

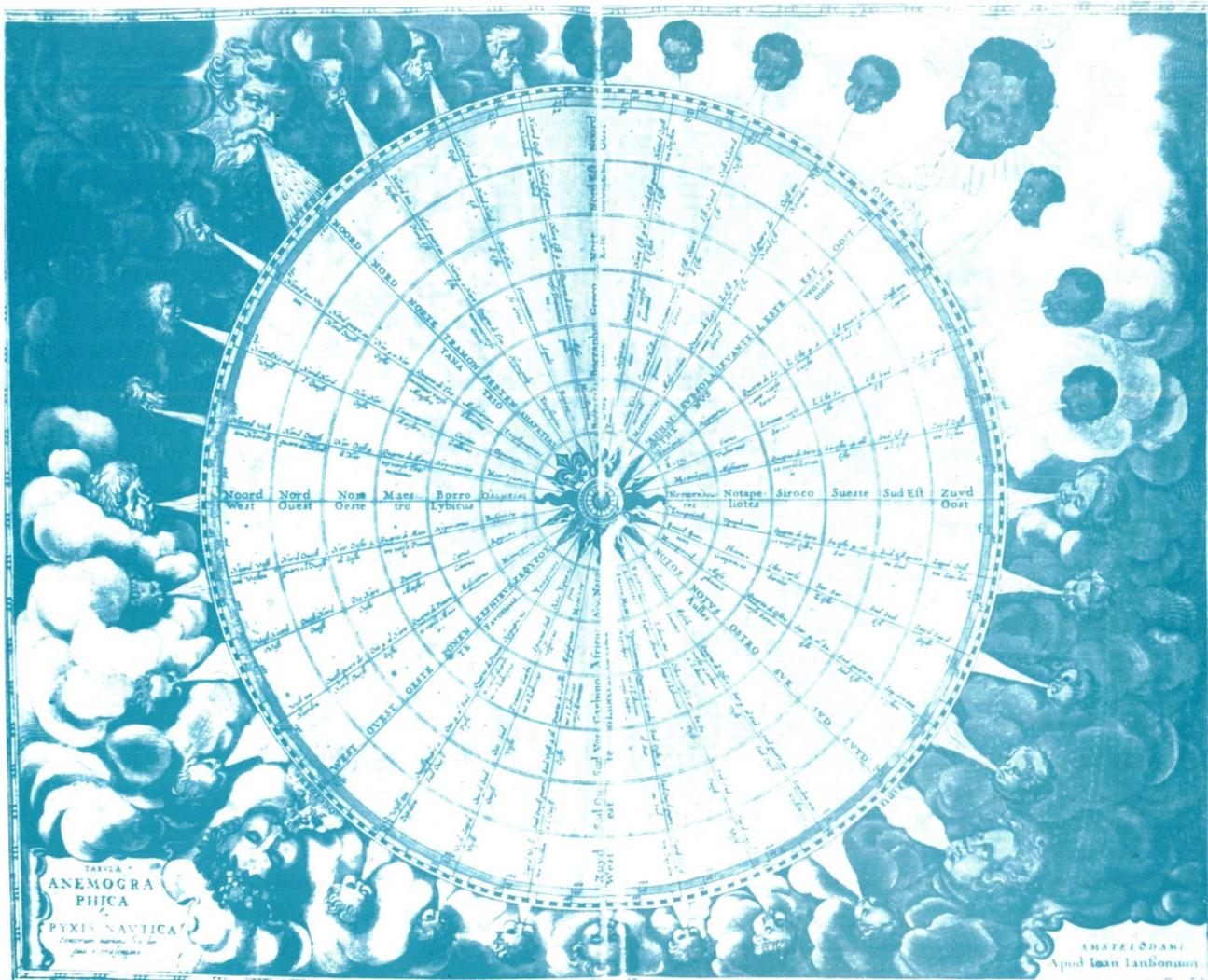
# "TRANSAQUA"

**Una idea per il Sahel.  
Une idée pour le Sahel.  
An idea for the Sahel.**



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*Hoc ab homine exigitur: ut prosit hominibus*  
Seneca

## TRANSAQUA PROJECT - An Idea for the Sahel

### The Sahel belt: an impending tragedy

1. In the last fifteen years the Sahel belt of countries has witnessed, impotently, a gradual process of desertification caused by the climatic upsets that have broken a centuries-long ecological balance represented by the scanty, precarious natural resources, by widespread subsistence agriculture and by pastoral nomadism. The fragile nature of the ecosystem has yielded before a sequence of years of drought and near drought, and today its recovery appears very dubious.

Of the area of approximately 2,500 million acres, which — according to United Nations estimates — presents a desertification risk throughout the African continent (about 34% of the overall area), some thousand million acres lie along a continuous belt 6,000 km in length, situated between 10° and 20° North, stretching all the way from the Atlantic Ocean to the Red Sea.

A thousand million acres tantamount to a challenge to the technological capacity of our day and age, and where an immense ecological catastrophe is taking place. These are the countries of the Sahel region. The figures of this tragedy are by now known: tens of millions of persons with a per capita income of under 200 dollars a year, hundreds of thousands of head of livestock dying of thirst or starving, several thousand million dollars spent on generous albeit complex operations to save millions of human beings who every year risk starvation.

### Prospects of recovery.

2. One of the most disquieting areas of underdevelopment in the world, with perhaps the most gloomy prospects in the entire continent of Africa, it calls for courageous measures of a dimension and scope on a par with the drama that is being enacted in this poverty-stricken part of the planet due to the natural inclemencies and to the scanty results obtained so far by the aid provided by the industrialized nations, massive as this has been.

Rangeland wells, irrigation districts, storage facilities for strategic foodstuffs, reforestation programmes, agro-industrial projects.... all measures suggested by a tragic situation capable of proposing above all immediate operations of quick effect and rapid impact on the local con-

text, able in some way or other to exorcise a scenario of hunger and desolation that is repudiated by international civil consciences.

Such specific but piecemeal projects have their precise role and a clear political and social rationale, as they are able, through their localized short-term — and sometimes very short-term — effects, to involve the local rural populations, in this way amplifying the effect of the aid, and curtailing, at least in part, the dramatic social decline of the Sahelian region.

But no-one can reasonably delude himself that these initiatives, praiseworthy and highly useful as they may be, can truly achieve any real and effective long-term solution, scattered as they are over such a vast area.

It cannot reasonably be conceived that, even if scores and scores of these projects were really implemented within a short period, they could radically change a «year 2000 scenario» which in any case would lose very little of its dramatic character, but would only perhaps be slightly mitigated in its aspects linked with mere survival. Even if these modest enough effects are not negligible, the chasm between the results achieved and the sheer mass of the problems to be faced would still be infinitely great.

Problems which are those of always, proclaimed at every international conference on the emergent countries, and allotted top priority by every financing agency; problems which in the Sahelian context inordinately magnify the consequences of the failure to solve them:

- the water-agriculture-livestock combination
- the transport-marketing binomial
- the energy-transformation binomial.

Our over thirty years' experience of the development of emerging nations — so miserably failing to meet the expectations of the beneficiaries — has amply demonstrated that any «piecemeal» project, however well implemented, is bound to prove an end in itself, or, worse still, will not even attain its economic and social take-off, unless closely tied in to the regional and interregional context with solid, long-lasting transport and commercial infrastructures (often far more costly than the project itself).

Conceiving the creation of such transport facilities and such regional and interregional trading facilities of a per-

manent, efficient type, either preparatory to or contemporaneous with the individual hydro-agricultural projects, appears to be a more adequate approach to the complexity not only of existing problems, but also and above all of those which arise immediately after the single projects and the concomitant management operations.

Creating opportunities to offset hunger and thirst, but at the same time to construct those large-scale support infrastructures which will guarantee supplies of raw materials and the marketing of the finished products, providing incentives for regional trade, means laying the foundations necessary not only for the single projects to take off, but also for each one of them to bring forth an induced effect of multiplying initiatives and generating collateral activities: which complex process, with a simultaneous inner growth, can really be called development, that will be the more secure over the long term, the more opportunities it generates.

### The presuppositions of the Project idea

3. The TRANSAQUA PROJECT presented here at the level of a project idea, is based upon the following simple presuppositions:

- the underlying cause unleashing the ecological imbalance of the Sahel is the lack of water due to several years of drought and near drought and to abnormal weather. It is therefore necessary to identify and to create new sources of water supply to substitute rainfall.
- The rebalancing by man of the upset rural activities of the populations can come about over the medium and long term only, in substance, through irrigated cultivation, lacking a natural return to more favourable climatic conditions.
- The recovery of the Sahel, therefore, must pass by way of new types of balance, deriving from the partial abandonment of extensive agriculture (based on well-spread and above all constant seasonal rainfall, even though of modest entity) in favour of the gradual development of intensive agriculture (based on «concentrated» water availability not dependent upon the seasons).

- A new balance to be achieved, at least in part, on the basis of intensive agriculture, cannot leave out of account adequate transport and marketing facilities which are regarded as indispensable supports for any serious hope of success.
- The necessary initial transfer of inputs and technology must have as its objective the development of autochthonous African resources, the verticalizing of production processes through local value added and the utmost amount of trading among African consumer markets, in such a way that the objectives to accomplish can guarantee the maximum amount of operational and economic-financial autonomy, the sole condition that will assure irreversibility, and the only one capable of interrupting the massive flow of international capital necessarily needed for many years yet to come for purposes of subsistence pending the takeoff of autonomous development.

**The Project  
idea: transfer  
of water.**

4. The basic idea of the TRANSAQUA PROJECT is to «transfer» approximately 100,000 million cubic metres/year of fresh water from the basins of the River Zaire to the Sahelian area in Chad and Niger.
- The support for this project idea is represented by the Central African geographical reality, in which the Zaire-Chad watershed is a natural barrier separating two great catchment areas: one to the north, where drought reaps victims because of the lack of water resources, and the other one to the south, where rainfall is so abundant that it creates extraordinarily lush environments that often experience — due to forest encroachment — the opposite sort of problems for the rational development of modern agricultural activities.
- The mass of water of the River Zaire — the most important river in Africa, the second one of the planet, after the Amazon, in size of catchment area — calculated at its mouth to be around 1.2 million million cubic metres flowing out into the Atlantic every year, would be «curtailed» by barely about 8% of its discharge as a result of taking off the approximately 100 thousand million cubic metres a year, able to change the face of the desert a few hundred kilometres further north.

This «modest» offtake would represent a constant discharge of about 3,200 cubic metres a second, equal to almost double the discharge of the Nile downstream of Aswan.

The basin of this largest African river forms a vast natural amphitheatre — at an elevation of under 500 m above sea level — corresponding to the main course of the river and of its chief tributaries, surrounded to the south, east and north by a plateau (situated between about 600 and 1000 metres above sea level) which is shaped almost like a semicircular crown.

The project idea could be a technically feasible proposition with the construction of a broad navigable canal which, running along the eastern and northern crest of the Zaire catchment, could intercept the waters of the extreme northeastern edges of the basin and, after a course of about 2,400 km (see Figs. 2 and 3), would reach the Zaire-Chad watershed in Central African territory and discharge its entire flow at the head of the River Chari, a tributary of Lake Chad.

In Chad, probably using in part the bed of the Chari itself, the waters could be conveyed to the areas of Chad and Niger north of Lake Chad which are in the process of becoming desertified. In these regions of the Sahel, it can be reckoned that between 12 and 17 million acres could be brought under intensive and semi-intensive type irrigation development (for purposes of comparison, it is pointed out that 40 million Egyptians live in an irrigated area of under 7 million acres, moreover cultivated less intensively).

The sector of the Zaire catchment area intercepted by the approx. 2,400 km of artificial canals would be located between about 20° S and 8° N, while the waters collected therefrom would be utilized right in the midst of the Sahel area, between 12° and 16° N.

In its drop down to Chad, this mass of 100,000 million cubic metres per year of water could, via a series of hydroelectric stations, produce energy to the extent of some 30 to 35 thousand million kWh, equal to about 70% of Italy's entire production of energy (hydro, heat and nuclear). Such a quantity of energy could radically change the face of the present rural settlements and provide a strong boost for future agricultural developments,

both in the foreseen area north of Lake Chad and in the new development area along the navigable canal, by means of two high tension electricity lines: one of them, distributing energy to Chad, about 1,300 km long, and the other, distributing energy along the navigable canal, about 2,400 km long.

**The Project  
idea:  
transport,  
processing  
and  
commercial  
infrastructure;  
container  
port and  
industrial  
free trade  
zone**

5. But the idea of a «transfer of water» as an end in itself, even of a mass of water greater than the discharge of the Nile, however appealing against the grim background of the arid Sahel, would still only be partial and insufficient unless framed in the vaster African international transport system: the planned Lagos-Mombasa Trans-African Highway which will run for over 6,000 km and connect the Indian Ocean with the Atlantic, and the Lagos-Algiers Trans-Sahara Highway, practically already in operation and which, once it has been completed for its full length, will permit fast links between the Gulf of Guinea and the Mediterranean.

It is also and above all in this context of big African international lines of communication that the TRANSAQUA PROJECT should be considered: a huge «riverway» able to connect up the markets of vast Central African «enclaves» such as Rwanda, Burundi, the Kivu region, the whole extreme northeastern part of Zaire and of the Central African Republic, with consumer centres of other Central African countries (Nigeria, Niger, Chad, Cameroon, Kenya and Uganda) and with the two ocean ports of Lagos and Mombasa for trade flows outside of Africa.

This international traffic link-up could take place at the crossing with the planned Lagos-Mombasa Trans-African Highway, where one can conceive the construction of a river container port with an adjoining industrial «free trade zone».

If this node or «marshalling yard» for river and road-borne goods were to be planned at or near the pass where the navigable canal crosses the Zaire-Chad watershed, there is no doubt that it could benefit from an enormous quantity of hydroelectric energy that could be produced on the spot, after the construction of a hydropower station at the head of the Chari catchment, which would be

**Plausible prospects: decisive water and energy supply for the Sahel; a practical start of the post-colonial dream of economic integration**

the first, from a topographical standpoint, of a series of such stations almost as far as N'Djamena. In this way a polyfunctional free trade zone could be established in Central African territory (see Fig. 4) which, as well as functions of marshalling container-borne goods, could cater for the important economic and commercial task of product processing, by means of a series of agricultural and food plants, textile mills and woodworking units, based on African agricultural, livestock and forestry products from newly-developed areas which would become available for productive agricultural activities precisely thanks to the new riverway (see Fig. 3) and to the future Lagos-Mombasa Highway.

In particular, the economic means of river transport represented by the 2,400 km of canal through Zaire and Central African territory would act as an agricultural produce marketing facility which, equipped with a series of small «moorings» or «berths», would provide a stimulus for the agricultural development of a large number of river valleys upstream of the waterway and throughout its course.

Many areas of the Sahel could, in the long term, be supplied not only with water and electricity, but also with cereals, meat, milk, etc., produced on African soil instead of having constantly to depend on costly and precarious imports from other continents.

6. The TRANSAQUA PROJECT, viewed from the sole standpoint of transferring water resources to the semidesert areas in the Chad-Niger border region, would lead to the creation of a series of irrigation areas in a region of some 50-70,000 sq. km (about the same size as southern Italy) in the heart of what is considered the «traditional» Sahel, formed by 8 countries (Cape Verde, Gambia, Senegal, Mauritania, Mali, Upper Volta, Niger and Chad). The TRANSAQUA PROJECT is, from the water and energy point of view, aimed at the final and lasting solution, albeit over the long term, of the problems of hunger over 50% of the Sahelian area, since the two countries that are the direct beneficiaries thereof account for about one-half of the total Sahel area and for about 30% of its entire population.

The TRANSAQUA PROJECT, viewed in the context of the ten Central African countries more or less directly concerned by the planned network of international river and overland transport (Niger, Nigeria, Chad, Central African Republic, Cameroon, Zaire, Rwanda, Burundi, Uganda and Kenya, representing in terms of land area approximately one-quarter of all Africa), is undoubtedly a decisively propulsive element for the practical start-up perhaps within the span of one generation, of the African post-colonial dream of the international economic and productive integration of the continent, an indispensable condition for true economic autonomy and political independence.

The time is ripe for a TRANSAQUA PROJECT.

Russia has started work on the transfer of 60 thousand million m<sup>3</sup> per year of water which the continent's relief today causes to flow into the Arctic Ocean, the final aim being to divert this flow to the dry regions of Kazakhstan and of Uzbekistan by means of a 2,200-km navigable canal (the envisaged cost of the hydraulic works alone is about 18 thousand million dollars), which should transform these semi-desert areas into some of the most fertile lands of the USSR.

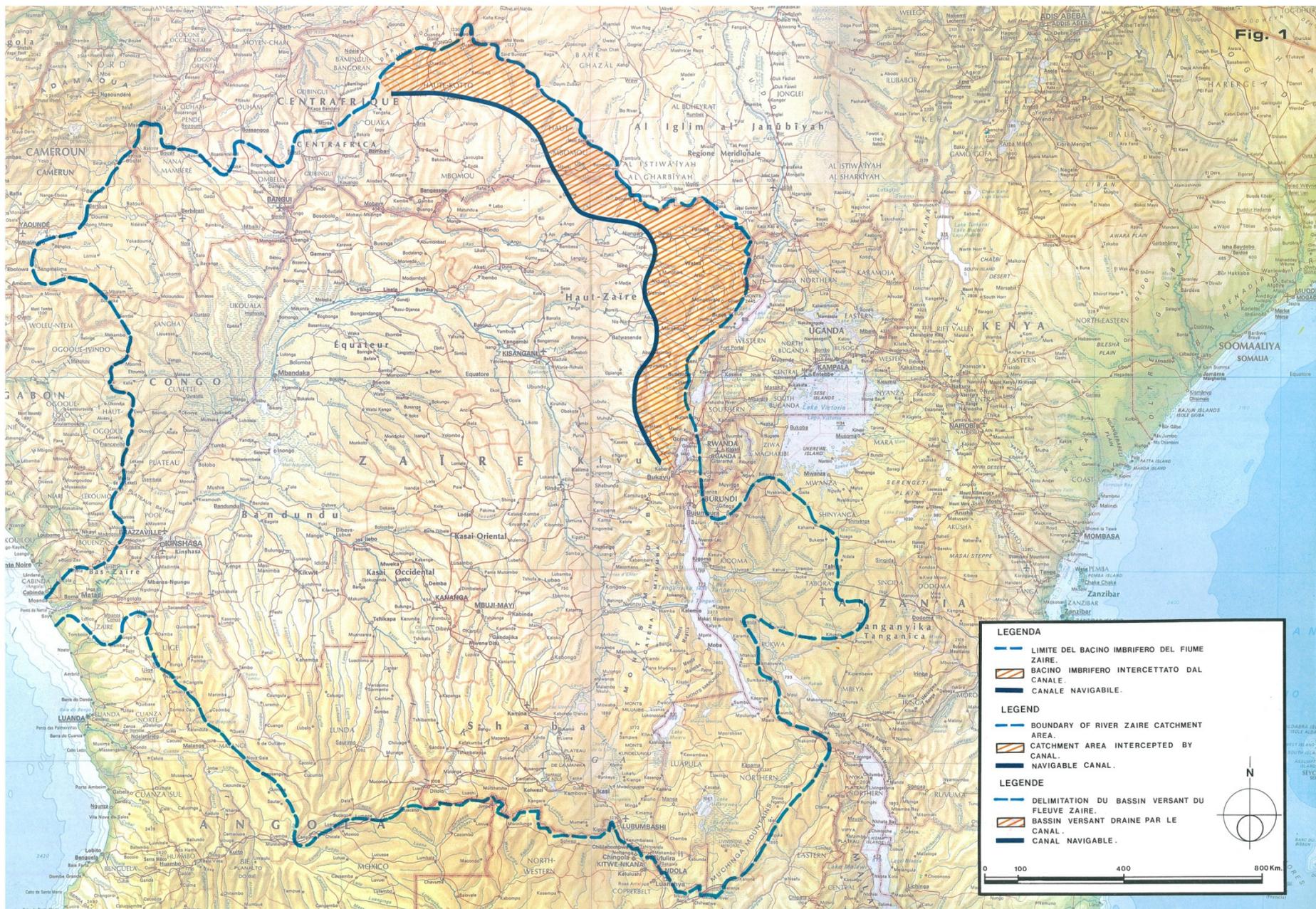
The direct and indirect benefits of the TRANSAQUA PROJECT deriving from the agricultural outputs obtainable, their processing and marketing, from the transport economy and energy production, enable us to foresee, despite the obvious present uncertainties regarding investment costs, a return on the operation that is interesting even from the economic and financial standpoint.

It is plain that, in view of the mass of investments required and the size and quantity of the foreseeable works along a stretch of 2,400 km, the project should be carried out in successive stages, each of them to be economically and socially justifiable. Such should undoubtedly be feasible assuming a start be made on constructing the canal at its downstream end, gradually extending it in an upstream direction to its point of origin. The technical means to construct such works do not constitute an unsurmountable obstacle.

The units of measurement of the investment costs are not only millions of dollars, but the absence of wars, millions of human beings saved from starvation, social

peace and an international conscience.

Fig. 1



**LEGENDA**

- LIMITE DEL BACINO IMBRIFERO DEL FIUME ZAIRE.
- ▨ BACINO IMBRIFERO INTERCETTATO DAL CANALE.
- CANALE NAVIGABILE.

**LEGEND**

- BOUNDARY OF RIVER ZAIRE CATCHMENT AREA.
- ▨ CATCHMENT AREA INTERCEPTED BY CANAL.
- NAVIGABLE CANAL.

**LEGENDE**

- DELIMITATION DU BASSIN VERSANT DU FLEUVE ZAIRE.
- ▨ BASSIN VERSANT DRAINE PAR LE CANAL.
- CANAL NAVIGABLE.

0 100 400 800 Km

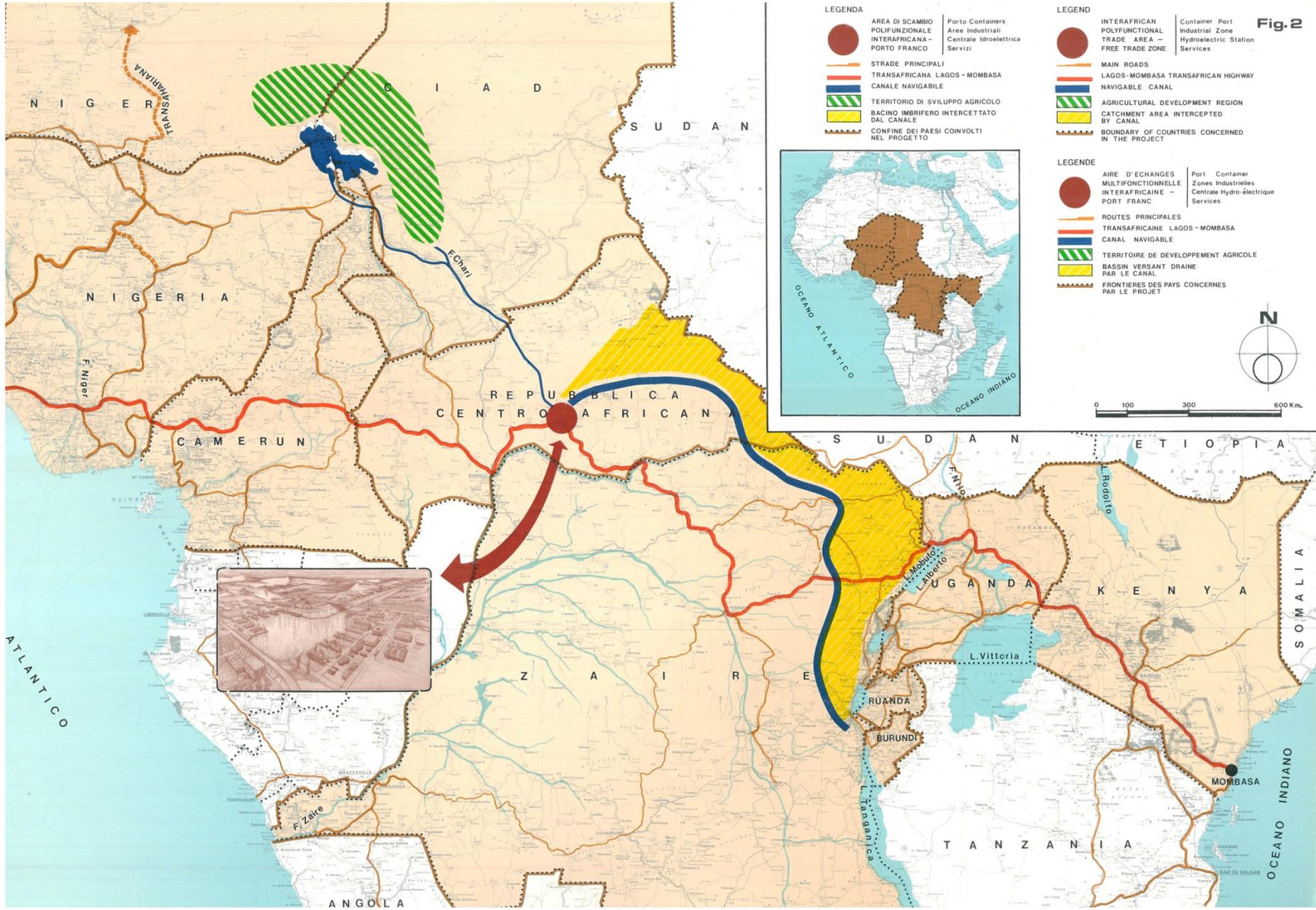
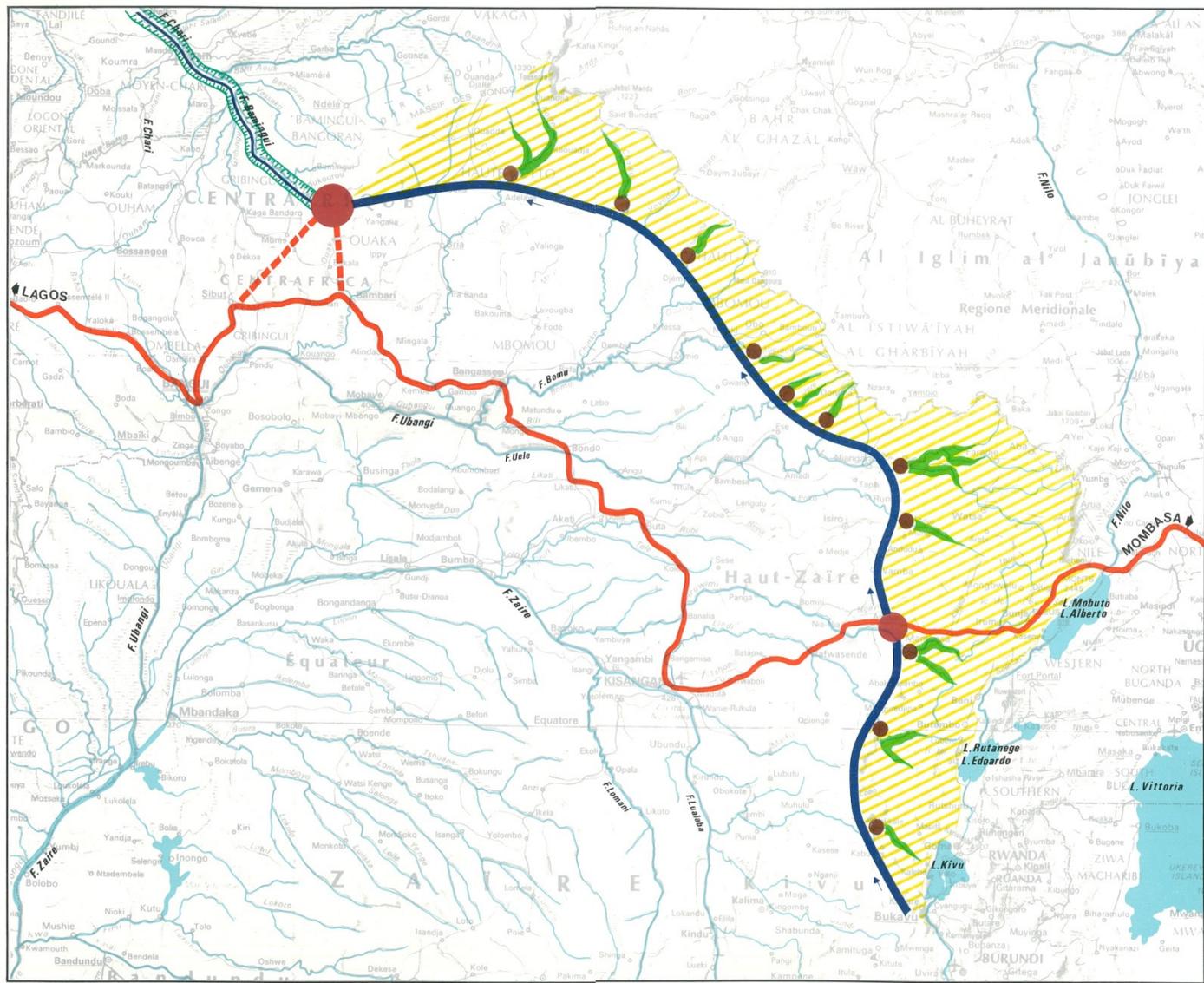


Fig. 3



**LEGENDA**

	AREA DI SCAMBIO POLIFUNZIONALE INTERAFRICANA - PORTO FRANCO	Porto Containers Aree Industriali Centrale Idroelettrica Servizi
	TRANSAFRICANA LAGOS - MOMBASA	
	CANALE NAVIGABILE	
	BACINO IMBRIFERO INTERCETTATO DAL CANALE	
	AREE DI SVILUPPO AGRICOLO	
	PORTI FLUVIALI	
	SISTEMAZIONE DEL FIUME CHARI	
	BRETELLA DI RACCORDO	

**LEGEND**

	INTERAFRICAN POLYFUNCTIONAL TRADE AREA - PORT FREE TRADE ZONE	Container Port Industrial Zone Hydroelectric Station Services
	LAGOS-MOMBASA TRANSAFRICAN HIGHWAY	
	NAVIGABLE CANAL	
	CATCHMENT AREA INTERCEPTED BY CANAL	
	AGRICULTURAL DEVELOPMENT AREAS	
	RIVER PORTS	
	TRAINING WORKS ON RIVER CHARI	
	LINK ROAD	

**LEGENDE**

	AIRE D'ECHANGES MULTIFONCTIONNELLE INTERAFRICAIN - PORT FRANCO	Port Container Zones Industrielles Centrale Hydro-électrique Services
	TRANSAFRICAIN LAGOS - MOMBASA	
	CANAL NAVIGABLE	
	BASSIN VERSANT DRAINE PAR LE CANAL	
	ZONES DE DEVELOPPEMENT AGRICOLE	
	PORTS FLUVIAUX	
	AMENAGEMENT DU CHARI	
	ROUTE DE RACCORDEMENT	

0 100 250 500 Km.

FIG. 4

