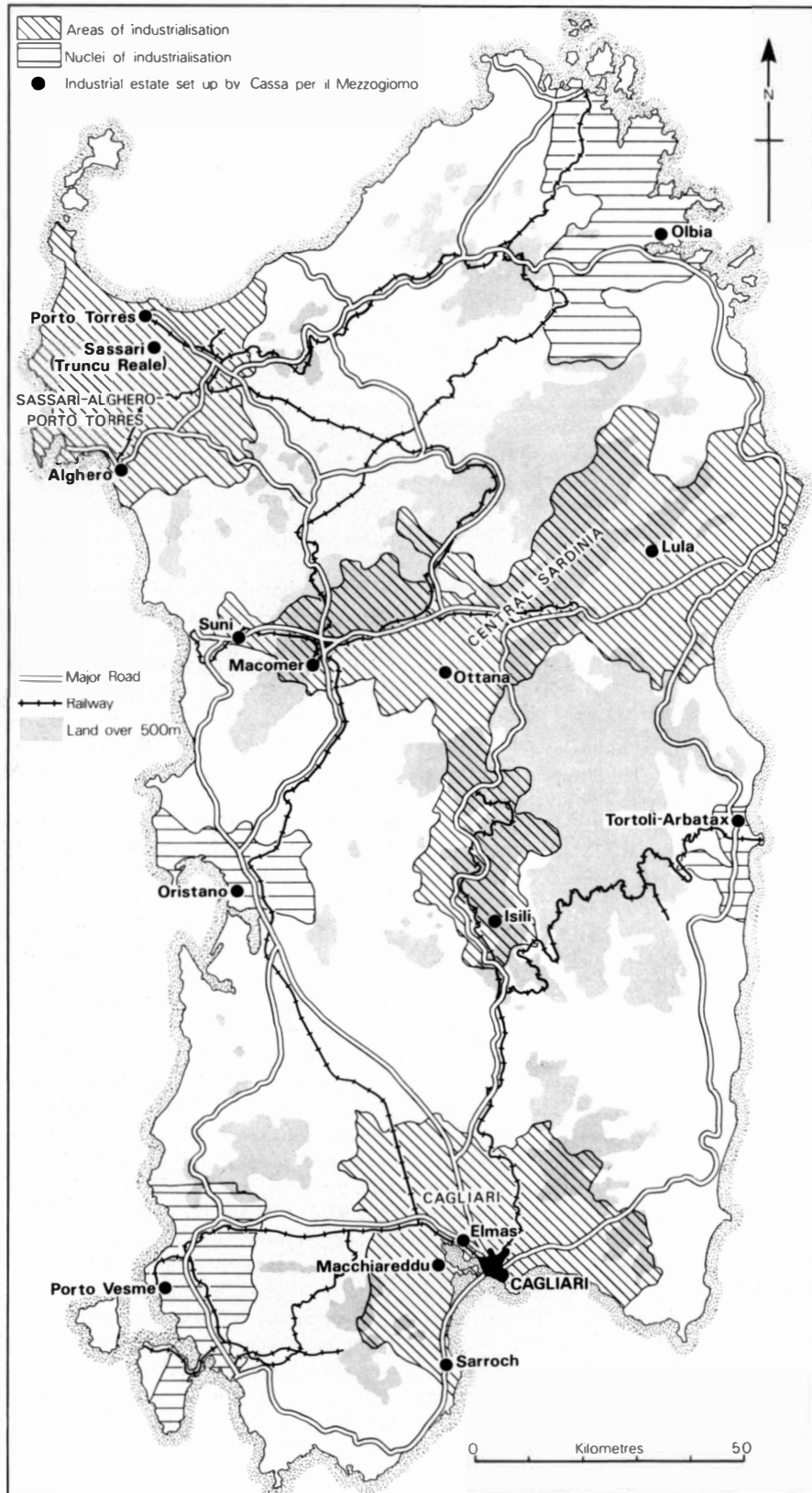


Fig. 2: Sardinia: current industrial policy zones

Snia-Viscosa acrylic fibre plant at Villacidro; most of the rest is exported.

Much impulse for the future industrial development of Cagliari will derive from the new canal-port to be carved out of the salt marshes on the western side of Stagno di Gilla over the next ten years (Fig. 3). After considerable bureaucratic delays (the project was originally given the go-ahead in 1970), work started on this rival to the new French Mediterranean container port of Fos-sur-Mer in late 1975. Although part of the salt pan area will be lost and the overall surface of the lagoon reduced, it is argued that the port is badly needed. The old port near the city centre is congested and totally unfit for future trade growth (BOGGIO 1971). The new port's promoters predict that, particularly with the re-opening of the Suez Canal, the canal-port will offer good prospects as an international container trans-shipment centre, serving feeder lines to the rest of the Mediterranean and beyond. Associated with this should arise important repair and industrial functions. An idea of potential activity can be gauged from the fact that 9,000 ships per year use the ports of southern Sardinia, yet up to now only rudimentary repair services have been available. Permanent employment created by port services will be of the order of 3,300. When complete, probably some time in the late 1980s, the 100 billion lire project will embrace a 10 km. approach canal 14–18 metres deep and 200 m. wide, several 500 m. wide basins, 20 km. of wharf frontage, a container depot of 400 ha., road and rail links, ship repair yards, naval engineering works and also, hopefully, a dense network of industries attracted by the port (as well as by the other incentives to firms locating on the Macchiareddu estate). The first phase – 2.5 km. of the canal, the two 4 km. moles guarding its sea entrance, 60 ha. of container area, 1.5 km. of quays and a turning basin – is programmed for completion in 1979; finance for this (37 billion lire) is assured by the Cassa and the Sardinian regional authorities.

The administrative, commercial and growing industrial functions of Cagliari make this city-region (which more or less coincides with the 23 commune area of industrial development) one of the most rapidly developing parts of the Mezzogiorno (SCHLIEBE 1975). Its population grew 60% during 1960–70: an annual growth rate of 2.4% (cf. Sardinia 0.9%). On this 7% of Sardinia's area now live over a quarter of the island's population. By 1986 the forecast is for a population of 478,000 in the industrialisation area; the labour force should grow from 107,000 (1971) to 180,000 (1986), an increment of 5,000 per year. The area's present dynamism and likely future growth bring, however, a number of environmental and planning problems. The most important of these concern water supplies, pollution, transport and urban growth.

The present supply of water from subterranean sources and from the Mulargia Dam on the Flumendosa 60 km. to the north-east is sufficient for current needs, but it is anticipated that demands will be four times as great in ten years time. Most of this increased demand will result from industrial growth; at present using 40 million cubic metres annually, industry will require 180 m. cu. metres by 1986. A new barrage on the Flumineddu north of Cagliari (linked to the Flumendosa water scheme) and reservoirs on the Cixerri river south of Siliqua and on the S. Lucia above Capoterra should satisfy the demands of the Macchiareddu estate. Smaller dams on two streams in the hills above Sarroch will supply the Saras plants. Other possibilities – recycling industrial water, desalination of sea water – are also being examined⁴).

A more direct environmental problem concerns pollution, particularly of the Stagno di Gilla where Professor Cottiglia of the Zoology Institute of the University of Cagliari holds a watching brief. Rumianca has its own purifier for industrial waste which reduces, rather than removes, harmful elements (COTTIGLIA et. al. 1973, pp. 18–19), but the problem will not be properly solved until the industrial consortium has built a purification plant treating the effluents of all industries on the estate and piping the product a considerable distance out to sea. Further ecological deterioration is likely with the advent of the new port: the area of the lagoon will be reduced by an estimated 22% and the oil content of the water increased. Fishing activity is being squeezed out: a 91% decline in fish stocks was registered between 1957 and 1971, the flavour of fish remaining being tainted by the effluents (COTTIGLIA et. al. 1973, pp. 19, 49–50). With very little water circulation within the lagoon, parts are now banned for fishing because of the build-up of noxious materials; the threat to the livelihood of the fishermen who work in the lagoon is considerable.

Further serious problems arise with the need for transport services and residential development in association with the industrial expansion. Comprehensive data on workers' residential and journey to work patterns are hard to come by. According to the *Consortio* 3,580 workers at Macchiareddu come from Cagliari city. A study of the addresses of employees in nine major firms in the Cagliari *agglomerati* (including Rumianca, Saras and Saras Chimica) indicated that 45% originated from Cagliari city (including

⁴) These various measures are unlikely to bear fruit for another 12 years, however, within which time water shortages may become acute. Conflicts between industrial and household demands for water have already become apparent; in 1971 the population of Capoterra engaged in strikes and demonstrations against the reduction in their use of water owing to the demands of the Saras plants.

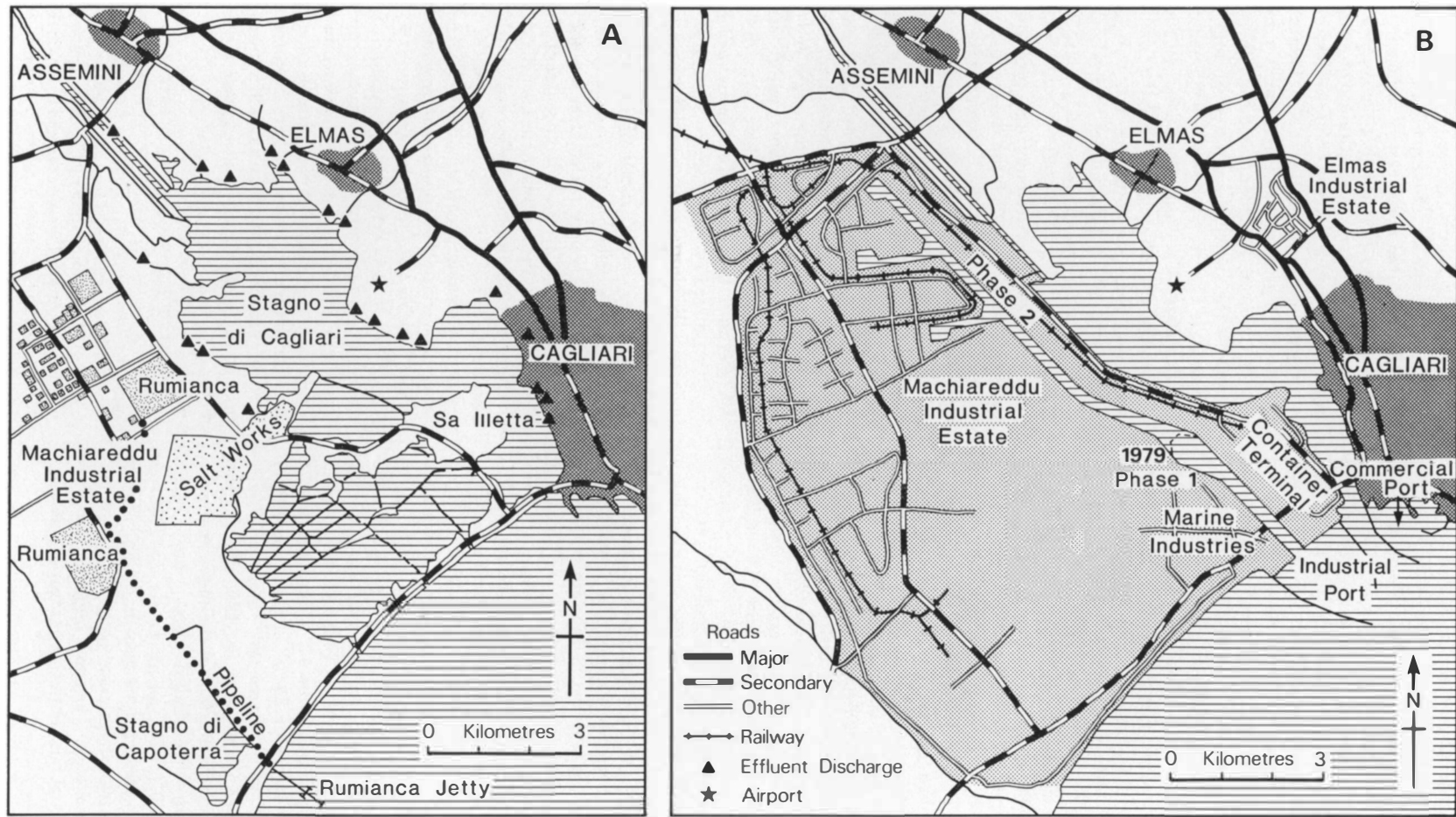


Fig. 3: The Macchiareddu Industrial Estate:
A: Present configuration
B: Planned developments

the suburbs of Elmas, Monserrato and Pirri), 11% from Assemini and 5% from Sarroch. Some 5% commute from beyond the boundaries of the industrialisation area, indicating a widespread commuting field⁵). Public transport services to the industrial estates are, however, almost completely lacking; only in 1974 was a bus route established between the city and Macchiareddu, and many villages close by which send several hundreds of workers to the industrial zone are still not connected by public transport to the *agglomerato*. Most workers are therefore forced to use their own transport, although the larger concerns have company buses. With the cost of petrol now higher in Italy than any other west European country, the need is for a vastly improved public transport system. The *Consorzio* is considering constructing a shuttle service railway line running from Cagliari to Macchiareddu via Elmas and Assemini; the cost would be considerable and the time needed to approve, finance and build it 10–12 years, but with the number of workers coming into Macchiareddu rising to a planned 28,000 within this period, it may be a viable long-term solution.

Industrial development also contributes to profound changes in the residential morphology of Cagliari. Rapid peripheral expansion takes place, the San Michele quarter increasing its population from 13,750 to 30,000 over the past ten years, Sant' Alenixedda from 8,550 to 22,000. Suburban expansion is generally channelled along the main arteries leading out from the city, but the speculative nature of the process and the lack of effective planning control make the growth unco-ordinated and lacking service provisions. Villages close to Cagliari which are being suburbanised, such as Quartu S. Elena and Assemini, suffer similar problems⁶).

Many of these issues raised by the development of the Macchiareddu industrial estate are evident on a smaller scale but in sharper relief in the Sarroch *agglomerato*. Here developments are more limited but the industrial landscape is no less dramatic and the impact on the social geography of the settlement

of Sarroch (population 4,000) has been profound (SCARAFFIA 1975). The Saras refinery, opened in 1965, is primarily a service refinery working under contract to Esso, Mobil, Total, Shell and Agip; 80% of the refined product is directly exported, 7% is sold in Sardinia through a network of 40 Saras filling-stations, and 13% passes to the neighbouring Saras Chimica works which opened in 1971 and is owned 20% by Saras. Strong socio-cultural problems have been thrown up locally by this sudden development. The social structure has been retextured: mobility has been induced by the availability of industrial jobs; the industries have tended to replace the feudal-type landowners who were strong in this area until the 1950s as the new 'boss class'; and a new middle class has emerged in the form of the specialised workmen and technical-managerial personnel, many of whom are not local. In a village like Sarroch, which previously was one of the most isolated and poor in lowland Sardinia, the mixing of people from diverse social and regional origins imposed severe strains on the harmony of the community as well as practical problems of understanding dialects. The numerous Sicilian families coming to Sarroch engendered particularly antagonistic feelings. Occasional 'cross-regional' marriages are not sufficient to break down barriers of regional prejudice; the real problem is the lack of cultural and recreational facilities to foster a genuine spirit of understanding.

b. Porto Torres

Since 1965 Porto Torres has emerged as the principal industrial centre of northern Sardinia. The town is part of the Sassari-Alghero-Porto Torres industrial region which started as a nucleus of industrialisation in 1961 with just these three communes, and was enlarged to 'area' status in 1970 with nine more communes added. In 1971 the 2,457 sq. km. area contained a population of 196,700, over half of whom lived in Sassari (107,200), with most of the rest in Alghero (31,960) and Porto Torres (16,370). Three *agglomerati* exist within the industrial area: Porto Torres (2,000 ha.), 3 km. west of the town; Alghero (200 ha.) 10 km. north of the town; and Sassari at Truncu Reale (600 ha.), 10 km. north-west of the city. Truncu Reale has hardly developed as yet, although the forecast is for 5,000 workers employed in 1980. Alghero has five firms (electrical products, telegraphic equipment, plastic products, paints, building units) employing 1,000 workers between them: the forecast is for 4,000 by 1980. By far the greatest strides have been made at Porto Torres, dominated by the SIR (*Società Italiana Resine*) petrochemicals complex, the largest single industrial enterprise in the island in terms of investment (600 billion lire up to the end of 1975) and employment (5,000 permanent employees, plus 3,000 construction workers). By 1980 SIR's permanent payroll should reach 7,000 which,

⁵) The fact that many commute rather long distances – up to 100 km. each way (the mean journey to work is 14 km. each way) – is related to three factors: a) the excellent road network, particularly to the north and north-west of Cagliari (most of the long-distance commuters come from settlements in the central and northern Campidano); b) the high accommodation prices in Cagliari; c) the desire to retain village residence perhaps for family reasons or to enable part-time agricultural activity to continue.

⁶) Quartu S. Elena has grown rapidly as a dormitory town for Cagliari (1951 – 17, 759; 1971 – 30, 324). In 1974 (33, 878) it overtook Nuoro, a provincial capital, as the third largest settlement in Sardinia, after Cagliari and Sassari. Certain shops and commercial services (banks, furniture stores) follow this growth, but physical and social services are badly lacking.

in a capital-intensive industry, gives some idea of the scale of operations.

SIR's activities in their 15 sq. km. complex at Porto Torres involve a high level of complexity and integration difficult to describe succinctly. Petrochemicals make up only 15% of the complex; there is a whole range of other sectors – chemicals, semi-manufactured goods such as yarns, resins and plastics, manufactured goods and a group of service companies. In fact some 30 sub-companies make up the complex, each one responsible for a special group of products. Alchisarda produces styrene and cumene, Sardoil does the refining, Fibrasir produces polyester fibres, and so on⁷⁾. The production of synthetic (styrene butadiene) rubbers started in 1973 – the first plant in Europe to produce these on an industrial scale. Another interesting innovation was the opening in 1971 of SIR's own desalinator⁸⁾. Like Saras at Sarroch and Rumianca at Macchiareddu, SIR have constructed many of their own infrastructural facilities: two jetties for the movement of liquid and solid materials, a 'floating buoy' terminal 4 km. offshore for supertankers up to 300,000 d. w. t., a 600-bed workers' hostel (built entirely of SIR products), and a fleet of eleven coaches to bring workers in daily from outlying villages⁹⁾.

⁷⁾ The three nerve centres of the complex are the plants a) for oil refining ('topping') which processes 5.2 million tons of crude per year (soon to be increased to 14 million tons when a new refinery enters production) into oil fractions (liquid petroleum gas, virgin naphtha, kerosene, heavy fuel oil etc.); b) for 'reforming' which extracts various aromatic compounds (toluene, benzene, xylene) at 500–550 °C through the action of a platinum catalyst; and c) for 'steam cracking' (computer controlled and the largest in Europe) which cracks oil molecules at 800–850 °C into component parts such as ethylene, methane, butadiene, propylene and ethane. These various products are then worked in other plants. A few examples follow. The heavy combustible oil which emerges at the bottom of the topping tower supplies SIR's own power station. Kerosene is traded for other virgin naphtha which is the principal raw material for the multiple processes. Benzene is either combined with ethylene to produce ethylbenzene which when stripped of its hydrogen yields polystyrene, or sent to a plant for the production of linear alkybenzenes (a base product for detergents). Xylene can be transformed into polyester resins or polyester fibres. Ethylene when added to chlorine yields the basis for PVC monomer and other plastics. Methane plus air gives urea, the basis for ammonium sulphate fertilisers.

⁸⁾ This desalinator, the second largest in the world after one in Kuwait, produces 2,400 cubic metres of pure water per hour and now supplies 60% of the SIR plants' needs, the rest coming from wells, rivers (Mannu and Santo) and a storage lake within the complex. Before the desalinator summer water shortages had on occasions (notably in 1968) caused some of the plants to close down.

⁹⁾ Data obtained from the personnel department of SIR show that 25% of the employees come from Sassari, 20%

The remainder of the Porto Torres industrial estate (310 ha., located between SIR and the town) houses about 30 small to medium size firms employing a total of around 1300 workers. The largest of these are in the building materials sector (eleven firms); also important are oil-linked activities (depots, bottling of kerosene and liquid petroleum gas), four machinery servicing and repair concerns, and single firms working iron, timber, waste meat products, lamp fittings and packaging materials (BAZZONI CARIA 1972, pp. 66–72).

The impact of SIR and the industrial estate on the geography of the town and the surrounding area has been considerable. Porto Torres is the fastest growing town in Sardinia: its population increased from 11,200 in 1961 to 16,370 in 1971; and the proportion of the population economically active rose from 38% in 1961 to 57% in 1971 (BAZZONI CARIA 1972, pp. 51, 59). In 1961 industrial employment was practically non-existent, the population living mostly from commerce, port activities, agriculture and pastoralism; now 55% of the employed population work in industry.

But there are basic questions to be asked about the rapid growth of Porto Torres and the monolithic domination by SIR of the economy of north-west Sardinia. Although it is true that the complex provides employment for many thousands of workers in the region, including an increasing number of returned emigrants, the distortion effects of the industry on the regional economy in fact often work to provoke further emigration. The locally inflationary effects of the large complex (increasing the demand for goods and services in the area, notably accommodation) progressively erodes the livelihood of sectors of the population engaged in activities (such as market gardening or artisan industry) that cannot respond to the general increase in prices (PAZZONA 1974). During the period 1961–71 the 30-commune labour hinterland of the Porto Torres industrial estate lost 60,000 workers from agriculture: this was only partially offset by the net increase in jobs in the industrial and tertiary sectors of 30,000.

Equally serious is the problem of the unco-ordinated urban expansion of Porto Torres: a speculative process described as 'collusive oligopoly' in which maximum return for parcels of land is assured to the developer by building blocks of flats at high densities and inflated rents with no provision of open space or other services such as shops and schools (PITTO 1975, p. 85). The structure plan for the commune of Porto Torres dates from 1963, before most of the industrial

from Porto Torres, 7% from from Alghero and Sorso, 3% from Ittiri and 2% from Sennori and Castei Sardo. Smaller numbers of workers are supplied by several other communes. Some 9% of the workforce are mainlanders, entirely employed in managerial, technical and clerical positions.

development took place, and has proved insufficient to cater for the greatly increased demand for housing, in spite of several modifications. Although there has been a threefold increase in habitable rooms during 1961–72 (cf. 46% increase in population), there are still about a thousand people crowded into 280 insanitary rooms in the old part of the town; the expansion in room space noted is chiefly explained by the proliferation along the coast of new villas owned by higher-level managerial, technical and clerical personnel in the industrial and administrative offices of Porto Torres (BAZZONI CARIA 1972 p. 52; PITTO 1975 p. 92).

c. Ottana

By the late 1960s a general need was felt for an industrial development pole in central Sardinia, to counterbalance the burgeoning developments at Porto Torres and Cagliari. The highland zone, centred on Nuoro province, was losing population due to out-migration, and industrial employment actually fell 12% during 1961–71. Banditry and livestock rustling, traditionally endemic to this highland zone, became worse in times of economic crisis such as the 1960s (BERGERON 1969 pp. 270–279; KING 1974 p. 410). In fact general insecurity amongst the highland shepherds was instrumental in bringing about a political decision to redirect some of the industrialisation effort towards the upland area (KING 1975).

Central Sardinia was identified a nucleus of industrialisation in 1969 (an eleven-commune area stretching between Macomer and Nuoro), and upgraded to area status in 1971, when the territory was enlarged to 46 communes having an area of 3,430 sq. km. and a population of 140,000. To counter the particularly difficult nature of developing industry in such an economically barren area, the government conceded exceptionally generous incentives to industry locating in central Sardinia: 20% grants from both the Cassa and the region on initial capital outlay and loans at 4% interest, repayable over 15 years, for the rest of the investment (PONTI 1975 p. 46). The attempt is to create a viable industrial economy *ex nihilo* in perhaps the most isolated, inhospitable part of the Mezzogiorno; with regard to banditry, the hope is that where police patrols, helicopters and machine guns have failed, economic opportunity will succeed.

Developments in central Sardinia are also interesting because this is the first area of industrialisation in the Mezzogiorno to reflect the revised policies of the early 1970s. The strategy here is to avoid overconcentration in one locality (as at Porto Torres and Macchiareddu) and instead to set up a carefully selected group of nodes connected by rapid transport routes to form an axis of industrial development spanning the island from Bosa to Siniscola. By paying careful attention to the actual and future availability of working population within commuting distances (Fig.

4), five *agglomerati* were selected: Suni, Macomer (where there was already an estate planned by the regional government in 1961), Ottana, Lula (or Sologo), and Isili (or Sarcidano – this too was near an already-identified regional government node, Laconi). By 1986 the five *agglomerati* should employ 19,500 industrial workers (Suni 1,500, Macomer 3,000, Ottana 7,300, Lula 4,900, Isili 2,800).

The essentially political decision to develop industry in central Sardinia gives rise to immense human, technical and economic problems. The choice of synthetic textiles as the main branch of industry, ironic in a major wool-producing area, rests largely on their high value-added nature and potential economies of scale. It is held that these factors, plus of course the generous industrial incentives, will be sufficient to overcome extra transport costs and the problematic human environment, and yield a satisfactory profit. Significant developments so far are limited to Macomer, a town of 10,000 inhabitants located at the natural crossroads of the island (Tirsotex clothing factory, food and drink industries), and Ottana, where most attention has been concentrated.

Developments at Ottana (1971 population 2,000) are spread across 1,045 ha. of the flat valley of the Tirso, one of Sardinia's largest rivers, just off the new cross-island highway which gives rapid access to Nuoro, Macomer and Oristano, the locally important towns. Ottana is also on the fringe of the Barbagia, the most notorious part of highland Sardinia, whence will come the majority of the new factory workers. So far, in a planned investment of over 300 billion lire, four major factories have been built or are under construction: Chimica del Tirso (700 workers) produces terephthalic acid; Fibra del Tirso (3,800 employees when fully expanded) works this into polyester fibres; Metallurgica del Tirso (750 workers) manufactures titanium castings largely for military use; and Sirion (1,200 workers) also produces artificial fibres. The first two of these belong to the semi-state ENI-Montedison group, the third belongs to Osvenigo Brothers and the fourth is a SIR subsidiary. By late 1975 employment at the Ottana estate stood at 4,100: 2,800 on a permanent basis and 1,300 construction workers. Residential development at Ottana is limited, the policy being to encourage the shepherd-workers to remain in their villages, commuting to the plants along a network of improved roads using newly-instituted bus services.

The optimism of the early years at Ottana has been replaced by a more critical tone in the views of various observers. PIGLIARU (1971 p. 25) describes regional economic policy for the internal zone as an 'imbroglio'. Typical is the wrangle over the 2 billion lire grant to build 1,200 workers' dwellings in surrounding villages. Delays caused by inter-village argument caused the real value of the grant to decline to 800 dwellings, and only the first 120 are at present under

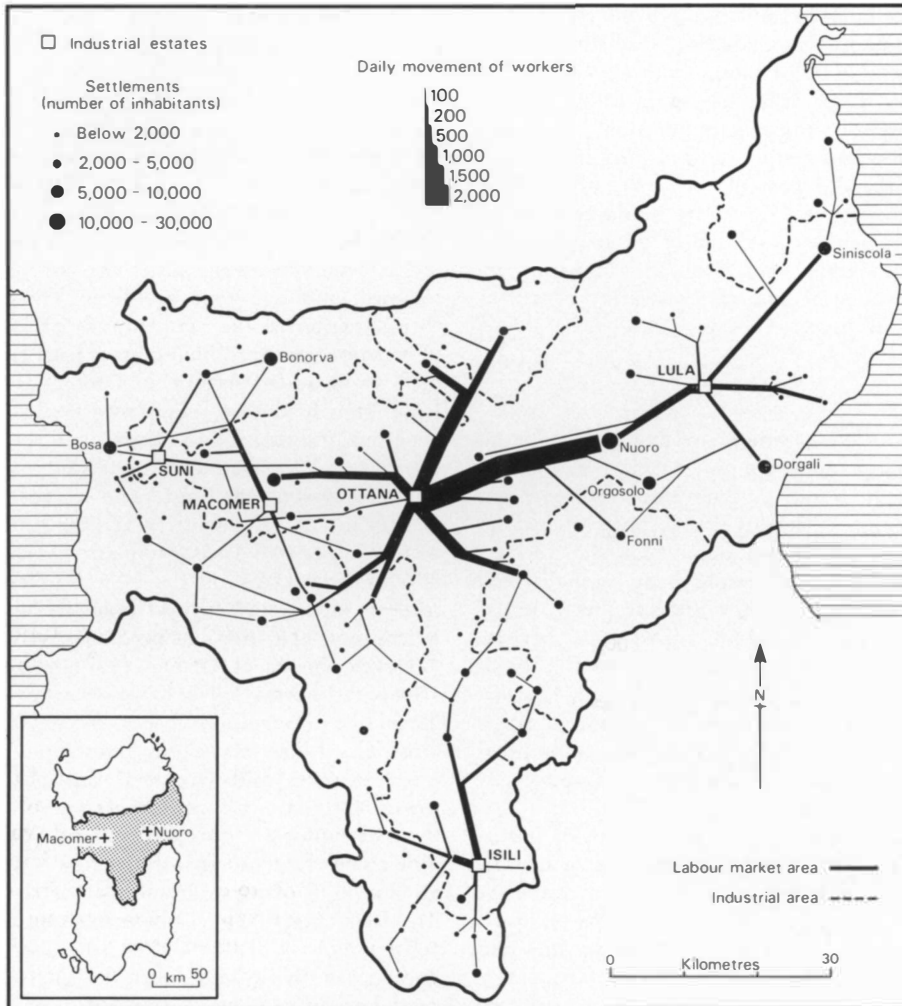


Fig. 4: The Central Sardinia Industrial Area: planned commuting movements to the five industrial estates

construction. It also seems certain that the promised number of jobs will not materialise. Intersol, one of the original plants at Ottana, has withdrawn, and the proposed SIR fibre plant destined for Lula has met strong opposition on environmental and ideological grounds from the communist local council.

The new factory workers, two-thirds of whom were shepherds or came from agricultural or pastoral families, have had some difficulty in adapting to the regime of industrial employment. Accustomed to an unregulated open air life, former shepherds and peasants found the transition to clockwork factory shifts arduous. Sleeping during the day in a crowded house with children about is difficult for night workers. Absenteeism has been a serious problem: 25% of the workforce at times, but now somewhat reduced. The best workers from this point of view are the returned migrants who have already been changed from shepherds to factory workers by their migratory experi-

ence. The worst tend to be those who try to keep their flocks going at the same time as doing a factory shift; this, combined with up to four hours travelling per day, leads to a very strained life¹⁰).

¹⁰) The political policy of 'spreading' the workforce as far as possible from Ottana (an average of 60 employees per settlement) leads to long journey-to-work times. Workers from the villages of central Barbagia (Austis, Ovodda, Fonni, etc.) have return journeys of up to 100 km., mostly along narrow, winding mountain roads. Bus services have been slow to develop, often only after strikes and protests. The planned travelling times of up to 30 mins. for 87% of the upland population, and 45 mins. maximum for the rest, are based on car speeds on improved roads: the real times are much greater. Orgosolo, for example, is 'theoretically' 40 mins. by car from Ottana: the actual car journey is 50 mins. and the bus, with stops in villages en route, takes 2 hrs!

d. The Nuclei of Industrialisation

Sardinia's four industrial nuclei (Fig. 2) have progressed at uneven rates. Arbatax has one of Europe's largest paper-making plants (75,000 tons per year; 500 employees), but little else. Olbia grows rapidly, but this is due to its port functions (it is the most accessible port to mainland Italy) and its nearness to the important Costa Smeralda tourist area, rather than to its industrial estate, which has attracted only a few concerns. At Oristano a new canal-port, started in 1970 and now nearing completion, will, it is hoped, improve the attractiveness of the nucleus for large-scale industries. In 1975 the industrial estate had acquired 17 mostly small concerns in the electronics, food processing, metal manufacturing, packaging and construction fields: total employment was 1,500.

The Sulcis-Iglesiente nucleus, centred at Porto Vesme, has attracted the most industry to date. Created in 1967 to cater for unemployed coal-miners, it covers seven communes with a population of 85,000 and includes the two main towns of the region, Carbonia (30,000) and Iglesias (28,000). The industrial estate extends to 620 ha. and employs 3,000, mostly in metal-working concerns. The principal plants are Eurallumina (750 workers) which processes Australian bauxite into alumina, Alsar (650 workers) which produces aluminium ingots, Metallotecnica Sarda (600) and Consal (400) – metal construction products, and Ammi-Sarda (500) which works local lead and zinc ores. An addition to the estate. Ildocat (500 employees) will work oil derivatives. Like petrochemicals, however, the net result is a high cost complex yielding relatively few jobs and considerable potential environmental damage. Alsar and Eurallumina represent an investment of over 150 billion lire for only 1400 jobs. Discharges, from the Eurallumina plant particularly, are held responsible for damage to the locally important tunny fishing industry.

III. Evaluation of the Sardinian model of Industrialisation

Before 1963 the Sardinian regional economy was one of the slowest growing in Italy. Since 1963, as a reflection of recent industrialisation, Sardinia's income has grown at a faster rate than any other Italian region, with the exception of Friuli-Venezia Giulia in north-east Italy. Mean per capita income from Sardinia rose from 70% of the national average in 1962 to 75% by 1970. The 1974 average income – 730,000 lire – was well up on Rebirth Plan requirements. Between 1961 and 1971 the number of factory workers rose by 20% from 68,570 to 82,630 (SABBATTINI and MORO 1973 pp. 3, 67). Another measure of the island's recent industrial growth is the fact that in 1971 80% of industrial enterprises were less than 10 years old, compared to the national proportion of 40% (FERRARINI 1972 pp. 9–10). Owing to the influ-

ence of petroleum products (which now account for over 80% of total freight movements to and from Sardinia), freight handled through the island's ports increased by nearly twelve times between 1950 and 1970 (LO MONACO 1971 pp. 170, 172).

Facts such as these lend support to those who maintain that Sardinia has over the last 15 years experienced an industrial revolution which has lifted it out of its millennial stagnation, to the lasting benefit of the island's entire population. This, as will become apparent shortly, is only one side of the argument. Against those who view industrialisation as an efficacious policy of regional development are others who see it as a strategy monopolised to the ends of the large financiers and industrial groups. Average income may have increased but new wealth is concentrated in relatively few hands: the Gini-Lorenz income concentration index of 0.45 (1972) contrasts with the Italian figure of 0.38 (SABBATTINI and MORO 1973 p. 11). It is true, however, that Sardinia is the first Italian region to start thinking in regional planning terms. The problem is that the island's planners have exhibited scant ability to follow their programmes through consistently. Nowhere is this more true than in the Rebirth Plan.

a. Rebirth Plan Stillborn

It is now common knowledge that the Rebirth Plan has failed: this fact is even admitted in documents produced since 1970 by the various regional and national planning authorities (LELLI et. al. 1975 p. 9). This is not to deny that much has been achieved; rather that the type of development which has occurred has been almost totally at variance with the plan's objectives. Various factors and interest groups have been blamed: this or that political party; the legislation itself (in particular the incentives system); the mentality of the Sards (their isolation and incapacity to come to terms with the modern technological world); the selling out of the island's planners to national and international capital. The question is not easy to resolve. *Sardistas* (members of the Sardinian autonomy movement) view the progressive infiltration of the island's economy by outside interests as a simple expression of the metropolis-satellite relationship that is inherent in the present logic of Italian capitalism, and note that this relationship has repeatedly characterised Sardinian history. The petrochemicals giants, on the other hand, regard themselves as the only dynamic element in an otherwise stagnant economy and criticise Sards for their inward-looking autarchic philosophy and for their failure or unwillingness to see things on a national or European scale (LELLI et. al. 1975 p. 10).

The piano di Rinascita, it will be recalled (footnote 2), involved a planned investment of 1800–2000 billion lire for the period 1963–75. By 1974 only a third of planned investment had been made; and 57% of

this originated from private investment, in contrast to the 30% proportion originally specified in 1963. Only 20% of the public funds destined for mobilisation under the rebirth policy had materialised. Further anomalies are apparent in the sectoral apportionment of spending. Although a margin of elasticity was allowed in the original breakdown (see footnote 2), only 7% of the budget targeted for agriculture had been spent by 1973. Overall expenditure under the industrial head appears to match that planned, but a discrepancy appears as to its origin: 70% has come from the private sector instead of the 30% planned – again, therefore, the public sector commitment has languished. And instead of the concentration on small and medium size manufacturing concerns linked to the island's local resources and traditions, 73% of industrial investment has gone on basic (i. e. non-manufacturing) industry, 68% on the petrochemicals sector alone. Emigration, which was due to decline to zero during the Rebirth Plan period, has actually increased. Finally the 15 'socially and economically homogenous zones' have been scrapped and are about to be replaced (1976) by 30 or more local *comprensori* with more meaningful advisory and executive powers at the village and local regional levels

Some of the most glaring discrepancies between plan forecasts and actual outcomes have been in the population-employment sector. The changes prescribed during the period 1963–75 were, in summary, as follows: a 27% increase in total labour force from 456,000 to 580,000 persons; a rise in the proportion of the total population economically active from 33% to 38% (cf. Italian average for 1961, 41%); a drop in numbers employed in agriculture from 175,000 to 150,000 persons, and an increase in those employed in industrial activities (including construction) from 134,000 to 200,000; elimination of unemployment and emigration. How different is the reality of the 1970s! Unemployment was 35,000 (over 8%) in 1973; and in addition 10% of the active population declared themselves under-occupied, working on average less than 32 hours per week. By 1974 the active population, instead of rising, had dropped to 425,000, 29% of the total. Agriculture lost 75,000 workers, not 25,000 (REYNE 1976 p. 5). In 1967 industrial sector employment had actually fallen to 125,000, with the new factory posts failing to balance a concentration in other branches of industrial employment (mining, artisan activity) of 8,000 jobs per year (SATTA and SINI 1971, p. 205). Only recently has industrial employment significantly increased, but the major sectoral employment shift has been into the inflated tertiary sector which now embraces over 45% of the working population (cf. 31% in 1961).

The second major failure of the Rebirth Plan, logically, was to permit a type of industrialisation which

ran counter to its aims of promoting small and medium scale labour-intensive manufacturing industry. There was little attempt to prevent the invasion of the island by the petrochemicals giants; indeed it has been suggested that the rebirth planners were to a certain extent ignorant of the true characteristics of this industry (SATTA and SINI 1971 p. 201). The real blame lies with the system of grants and incentives which favoured basic industries with high ratios between capital and labour and between fixed capital and circulating capital. The impact of the petrochemicals sector on the Sardinian industrial economy during the 1960s was dramatic, increasing its share of the island's industrial income from 1% to 15%. Its capital-intensive nature, however, meant that the impact on employment was much less – from less than 1% to only 4% over the same period. Concomitantly manufacturing (i. e. processing) industry saw its contribution to total industrial income fall from 66% to 48%. Of the 26% of rebirth industrial credit that went to processing industry, a half went to the Snia Viscosa textile factory at Villacidro and a quarter to the Arbatax paper plant, neither activity being related in any way to the traditional island economy (SATTA and SINI 1971 pp. 259, 262). Noticeable has been the lack of aid to, and consequent decline of, industrial concerns working locally produced commodities such as cork, live-stock products (cheese, meat, wool) and minerals.

The Rebirth Plan specified an average investment per industrial job created of 8 million lire; this figure squared with the 75,000 new jobs aimed at under the

Table 1: Distribution of industrial development up to 1971

	% investment (total: 1400 billion lire)	% workers (total 41,500)
a) Areas of industrialisation:		
Cagliari	18.3	21.8
Sassari-Alghero-Porto		
Torres	32.0	25.4
b) Nuclei of industrialisation:		
Sulcis-Iglesiente	15.5	7.6
Oristano	0.6	3.1
Tortoli-Arbatax	2.5	2.3
Olbia	0.8	3.1
Central Sardinia	25.2	22.4
c) Regional industrialisation nodes:		
Villacidro	2.3	5.5
Laconi, Nuoro, Ozieri, Siniscola, Tempio	0.6	2.3
d) Rest of Sardinia:	2.1	6.5

Source: Rapporto sull' Industrializzazione in Sardegna. La Programmazione in Sardegna, 6 (32–33), 1971, pp. 130, 134.

plan. However, the concentration on basic, capital-intensive industrial development made nonsense of these figures (SCHLIEBE 1970). For paper manufacturing, metalworking and cement production the cost-per-job ratio was two to three times as high, and for the petroleum sector seven to ten times. The 7,700 permanent workers at SIR, Saras, Rumianca and Snia-Viscosa result from the investment of 800 billion lire: an average of over 100 million lire per job.

Finally, the concentration of Sardinian industrial development in one sector (petro-chemicals) and in one type of plant (large, capital-intensive complexes) has a spatial expression in terms of the geographical concentration in few areas, mostly coastally located. Considerable industrial development has occurred in the Cagliari, Central Sardinia and Sassari-Alghero-Porto Torres areas of industrialisation, and in the Sulcis-Iglesiente nucleus. Arbatax has not expanded beyond its paper factory, and Olbia and Oristano attract only small numbers of small industries. The regional government-sponsored nodes of industrial development are empty except for Villacidro (Table 1). There is an obvious need to bring industrial development to these foci¹¹).

b. Conclusion: Industrial Revolution or Colonialism Continued?

Far from being an unquestionably beneficent phenomenon, the process of industrialisation in Sardinia is so sectorally and spatially concentrated as to increase the distortions in the island's economy which it was the avowed intention of the rebirth policy to eradicate. The large, and increasing, scale of petroleum and petrochemicals plants (even for such 'downstream' activities as textiles and plastics) implies concentration in a few units of thousands rather than hundreds of workers each. Such large units fit uneasily into any territorially-based development plan possessing social responsibilities. The petrochemicals sector has brusquely introduced new factory-based working and middle classes into a traditional rural social structure, thereby hastening its break-up (LELLI 1975). The conflicts between the social bases of regional planning, as viewed by many islanders, and the desire for the optimum economic location within the island (which basically means Porto-Torres or Cagliari) on the part of the national and international groups in charge of the oil-based industry, are very real: the veto on SIR's expansion plans at Sassari (Truncu Reale) and their subsequent diversion to central Sardinia is a case in point. But perhaps the

most unpalatable aspect, from the Sardinian point of view, is the progressive externalisation of the island's economy inherent in the growth of the petrochemicals sector. This industry is a major economic power at the national level; decisions taken within a national perspective may not be entirely beneficial to the interests of the island. Sardinia is thus forced to replay its subject, colonial role: in the words of a dialect saying, '*Furat chi-e venit da-e su mare*' – whoever comes across the sea, destroys us.

A common reaction amongst educated Sards is a quasi-hostility, not so much against industry itself, but rather towards the enormous finance which lies behind its development: capital which could have been used more efficaciously in developing and modernising agriculture and the tourist sector. Industry still tends to be looked at as an alien phenomenon, foreign to the Sardinian landscape and certainly to the social life of the villages in which the majority of factory workers still dwell. Sardinians are prominent in a growing national feeling that the whole question of developing the Mezzogiorno, of which the island is a part, needs rethinking and a completely different approach identified. The question of incentives is one key problem. Many feel that contributions should be based on production costs rather than initial capital outlay, but this is likely to be contrary to EEC policy concerning aid to industries. Any policy switch is unlikely to be made easily. Vast vested interests have grown up around the efforts to develop Sardinia. Industrial empires have been founded on national and regional grants and it would be economically unwise to jeopardise established concerns. One recent major event is, however, instructive: in 1974 the Italian parliament voted to extend the Rebirth Plan to 1980, and assigned the policy a further 600 billion lire, 50% of which is earmarked for agricultural development (irrigation, land consolidation, livestock improvement, processing cooperatives, etc.). It will be interesting in the next few years to see if a more specifically rural-based policy succeeds in those aspects (ecology, unemployment, social harmony, spatially balanced development) in which the industrial policy so clearly failed.

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¹¹ At present, the likelihood of this happening is impossible to predict. One fact may be relevant, however. It is forecast that over the next ten years the Mezzogiorno will house nine or ten new integrated petro-chemicals complexes of around 5,000 workers each. It may be expected that two of these will be in Sardinia.

- mento nello stagno di Cagliari. La Programmazione in Sardegna 1973, 7 (48), pp. 3–55.
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HONOLULU CHINATOWN

Ein Stadtteil im Wandel

Mit 12 Abbildungen, z. T. als Beilage

WERNER KREISEL

Summary: Honolulu's Chinatown – A district under change.

Honolulu's Chinatown is one of the most important urban areas in Hawaii in regard to the development and change of population and ethnic stock. At the beginning of the 19th century a residence of Hawaii's Kings this area has then been occupied by white missionaries and businessmen. With the increasing immigration of Chinese labour force into Hawaii's expanding sugar industry Chinese labourers returning from the plantations moved into this area situated on Honolulu harbour and created "Chinatown". Chinese style elements in the construction sites, typical institutions like Chinese societies, the "Chinese store" and characteristic occupations (barbers, tailors, mer-

chants, laundrymen) were introduced. As the Chinese moved in so the Whites (Caucasians) moved out and settled in better regions (Upper Manoa, Makiki, Waikiki). Replacing a meanwhile wealthy population group (Caucasians) by a poor one (Chinese) was the first step in the deterioration of Chinatown's social situation as a residential area. This development continued as most Chinese, having improved their economic condition, migrated from Chinatown to better living quarters, thereby making some space available for the next ethnic group – still, however, owning much of the real estate in Chinatown. First the Japanese and then the Filipinos followed them. Each of these groups attained its highest percentage in the population of Chinatown after peak its immigration. Today,