

ESTABLISHING A SERIES OF MONOGRAPHS

on the theme:

POPULATION DYNAMICS,

LAND AVAILABILITY

AND

ADAPTING LAND TENURE SYSTEMS

CHARTER

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The present document, entitled "Charter for Establishing a Series of Monographs on Population Dynamics, Land Availability and Adapting Land Tenure Systems", was drafted by Philippe Collomb, Executive Director of the International Committee for Cooperation in National Research in Demography, research director for the National Institute in Demographic Studies (I.N.E.D).

It is a follow-up to a report, also drafted by the director of CICRED, at the request of the United Nations Food and Agriculture Organization (FAO) and of the United Nations Population Fund (UNFPA), on the theme "Population Growth and Food Production - The Role of Demographic Factors for the Year 2050". The report constitutes the basis for technical document n°4: "Food Requirements and Population Growth", in volume n°1 of the "Technical Information Documents 1 to 15" communicated to member States having taken part in the World Food Summit organized by the United Nations Food and Agriculture Organization (FAO) from November 13-17, 1996.

He benefited from the help of André Quesnel (ORSTOM) for the writing of annexes 2, 4 and 5. André Quesnel will be a member of the scientific council in charge of evaluating the monographs.

I - The Causes of Food Insecurity¹

I.1 - Foreword

One billion people in 1830, 2 billion in 1930, 3 in 1960, 4 in 1975, 5 in the beginning of the 90s, 6 billion today, approximately 7 in 2010, 8 in 2020, probably 9 in 2035 and almost 10 billion in 2050, at a date when world population will perhaps be close to its maximum number, such is the demographic context of almost two centuries of human development. Why raise the issue of food insecurity again today? There are three fundamental reasons for the return of this theme to the international political scene.

- First of all, more than 50 years ago, October 16th, 1945, 44 countries officially founded the United Nations Food and Agriculture Organization (FAO) with the ambitious objective of "feeding the planet", and yet at the time of the World Food Summit in November 1996 it was estimated that 800 million people were undernourished.
- Roughly 20 years after the World Food Summit of 1974, and as was the case at that time, world prices are high, the stocks of the main exporting countries are at their lowest levels, and the threat of a world food shortage is once again brought to our attention. Technical adjustment measures, such as the laying fallow of lands by the main grain exporting countries (United States, Canada, European Union) in order to reduce their stocks and help increase prices which had been maintained artificially low, are in fact causing a slowdown in the growth of agricultural production that has been observed since the middle of the 80s [1] and that has reduced per capita grain production since 1984.

¹This chapter is drawn from the CICRED director's report drafted upon the request of UNESCO [26].

- According to some ecologists, natural resources would not be sufficient for the food requirements of the world population in 2050. F. Ramade, a French university professor, has written: "world population will have to decline to stabilize at a much lower level than its current level..., many ecologists considering that hardly more than two billion people could live according to European standards without putting the biosphere at risk"[2]. In the United States, L. Brown, president of the *World Watch Institute*, who already stated on the eve of the Rio Conference that the world could not support a population of more than 8 billion people (*Le Monde* 04/03/1992), now maintains that we are entering a period of grave uncertainty regarding the means by which we will be able to feed a constantly growing population (*Le Monde* 27/02/96). He based this observation on the reduction in the growth rate of agricultural production since the middle of the '80s.

Note: food security is to be understood as permanent access for everyone to food needed to ensure a healthy and active life.

However, according to the United Nations Population Fund, "At the end of 20th century, the world is confronting a terrible challenge: to balance increasing numbers of people and their needs with the natural resources required for their development. The decisions made in the next ten years will greatly determine future possibilities for inhabiting the planet. The collision between the number of people and the resources they need will become even more acute in the last years of the century and beyond" [3].

Therefore, the continued increase in world population appears to be a severe constituent. In this respect the United Nations Population Fund reflects the opinion of a majority of member states that have subscribed to the Program of Action of the International Conference on Population and Development (Cairo 1994 [14]). Awareness of this constraint led to delegations referring more and more to "sustainable development". Thus, out of 396 paragraphs of this program of action, 74 paragraphs -roughly 1 paragraph out of every 5- includes the term "sustainable

development" (see Annex n° 1.1 attached). The concepts of sustainable development and sustainable consumption raise the issue of mediation between still rapid population growth during the next few decades, continued expansion in consumption projected during the same period and the increasing exploitation of natural resources.

Therefore population and natural resources are in conflict. Although we evaluate our approximate numbers by means of censuses, and evaluate our economic output, we have not, however, evaluated "natural resources" as recommended in Action 21, the Program of Action of the Rio Conference, 1993 [4], or by the World Bank [5], and which is needed for making any informed comments on the issue. Therefore, an observer might be led to describe the global situation of the planet by focusing, for example, on specific observations concerning desertification, whereas efforts to develop land and natural resources are inadequately inventoried and have not been evaluated.

It should be noted that projections are being carried out currently without there being any answer to the question concerning whether the threats that await the human race are due to population growth in developing countries or to the actions of the populations of developed countries. What is more these projections are made without knowledge of the capacity for human societies to adapt and innovate.

At the dawn of the third millennium, many experts share the same concerns as UNFPA. Hence, the re-emerging question: "Will there be enough food for everyone ?" [6].

1.2 - Increased Productivity and Improvements in the Situation Since 1945

It is not the first time that this question has been raised. As early as the Neolithic era, people burned the forests to extend their hunting territories. But even with this transformation, the planetary environment would not have allowed population to grow beyond a few hundred million inhabitants. Humans have been able to reach the population levels of today only by returning to the direct exploitation of plants by building soils, controlling water, developing genetic resources, etc.

Recent Increases in Yields

Grain yields were very low historically. For example, in France until the last century, according to Vauban, average wheat yields did not exceed 1000 kg per hectare in 1660. This observation was confirmed by Pottier in 1715, by Young in 1789, by the *Feuille du Cultivateur* in 1792.

Leaving the land fallow only disappeared from Europe in the 20th century with the massive use of green fertilizers. According to Moreau de Jomès in 1610, 66% of lands was left fallow in France; this figure fell to 40% according to Lavoisier in 1790 and *La Feuille du Cultivateur* in 1794.

Thanks to recent technical progress, yields of wheat, paddy rice and maize have doubled, and even tripled in some cases, and the land areas devoted to these crops have probably doubled. Thus, progress in agriculture has greatly exceeded population growth.

But if the history of the civilizations of rice, wheat, or maize is full of improvements in local pedological resources through working the land and hydraulic engineering, especially on a part of the planet between two parallels including most of the areas of high population density in the world, there are also abundant examples of animal or

vegetal over-exploitation responsible for the desertification of lands. That is why an accounting of resources is needed to be able to make this projection.

A Projection Made Twenty Years Ago at a Time When Population Growth Was at its Highest

Between 1965 and 1970, faced with the fastest population growth known to the human race, the United Nations Food and Agriculture Organization conducted the most ambitious agro-demographic projection ever carried out [9]. The objective was to examine future possibilities for continued growth of food production at a rate corresponding to that of the population growth, and to determine the maximum population for each country for the years 1975 and 2000, given the regional context and three investment scenarios corresponding to the three main stages in the history of human development:

- ***Low Variant:*** Human labor is the only production factor. No fertilizers or insecticides are used.
- ***Medium Variant:*** To human labor is added the labor of draught animals. Some chemical fertilizers are used in addition to natural fertilizers provided by stock breeding. Elementary measures for soil conservation are used.
- ***High Variant:*** To human labor is added total agricultural mechanization. High yield genetic material and all the necessary chemical products are used. A strict soil preservation policy is practiced.

It became apparent that passing from the lowest to the highest technological level (from the low to the high variant) multiplied carrying capacity tenfold or more. This reflects the fact that populating a region entails investment oriented to development, including a variety of infrastructures, development of land and water resources,

research in animal and plant genetics, investment in livestock, in farming equipment, but also, and perhaps most importantly, investment in human capital, know-how.

The final report showed that the number of countries in a critical situation would be greatly increased by the year 2000.

Of the 117 countries studied, 64 seemed not to have enough land available to ensure food security between 1975 and 2000 if they limited their investments to the lowest variant.

Among these 64 countries, 28 would be able to satisfy their food requirements for 2000 if they invested to the level of the medium variant for all of their arable land in rainfed agriculture.

To ensure food self-sufficiency, 17 of these countries would have to apply the highest level of investment, that which is carried out by developed countries.

The remaining 19 countries would be condemned to importing food because of a lack of sufficient land resources: Western Sahara, Rwanda, Jordan, Lebanon, Israel, the Arab Republic of Yemen, Afghanistan and Iran, apart from certain island states and most of the oil producing countries of Southwest Asia. Three of them would only join this group between 1975 and 2000 because of their worsening situations: Rwanda, Afghanistan and the Arab Republic of Yemen.

At the same time, Algeria, Burundi, Lesotho, Mauritania, Iran, Iraq, Syria, Salvador, Haiti and Bangladesh would definitely have to move from the "low" to the "medium" investment variant to ensure self-sufficiency. Some of these countries have experienced serious social unrest since 1975, but the very pessimistic FAO projections were far from becoming a reality.

The Food Situation at the End of the Second Millennium

The world has inherited a coverage of its needs through greatly improved food supply. At the global level, the ratio of food requirement to food supply progressed from 1.05 in 1962 to 1.12 in 1970, to 1.18 in 1990, despite the exceptionally high population growth observed during this period.

But the situation varies greatly across countries. After having experienced a high average food deficit per capita up to 1962, Asia has greatly improved its food situation and continues to do so. Today it is catching up with Latin America, where after a period of improvement in the coverage of food requirements, the situation has leveled off. On the other hand, Africa has not succeeded in improving its food situation, which has on average gotten worse in countries where mostly cassava, yams and taro are consumed (coverage rate: 0.98 in 1990) [10].

Average food supply per capita have been increased in excess of projections for many countries, especially in Asia. The critical situations forecast for the year 2000 have not occurred in the numbers and to the extent expected as this date approaches.

With hindsight, the predictive capacity of the FAO report has proved accurate in the cases where agriculture is the major national economic activity and economic improvement and technological progress have remained low. This was the case of Africa especially. Insolvency prevented the grain imports needed to feed the population, whatever the population growth rate [11]. Also, the unequal distribution of food and of agricultural production factors were for the most part the cause of continued chronic malnutrition which still affects 800 million people in the world, the majority of whom still practice an activity linked to the exploitation of the plant or animal bio-mass.

On a Global Level Food Supply is Sufficient

Whereas in 1960, 80% of the world population were living in countries where food supplies were manifestly insufficient (less than 2 100 calories per day per person), today, less than 10% of the world population finds itself in such a position.

It would appear that food insecurity today is mainly due to a poor distribution of resources, pertinent to specific regions and disadvantaged population groups.

Productivity remains much lower than the use of current scientific and technical knowledge would allow, and this is the case in most countries in the world. Considerable increases in productivity could be obtained, often with the implementation of simple technologies and small investments. Sufficient proof of this can be provided by comparing, region by region, the yields of harvests in optimum conditions with those currently obtained. The yields obtained in optimum conditions are still 5 to 9 times higher than those obtained in developed countries and in developing countries [12].

It would appear that food insecurity is more the result of insufficient implementation of available technology, because of insufficient access to means of production or insufficient dissemination of knowledge, rather than of a general situation of insufficient knowledge and technology.

1.3 - Food Requirements of the World Population in 2050

This chapter uses the results of an evaluation of requirements in food energy for the world population in 2050 that I carried out for the FAO according to the method used by nutritionists, taking into account the age, sex, height, weight, physical activity and degree of urbanization of the population of each country. The meat consumption taken into account has been converted to the energy of plant origin needed to produce this meat [10], the phrase « plant-based energy needed directly or indirectly (the fattening up of animals) to feed humans » has been commonly used in this text.

These evaluations have no value as agricultural food production projections. They are to be considered as a series of scenarios involving populations with different population dynamics defined by the United Nations Population Division, nutritional situations defined by the FAO nutritionists and changes in dietary patterns proposed as examples.

It is to be remembered that population changes are probably the least difficult to predict. The United Nations was thus able to estimate, soon after World War II, what would be the world population in the year 2000, and subsequently renew this estimate without the final result changing significantly. UN Population prospects bring a good framework at a very aggregate level for the estimation of human food requirements in 2050.

The pre-eminence of Demographic Factors in Determining Food Requirements for the World Population in 2050

The United Nations Population Division has estimated world population in 2050 according to three scenarios of a decrease in fertility [13]. World population should reach 7.9 billion inhabitants in 2050 according to the low variant, approximately 9.8 in the medium variant and 11.9 billion according to the high variant. However, whereas world population will have reached a peak of nearly 8 billion between 2040 and 2045,

it will be decreasing in 2050 if there is a rapid reduction in fertility between 1995 and 2050 (low variant), it will continue to grow after 2050 if there is a medium reduction in fertility (medium variant) and will continue to increase substantially in the case of a slow reduction in fertility (high variant).

Population growth between now and 2050 will be the main cause behind the increase in food energy requirements of developing countries. Taking all demographic impacts

between now and 2050 into account, food energy requirements will increase by 95% in developing countries as a whole, by 215% in Africa, and in those African countries consuming cassava, yams and taro by 250%.

Sustained Population Growth is Expected Because of the High Proportions of Young People in the Population

The high proportion of young people in the world population age distribution will definitely lead to rapid population growth during the coming decades. Even if there were a sudden adjustment in fertility to the replacement level (i.e. the level required to replace the current numbers), world population would increase by more than 2 billion between now and 2050. In English this phenomenon is often referred to as « population momentum ».

Changes in Dietary Habits

Developing countries will also have to supplement their diets to eliminate chronic malnutrition. The price to pay for this may be an 18% increase in food supply of developing countries between now and 2050. For diets to be balanced (in amino acids, vitamins and nutritive elements) food consumption must be diversified. The cost here may be a 19% increase in food supply in developing countries between now and 2050.

Ensuring Food Security for the World Population by 2050 Seems Possible

Globally, by 2050 developing countries should increase by 175% their plant-based energy needed directly or indirectly (the fattening up of animals) to feed humans.

According to the FAO, expected increases in yields and increased availability of arable lands and irrigated areas will make it possible to respond to the growth in demand for the whole planet up to 2010, and even until 2025. Developed countries should not encounter any problems in producing the grain required to make up for the deficiencies of developing countries until 2010 or perhaps even 2025 [1].

However, the decrease in agricultural production since the mid 80s is exclusively due to a reduction in global production by the main grain exporting countries [1]. This reduction was not accompanied by an increase in world prices, in fact, a drop in prices was recorded until very recently. The production rate observed will make it possible to respond to solvent demand. The slowing down of production growth by the main exporting countries was aimed at avoiding a drop in prices which might result from an accumulation of surpluses.

The main problem therefore is that of the slow increase in effective demand, in other words, the problem of poverty, the real factor for the slow increase in demand, and therefore of food production.

The limits in the capacity of natural resources do not appear to have been reached on a global scale. The reduction in the growth of agricultural production since the mid '80s cannot be interpreted as a sign of a future scarcity of food, nor as an indication that production has reached a peak due to environmental conditions.

Provided there is a marked improvement in the distribution of the means of agricultural production and in the dissemination of knowledge, changes mentioned earlier [12] and

which should allow substantial increases in grain crop yields, it should be possible to meet food requirements for the world population up through 2050.

Challenges Vary Greatly Regionally and Locally

If one takes into account the effects of demographic phenomena, those concerning dietary supplements and those concerning the diversification of food, the countries of Latin America and Asia should more or less double the amount of food available, but Africa should increase its consumption of plant-based energy needed directly or indirectly, fivefold (sevenfold in the case of countries consuming mainly roots and tubers).

It is among the populations consuming mainly cassava, yams, taro or plantains that the consumption of plant-based energy should grow fastest, with an increase of over 600% by 2050.

Nearly 25 countries are expected to increase by over 4% per year their consumption of plant-based energy taken from natural resources (see table n° 1), which would amount to multiplying plant based consumption by 8, by 10, or even by 15 plant-based consumption in 55 years.

Chronic malnutrition appears to be able to be diminished in the world. The number of undernourished people should fall from 800 million in 1988-90 to 650 million in 2010. This change can be explained especially by the impetus from Asian countries where the numbers of undernourished people should fall by nearly half, from 520 to 270 million. However, the number of undernourished people will increase in Africa, rising from 175 million to 300 million [1].

The Countries with the Greatest Numbers of Undernourished People in the World Will Need to Increase Food Supplies by 2050

What is remarkable is that the countries currently experiencing the highest chronic malnutrition (less than 2 100 calories per day), will have to increase their consumption of plant-based energy taken from their own resources or from imports, provided they have the financial means (see table n° 1).

This high increase in plant-based consumption is not due to the additions needed to supplement insufficient food rations of the current populations, but rather to provide for the needs of the populations which will be added to the current numbers by 2050 because of high population growth.

Among the countries on this list are Burundi, Rwanda, Malawi, Ethiopia, and Afghanistan, all of which are countries with 75% of their populations in rural areas, and also Ghana, Cameroon, Liberia, Sierra Leone, Chad, Haiti, Angola, Mozambique, and Zaire, which have 60 to 75% of their populations in rural areas (see table n° 1).

Other countries, with on average less critical food situations (2 100 to 2 300 calories per day), are also on this list. They are Uganda, Burkina Faso, Niger, Nigeria, Togo and Congo.

Table n° 1: Cross-classification of 93 Developing Countries According to the Proportion of the Population in Rural Areas and Food Supply Per Capita (1).
Countries marked with the sign "+" will have to increase their consumption of plant-based energy by more than 4% per year between now and 2050.

Rural population as a percentage of total population, 1990	Food supply per capita (Calories/day, 1990-1992)						
	Under 2 100	2 100-2 300	2 300-2 500	2 500-2 700	2 700-3 000	Over 3 000	
Over 75 %	Burundi Rwanda Malawi Ethiopia Afghanistan Bangladesh Somalia Kenya	+ Uganda + Nepal + Cambodia + Burkina Faso + Lesotho Laos Niger Vietnam Tanzania Sri Lanka Sudan Mali Madagascar	+ Botswana + Myanmar + Gambia + Thailand				
60 to 74 %	Ghana Cameroon Liberia Sierra Leone Chad Haiti Zimbabwe Angola Zaire Mozambique	+ Guatemala + Nigeria + Yemen + Togo + Namibia	+ Ivory Coast + Guyana + India + Pakistan + Senegal + Guinea	+ Indonesia + Swaziland + Benin		China	
45 to 59 %	Bolivia Central. African Rep. Zambia	+ Panama + Philippines + Congo	+ Gabon + Honduras	Jamaica El Salvador Paraguay Surinam Mauritania	Algeria Costa Rica Malaysia Mauritius	Syria Egypt Morocco	
25 to 44 %	Peru	Iraq Nicaragua Dominican. Republic.		Colombia Trinidad and Tobago Ecuador	Brazil Korea, People's Democratic Republic Jordan Iran	Cuba Republic of Korea Tunisia Turkey	
0 à 24 %				Chile Venezuela Uruguay	Argentina Saudi Arabia	Lebanon Libya	

(1) The list of the countries provided in each cell of this table comes from FAO, WFS 96/TECH/1, Table 12 [15].

The annual growth rate of agricultural production in Asia could be lower than that of the last 15 years (4.3% per year from 1975 to 1990). Similarly, that of Latin America could be lower than in the past 15 years. But this will not be the case for Africa: the rate of increase in agricultural production will have to reach a much higher level than it has over the last 15 years, something unheard of on this continent.

The FAO is still issuing warnings. Because of their lack of land, seven countries will not be able to ensure food security unless they are able to use the highest level of technology: Mauritania, Namibia, Niger, Senegal, Ethiopia, Uganda and Nigeria. Ten countries will be unable to meet their populations' food requirements even if they do apply the most advanced technology, and they will thus be forced to make massive imports of grain. In addition to Rwanda which has already been mentioned for the period from 1975 to 2000, the following countries are also concerned: Burundi, Algeria, Egypt, Lesotho, Libya, Morocco, Somalia, Kenya and Tunisia.

Moreover, fifteen countries, including all the countries mentioned previously, will be faced with serious water shortages. Five among them, Rwanda, Burundi, Kenya, Tunisia and Malawi, may have to import massive quantities of water or, if possible, desalinate large quantities of sea water.

A Critical Situation for a Small Part of the World Population, But Issues which are Global

Whichever projections are taken into account, imminent critical situations and long-term concerns affect, according to the scenarios, a group of countries representing 5-10% of the world population. This group includes the most undernourished countries in the world. The possible solutions involve either food aid for low-income populations or improved infrastructures, and will be examined further on.

Despite their small demographic weight, the countries belonging to this group provoke, due to their political, social and human situations, a climate of permanent international

crisis. For the most part they have experienced serious social unrest. That is to say, civil or national wars lasting more than a year, between 1970 and 1995 [22]. This was the case, for example, for 11 of the 22 countries whose food consumption did not exceed 2 100 calories per day in 1990-1992. This was the case for 12 of the 24 countries with food supplies of 2 100 to 2 300 calories per day. Only 5 of the 47 countries having more than 2 300 calories experienced such hardships during the same period (table n° 2). Also, their demographic growth is among the highest in the world and will result in three, four or even fivefold increases in their populations by 2050, which will greatly change their relative weight by the middle of the coming century.

Apart from the fact that having 800 million people suffering from malnutrition in the year 2000 is humanely unacceptable, the probable increase of food insecurity in Africa forecast by the FAO reveals this situation as shameful and makes the issue a global one. In fact, the risk is that of political, social and economic destabilization of an entire continent.

Table n° 2 : Cross-classification of 93 Developing Countries According to the Proportion of People Living in Rural Areas and Food Supply Per Capita.
Countries marked with the sign "+" have experienced civil or national war lasting more than one year between 1970 and 1995.

Rural population as a percentage of total population, 1990	Food supply per capita (Calories/day, 1990-1992)											
	Under 2 100		2 100-2 300		2 300-2 500		2 500-2 700		2 700-3 000		Over 3 000	
Over 75 %	Burundi Rwanda Malawi Ethiopia Afghanistan Bangladesh Somalia Kenya	+	Uganda Nepal Cambodia Burkina Faso Laos Niger Vietnam Tanzania Sri Lanka Sudan Mali Madagascar	+	Botswana Myanmar Gambia Thailand							
60 to 74 %	Ghana Cameroon Liberia Sierra Leone Chad Haiti Zimbabwe Angola Zaire Mozambique	+	Guatemala Nigeria Yemen Togo Namibia	+	Ivory Coast Guyana India Pakistan Senegal Guinea		Indonesia Swaziland Benin		China			
45 to 59 %	Bolivia Central. African Repub. Zambia		Panama Philippines Congo		Gabon Honduras		Jamaica El Salvador Paraguay Surinam Mauritania	+	Algeria Costa Rica Malaysia Mauritius		Syria Egypt Morocco	
25 to 44 %	Peru		Iraq Nicaragua Dominican. Republic.	+			Colombia Trinidad and Tobago. Ecuador		Brazil Korea, People's Democratic Republic, Jordan Iran		Cuba Mexico Rep. of Korea Tunisia Turkey	
0 to 24 %							Chile Venezuela Uruguay		Argentina Saudi Arabia		Lebanon Libya	+

(1) The list of the countries provided in each cell of this table comes from FAO, WFS 96/TECH/1, Table 12 [15].

1.4 - Seven Scenarios Regarding Food Insecurity

Let us leave aside for the moment the general development of national economies and the eradication of poverty, which is the root of food insecurity. Seven solutions are often put forward for eliminating food insecurity.

First Scenario: Demographic Transition as a Remedy for Food Insecurity

The limitation of births, an element in the fight against poverty, is very often put forward [14]. Demographic transition will make it easier to attain food security in the developing world. It will, in time, bring about a reduction in population growth in developing countries. Because of this, annual rates of increase in production of plant-based energy needed to ensure food security for the populations of developing countries between now and 2050 should not exceed a moderate 1.8%.

The sooner demographic transition that is, a reduction in fertility occurs, the less difficult it will be to ensure sustainable development and food security [10].

But the role of family planning policies will be less important than predicted. Stabilization of fertility at 1.6 (United Nations low variant), 2.1 (medium variant), or 2.6 children per woman (high variant) will result in the African continent having to increase the plant-based energy it uses by a factor 4, 5 or 6, respectively between now and 2050. Regarding populations consuming mainly cassava, or other roots and tubers, they will, according to the variant, have to increase the plant-based energy used by a factor of 6, 7.2 or 8.4 [10].

Therefore, according to whether one assumes a low, medium or high reduction in fertility, these countries will have to increase their plant-based energy consumption by 3.9%, 3.6% and 3.4% per year, respectively, from 1975 to 2050, corresponding to annual increases which do not differ much according to the scenarios for reductions in

fertility. Whatever they may be these increases seem unattainable in the absence of socio-economic and infrastructural contexts appropriate to such performances.

Even if the reduction in fertility makes the economic changes required less improbable and unattainable, the development policies implemented will have a determining influence.

Second Scenario : New Investment in Land Through the Settlement of New Lands is a Remedy for Food Insecurity

Another solution which is often put forward is increasing the amount of cultivated land.

According to the FAO [1], 1 800 million hectares of rainfed land remains unexploited, not including available land in China. Out of these 1 800 million hectares, 94 million are occupied by human settlements, 770 are forest lands and 200 are in protected areas (national parks, forest and animal reserves). This leaves over 700 million hectares available for cultivation, in other words a reserve of land approximately equivalent to the amount of land already being exploited.

Most of this reserve of unexploited arable land is in Africa (500 million hectares in sub-Saharan Africa), in Latin America (220 million hectares), the sub-continent which has a large forest reserve, to a lesser degree in East Asia (45 million, China not included) and in South Asia (10 million).

According to the FAO, the continued population growth the world will experience for several decades to come will not bring about any large settlements of new lands to the detriment of forest areas.

This reserve is partly made up of lands which are not very fertile. This may explain in part why programs for the settlement of new lands implemented during the last few

decades have met with little success and have never been able to absorb large numbers of surplus rural populations [21]. However, there are four other types of explanations which deserve mention: i) the development of new lands before the installation of any population is costly, ii) progress in research into techniques for developing new lands is not very advanced, iii) subsidies given for covering the large initial costs of exploitation (the first crop cycle) are usually insufficient, iv) the ecological conditions in which populations are transplanted are seldom favorable and pose epidemiological problems (transfer of populations from certain dense high-plateau regions of Latin America towards humid tropical coastal regions, sometimes at the cost of major development, extensive deforestation, etc.). Finally, it should also be noted that a part of these lands will be used for the human settlement of growing populations and for the installation of new non-agricultural enterprises.

According to the FAO, the increase in the amount of arable lands exploited should not exceed 90 million hectares, or 12%, between now and 2010. Also, 2 million hectares of arid and extremely arid land could be irrigated [1].

One cannot, then, hope that the opening up of new lands for agriculture will be a determining factor for food security in the next few decades.

Third Scenario: Increased Productivity and the Contributions of Biotechnology: Remedies for Food Insecurity²

According to the FAO [1], it seems that grain production yield should increase by 37% between 1988-1990 and 2010 in developing countries. This gives an indication of how increased grain production (58%) will mainly be due to improved productivity and not to increases in the amount of cultivated land under cultivation (17%).

²This chapter is drawn from the CICRED director's report drafted at the request of UNESCO [27].

The average yields of the three main cereal crops (rice, wheat and maize) are projected to increase by 36, 42 and 39%, respectively. Therefore an annual increase of over 1.5% is expected in cereal crop yields.

These increased yields will be the result of improved cultivars. Research is being carried out to reduce the gap between yields obtained in trials and yields in the field and, to a lesser degree, to increase maximum yields. It should be noted that the share of modern varieties has increased: from 30% to 74% for rice in developing countries, and from 20% to 70% for wheat (China not included) between 1970 and 1990.

These improvements will partly be due to the arrival of a great number of biotechnologies concerning the whole chain from production to consumption of food and reaching well beyond the field of traditional genetics.

Some of the effects expected from biotechnology are the adaptation of new varieties to local agro-climatic conditions, increased yields, reduced variability in yields, resistance to pathogenic agents, emerging of new uses for existing agricultural products, the creation of new products more effective than existing agricultural products, etc. The human race could possibly be about to embark on fundamental changes in its agricultural production techniques which would enable many hopes to be fulfilled, even in developing countries.

Progress in biotechnologies will be made in countries where human, land and water productivity is highest. Priority will be given to methods for improving the resistance of varieties to pathogenic agents and increased tolerance of species to factors that hinder the development of plants or animals.

Improved genetic varieties will probably be commercialized within the next ten or fifteen years in developing countries. This will mainly involve cereals. Biotechnological improvements aimed at increasing productivity will certainly constitute an important factor for attaining food security in South and East Asia, and

perhaps in Latin America. They will provide, in great part if not totally, a response to the increasing needs of countries consuming the products from the main cereal crops such as rice, wheat, maize, etc.

Keeping track of the progress made by those involved in genetic improvements enables us to affirm that increased food supply for direct human consumption will exceed food requirements in developing countries for at least the next two decades.

Research to find new cultivars for more productive cassava, yams and taro should be encouraged. This research would provide a substantial contribution to reducing food insecurity since these roots and tubers accept all sorts of unfavorable conditions. It should be directed to developing resistance to pathogenic agents [24]. Research into finding improved varieties of dry cereals (millet, etc.) and of sorghum should concern varieties coming from areas with harsh climatic conditions. In this area, selection will have to be directed more towards stabilizing yields than towards increasing maximum yields. However, efforts made in research into improved cultivars for these plants is presently insufficient.

These potential improvements should not lead to presenting genetic breakthroughs as a panacea. Certain characteristics essential for rural development of countries consuming mainly cassava, yams, taro, etc. should be remembered at this point. Rwanda and Burundi in fact draw a good part of their food supply from roots or tubers, but efficiently supplement their diets with dried vegetables rich in protein. However, these countries should be considered separately because of the heavy demographic pressure weighing on their natural resources. They must extensively develop the productivity of all factors of production (humans, land and water). On the other hand, several other countries where roots and tubers are mainly consumed have large reserves of rainfed lands, which allow for notable extensions of crops. Some of them, like Congo, are even very sparsely populated. In such conditions extension of root and tuber crops will provide a solution to the food situation [23]. Growing cassava does not require developed technology. However, the yam, a refined crop extensively grown in Nigeria,

for example, demands greater technical capacities. Lastly, the land reserves of countries such as Cameroon, Gabon, Ivory Coast, Togo, etc. are limited, and higher yields are required.

The extra cost of purchasing new seeds will be beyond the economic capacities of populations suffering from chronic malnutrition, of populations whose entire production is dedicated to own consumption of food crops, and of the poorest families. Moreover, the socio-economic situation and the lack of infrastructures in the poorest countries does not yet allow them to benefit from such improvements. For all of these reasons the impacts of biotechnological progress will not be fully felt in developing countries for another 10 to 20 years, and biotechnology should not be expected to provide solutions fundamentally modifying food insecurity in the short, medium or even in the long term.

For populations suffering from chronic malnutrition, for those whose entire production is dedicated to subsistence farming and for the poorest populations, especially in Africa, it is unlikely that the principal determining factors providing solutions ensuring food security will be solely brought about by technological progress.

Fourth Scenario: Food Imports Will Solve Food Insecurity

Another key to food security is the possibility of importing grain.

As well as China and Indonesia, many developing countries have, to varying degrees, increased grain imports during the last decade.

The big grain exporters have easily been able to satisfy the increase in demand. The subsidies the agriculture of these countries benefited from at the time partly explains the low prices and the increased volume of imports of developing countries. But these subsidies are now disappearing.

As the gap between national production and food requirements increases, grain imports have become increasingly indispensable for poor countries. But the amount of food imported is only a function of how solvent the countries are.

Beyond a certain level of economic progress, which can be expressed in terms of an initial decline in fertility, grain imports are increasingly larger when fertility on population growth are lower [11]. In simplified terms, the richer the country, the lower the fertility rate and the greater the grain imports. This could be termed as the economic logic behind grain imports.

It is not so easy to reach a conclusion concerning high fertility rates. An aspect specific to Arab countries is the rule by which, the higher the fertility rate, or the higher population growth, the greater are grain imports [11]. Revenue from oil and tourism is undoubtedly the reason why such imports are possible. Therefore, in this case, there is a demographic logic behind grain imports, but this is possible only so long as the countries are solvent.

This is not the case for sub-Saharan countries. In fact, here it is the opposite. African countries are distinct in two ways: first of all, imports are lower as population growth increases, which is no doubt the result of the insolvency of countries with high fertility rates. Also, the greater the demographic pressure in relation to the amount of arable land available in countries consuming cassava, yams and taro, the smaller the grain imports per capita, which is the reason behind the acute food insecurity of these countries. The more precarious the economic and political situation, the less able these countries are to import the grain they need to feed their populations [11].

The most recent data (see table n° 3) confirm this: the economies of the poorest countries in the world will probably not permit the importation of the amounts of grain needed to balance their food situations. Food imports will solve food insecurity only if economic development and a positive trade balance allows it.

Table n° 3 : Cross-classification of 93 Developing Countries According to the Proportion of their Populations Living in Rural Areas and Food Supply per Capita.
The figures next to the names of the countries show grain imports in kilograms per inhabitant per year.

Rural population as a percentage of total population, 1990	Food supply per inhabitant (Calories/day, 1990-1992)											
	Less than 2 100		2 100-2 300		2 300-2 500		2 500-2 700		2 700-3 000		Plus de 3 000	
Plus de 75 %	Burundi	5	Uganda	0	Botswana	108						
	Rwanda	4	Nepal	2	Myanmar	-4						
	Malawi	21	Cambodia	6	Gambia	114						
	Ethiopia	16	Burkina Faso	18	Thailand	-104						
	Afghanistan	14	Lesotho	122								
	Bangladesh	17	Laos	10								
	Somalia	31	Niger	16								
	Kenya	9	Vietnam	-14								
			Tanzania	4								
			Sri Lanka	57								
			Sudan	25								
			Mali	14								
			Madagascar	8								
60 à 74 %	Ghana	22	Guatemala	33	Ivory Coast	50	Indonesia	12	China	6		
	Cameroon	36	Nigeria	7	Guyana	-12	Swaziland	146				
	Liberia	52	Yemen	130	India	1	Benin	33				
	Sierra Leone	39	Togo	32	Pakistan	4						
	Chad	10	Namibia	75	Senegal	83						
	Haiti	45			Guinea	46						
	Zimbabwe	-6										
	Angola	35										
	Zaire	10										
	Mozambique	44										
45 à 59 %	Bolivia	34	Panama	67	Gabon	74	Jamaica	162	Algeria	220	Syria	109
	Central African Republic	14	Philippines	32	Honduras	34	El Salvador	42	Costa Rica	116	Egypt	150
	Zambia	28	Congo	54			Paraguay	-27				
							Surinam	-30	Malaysia	159	Morocco	75
							Mauritania	123	Mauritius	188		
25 à 44 %	Peru	74	Iraq	167			Colombia	31	Brazil	29	Cuba	204
			Nicaragua	45			Trinidad and Tobago.	201	Korea, R. P. D.	38	Mexico	80
			Dominican Republic	103			Ecuador	43	Jordan	387	Rep. of Korea	229
									Iran	88	Tunisia	175
											Turkey	-21
0 à 24 %							Chile	30	Argentina	-330	Lebanon	217
							Venezuela	117	Saudi Arabia	279	Libya	427
							Uruguay	-138				

(1) This table comes from FAO, WFS 96/TECH/1, Table 12 [15].

(2) Five-year average from 1988 to 1992 (a negative sign indicates net exports).

Fifth Scenario: The Need for Major and Costly Investments in Infrastructure and for Creating all Types of Services

Another factor of a technical nature is often put forth to explain the continued presence of food insecurity. This is the lack of infrastructure and basic investments.

Among the elements which tend to constrain rural development are the lack of: irrigation infrastructure and sometimes water resource management, roads and transport, an information network, co-operative structures for supplies, a banking system, marketing structures and the absence or remoteness of markets, appropriate land tenure systems or situations of precarious land tenure, services, or co-operatives and mutual organizations, agricultural supplies to respond to the genetic aging of crops, veterinary services to care for the health needs of livestock. What is more the absence of agricultural policies, especially for the regulation of markets, the absence of credit policies for encouraging investment and the absence of a system of long-term loans tend to prevent rural development.

It should be remembered that the agriculture of developed countries was built up over long periods and that the capital immobilized in agriculture yielded little return, not to mention that the civilizations based on the major cereal crops, especially those of rice and wheat, took centuries to become established.

In fact it is very difficult to evaluate the transfer of funds, from North to South, which would build up infrastructures and thus develop the rural economy of developing countries and contribute to eliminating poverty and food insecurity in these regions.

The Sixth Scenario: The Reduction of Poverty and the Fight Against Illiteracy, Other Factors Affecting the Food Situation

Since World War II, those populations which produce their own food, are employed in agriculture and whose income comes from agricultural activities have probably continually decreased in size in proportion to the population as a whole but have nonetheless remained the majority. It is among rural populations where the majority of poor people in the world are to be found (World Bank 1990, World Development Report).

However, the main factors ensuring a successful balance between increasing food requirements and food supplies in developing countries have probably been those of general economic growth and the reduction of poverty, which led to an increase in the effective demand for food products.

Since World War II a substantial increase in food supply has in fact been recorded. This increase has been made possible primarily because of increased productivity, and to a lesser degree, because of an increase in the amount of land under cultivation. In fact, according to the FAO, 69% of increased plant production from 1970 to 1990 was due to increased yields and 31% to the increase in cultivated land [1].

This increased productivity was realized mainly for wheat (2.8% per year), and rice (2.3% per year) and to a lesser degree maize (1.8% per year) and sorghum (1.5% per year). The yields of other cereals (barley, millet) have increased by only 1% per year, at the same rate as the growth in yields for cassava [1].

Intensification has also been introduced with irrigation, which has made it possible to use high-yield varieties of grain (hybrids, etc.) and to use each hectare more intensively (increase in the number of harvests in a year on the same plot of land, etc.), independently of the increased yield it has permitted without changing cultivars. It is to

be noted that 123 million hectares of arable land were irrigated in 1988-90, of which 35 million were arid or extremely arid lands [1].

Increased food production has also resulted from replacing low-yield crops by high-yield crops. To date there have been no in-depth studies on this subject.

New techniques have brought down food prices, therefore contributing to increased human consumption. What is more, developing countries have started to give food initially intended for human consumption to livestock, essentially because of its lower cost. Increased demand has generated new technologies which in turn become less costly to use.

Increased population density has also probably encouraged production due to mass consumption, although this has not been proved.

Increased production in developing countries is not yet sufficient to respond to food requirements. Apart from a few of the main rice-producing countries, especially China, developing countries have resorted to massive grain imports, all the more massive given the fact that prices were abnormally low due to the subsidies certain countries gave their farmers.

The long-term trend has been for food prices to fall. This reduction has been partly due to the fact that at the global level there have been no obstacles to the increase in food production so as to match effective demand. The reduction in per capita world production of grain recorded during the last decade can only be explained by the reduced production of the main grain-exporting countries.

Two incompatible political objectives are thus being pursued. The first objective is that of reducing poverty, improving access to food for the poor and, as a consequence, increased effective demand. The second objective is to maintain prices supporting the

production of the main grain exporters which leads to laying lands fallow and minimizing the increase in food supply per inhabitant.

However, increased food production and human, land and water productivity have been the principal means ensuring a reduction in poverty and an improvement of the food situation of developing countries. The main cause of chronic malnutrition has been the incapacity to reduce poverty in these countries.

Apart from the natural environment, the main economic factor behind the failure to adequately increase food supply has been poverty and its corollary, insufficient national consumption (World Bank 1990, World Development Report). Development is in fact more closely linked to increased internal consumption than to increased exports.

But the main obstacle is probably the lack of investment in human resources. This study shows in particular the importance of food deficiencies in Africa and Asia.

Providing health services and covering people's food requirements are obviously the most important conditions for ensuring rural and agricultural development. However, the human race is still far from ensuring health care for all, as set out in the Declaration for Primary Health Care at Alma-Ata, and supplies of fresh water have not progressed enough.

High rates of illiteracy, insufficient basic education (see table n° 4), a lack of training, and insufficient information on new technologies or innovations are obstacles to development. The effects of training on production and productivity are proven. But the effects on Gross Domestic Product differ greatly according to the country. The higher the quality of basic education the greater the return on investments in education. It would seem that sub-Saharan Africa is an exception to this rule and this can probably be explained by the lack of infrastructure and the unfavorable institutional environment (World Bank 1990, World Development Report).

The Seventh Scenario: The Geographical Redistribution of Populations Will Ensure Food Security

International migration is often evoked since it conjures up fears of borders being transgressed by hungry populations. It should be noted, however, that food insecurity does not constitute a factor for migration to developed countries. It is, though, a factor for migration to neighboring countries. It is also a factor in the installation of refugees in neighboring countries (a survey is currently being carried out on this theme). It can therefore be the cause of social unrest, serious conflicts over the possession of land and water resources, and sometimes even wars. In some cases, past or present, migration can be inescapable. The size of migration flows will never be enough to solve food problems of the countries of departure. However they may be large enough to destabilize the political situations in the countries of arrival even when the migration is limited in size. It is rather unlikely that international migrations, usually contained by the receiving countries, will make it possible to reduce the differences between the geographical distribution of populations and that of natural resources.

Internal migration has also emerged as a solution to the lack of land and to food insecurity. That is why the exploitation of state-owned land by populations living in densely populated areas is sometimes evoked. In fact this solution is too seldom applied. Land reform, however, has emerged as a determining factor for rural development. This led to the FAO organizing a World Conference on Land Reform and Rural Development, in Rome, in 1979 [28], which resulted in the organization of many meetings and a great number of reports. The redistribution of arable land and the population redistribution this enabled helped some countries deal with the sustained rapid population growth of the 60s and 70s by greatly encouraging food production and limiting the extent of migration towards urban areas.

Table 4 : Cross-classification of 93 Developing Countries According to the Proportion of their Populations Living in Rural Areas and Food Supply per Capita.

In the countries marked with a cross, the population attending primary school in 1993 represented less than 80% of the boys aged 6 to 11 (2).

Rural population as a percentage of the total population, 1990	Food supply per capita (Calories/day, 1990-1992)											
	Less than 2 100		2 100-2 300		2 300-2 500		2 500-2 700		2 700-3 000		Plus de 3 000	
Plus de 75 %	Burundi	x	Uganda		Botswana							
	Rwanda	x	Nepal		Myanmar							
	Malawi	x	Cambodia		Gambia							
	Ethiopia	x	Burkina Faso	x	Thailand							
	Afghanistan	x	Lesotho									
	Bangladesh		Laos									
	Somalia	x	Niger	x								
	Kenya		Vietnam	x								
			Tanzania	x								
			Sri Lanka									
			Sudan									
			Mali	x								
			Madagascar	x								
60 à 74 %	Ghana		Guatemala		Ivory Coast	x	Indonesia		China			
	Cameroon		Nigeria		Guyana		Swaziland					
	Liberia		Yemen		India		Benin					
	Sierra Leone	x	Togo		Pakistan	x						
	Chad	x	Namibia		Senegal	x						
	Haiti	x			Guinea	x						
	Zimbabwe											
	Angola											
	Zaire											
	Mozambique	x										
45 à 59 %	Bolivia		Panama		Gabon		Jamaica		Algeria		Syria	
	Central African Republic		Philippines		Honduras		El Salvador	x	Costa Rica		Egypt	
	Zambia		Congo				Paraguay		Malaysia		Morocco	
							Surinam		Mauritius			
							Mauritania	x				
25 à 44 %	Peru		Iraq				Colombia		Brazil		Cuba	
			Nicaragua				Trinidad and Tobago.		Korea, R. P. D.		Mexico	
			Dominican Republic.				Ecuador		Jordan		Rep. of Korea	
									Iran		Tunisia	
											Turkey	
0 à 24 %							Chile		Argentina		Lebanon	
							Venezuela		Saudi Arabia	x	Libya	
							Uruguay					

(1) The list of countries presented in each classification of this table come from FAO, WFS 96/TECH/1, Table 12 [15].

(2) Including countries for which no information is available.

1.5 - Land Tenure Factors

Studying the global political, social, economic, financial and infrastructural context of the food production of countries with high population growth leads to doubts about the intrinsic efficiency of exogenous factors such as international responses to food insecurity.

Solutions should thus be looked for among endogenous factors, specifically national and especially those which are least costly.

The first solution is to be looked for in the participation of the population in farming activities. This is tending to diminish, on the one hand with the departure of working-age men, and on the other with the departure of working-age youth to the cities in search of work. The role of women is becoming increasingly important in food production, as shown by the FAO in October 1987, during a meeting in Harare, in Zimbabwe [29].

A return to food production by populations is to be sought after with stronger incentives for farming the land, more determined efforts by collective units to invest in the means of production and support for populations wishing to transmit their means of production to their children, which generally means reinforcing the security of land tenure, but also and above all ensuring better access to productive resources.

As stressed in the ICPD 1994 program of action, poverty is both a cause and a consequence of the unequal distribution of land and water resources (see Annex 1.2, paragraph 3.13). This inequality is mainly responsible for food insecurity.

As indicated in the ICPD 1994 plan of action, women's access to production factors (land and water), access to their use and ownership, is greatly hindered (see Annex 1.2, paragraph 3.18). Knowing that the participation of men in agriculture is rather frequently less than that of women within a household, this leads to insecurity of land

tenure, the consequence of which is a reduction in the productivity of agricultural production factors.

As indicated in the ICPD 1994 program of action, migration flows are often a result of factors such as the inequitable distribution of resources useful for development, and the impossibility of gaining access to available land (see Annex 1.2, paragraph 9.1). This led those who drafted the plan of action to recommend that governments wishing to find solutions to rural out-migration should actively support access to ownership onto the use of the land and access to water, especially for families (see Annex 1.2, paragraph 9.6). It would seem that special attention should be given to ensuring access to land for the poorest populations (see Annex 1.2, paragraph 9.8).

The action plan of the World Food Summit (WFS 1996) focused on the importance of sustainable development. In fact, during the summit this was a recurrent theme. The recommendations of the summit also focused greatly on the challenge represented by the pressure of a growing population on natural resources (see Annex 1.7, paragraphs 1 and 2 - see for example Annex 1.7, paragraph 27, paragraph 32 - Objective 3.1, paragraph 36 - Objective 3.5).

The action plan of the World Food Summit insists in a similar manner on the effects of poverty which is responsible for inadequate access to productive resources such as land and water (see Annex 1.7, paragraph 2). It calls for the creation of legal mechanisms to promote land reform and to protect property rights and access to water and for establishing practices which will improve access for the poor and women to natural resources (see Annex 1.7, paragraph 15 - see Annex 1.7, paragraph 19 - Objective 2.1). It insists on establishing and applying legislation for equality of the sexes, ensuring that women have equal access to productive resources such as credit, but also land and water (see Annex 1.7, paragraph 16 - Objective 1.3 - see Annex 1.7, paragraph 15 - see Annex 1.7, paragraph 19 - Objective 2.1).

The World Food Summit Plan of Action urges nations to continue land reform so as to protect access for the poor and women to productive resources (see Annex 1.8, paragraph 15 - Objective 1.2, Annex 1.8, paragraph 19 - Objective 2.1, paragraph 36 - Objective 3.5). These concerns led those who drafted the declaration to refer to another summit, the World Summit for Social Development (Copenhagen, WSSD 1995).

In the same way as the Cairo Program of Action and the Rome Plan of Action, the Declaration of the World Summit for Social Development (Copenhagen WSSD 1995) insists on access to land (Annex n° 1.4, Article 3), on the rights of women to own land (Annex n° 1.4, Article 5), etc.

This declaration also sheds more light than the other two documents recommending measures concerning the land tenure problems confronted by the poorest populations and women, as indicated in Annex 1.5 attached. It proposes a very definite program of measures detailed in paragraph 32. Clearly defined is the need for legal measures facilitating land ownership, improved land rights ensuring land tenure, in other words, the occupation of the land, but also ensuring that men and women should enjoy equal land rights by ensuring fairness in tenant farming and making land transfers more efficient and fair, and adjudicating land disputes (Annex n° 1.5, paragraph n° 32). Thus, an appropriate adaptation of the legislation is proposed which will make it possible to reduce the precarity of land tenure.

Thus, the States having signed the declarations of the three international meetings in Cairo (1994), Copenhagen (1995) and Rome (1996) have reached similar conclusions indicating that changing the structure of land tenure systems is a necessary condition to eliminate poverty and food insecurity linked to poverty. It should also be noted that the unequal distribution of productive resources hinders development. The transformation of agrarian structures therefore is a key element of strategies for rural development.

1.6 - Adapting Land Reform to Population Modes and Structures

Given the urgent problems facing the least developed countries in the world, many of which are experiencing serious food shortages, the United Nations Food and Agriculture Organization has given its Food Security Program top priority.

Given the fact that most of these countries are also experiencing very high population growth and will therefore have to make efforts in agricultural and food production similar to what the green revolution made possible in Asia from 1975 to 1990, given that grain imports will not increase adequately to match the rapid growth of food requirements because of inadequate effective demand, given the fact that these countries will not benefit from biotechnological breakthroughs for another ten or even twenty years, especially because of the lack of research infrastructure but also because of the low level of technical training of their populations, given that emigration will never be enough to provide any real solution to the problems posed in the sending countries but that it will, however, generate big problems in the receiving countries, given the fact that most of the countries concerned by food shortages have experienced serious social unrest or wars during the last fifteen years, given the fact that they fail to realize gains from use of their human resources because of a lack of basic education and lack of technical training, and given the fact that they suffer from serious deficiencies in all of their basic infrastructures, most of these countries will have to change the scale of their development.

These changes in the scale of development must result in particular in substantial productivity gains resulting from the sustainable development of productive resources. This improved productivity can only be generated following a genuine effort in agricultural production on the part of domestic production units. This effort in agricultural production will only be obtained through urgent interventions which should allow improved access to productive resources and therefore a reduction in the precarity of land tenure and greater security of land tenure. Despite the fact that these measures are considered as partial, and will need supplementing with new inputs, new

genetic material, new technology, training, the creation of adequate infrastructures, etc., they remain essential.

In such conditions it is urgent to undertake an examination of the possibilities for *adapting land tenure systems to population modes and structures in countries with high population growth*. This examination will have to be carried out at a local level in extremely varied contexts. It could come in the form of monographs done following the same model, applied to countries suffering from large food deficits, who will have to ensure increases in production similar to those resulting from the green revolution in Asia from 1975 to 1990. These monographs will have to give an account of the effects of modifications in land rights on the agricultural activity of the regions, the domestic units and of the people themselves, as well as on rural development in extremely varied agro-geographical contexts, including in the areas of extensive exploitation of productive resources.

Apart from the modifications affecting the agricultural activity of the populations, these monographs should give an account of changes in the way land is used and in the yields obtained induced by land reform and the increased security of land tenure.

Migration should be taken into account. It should be considered as an endogenous element of the situation and of changes in land rights. In fact, problems of access to the land or pressure on productive resources can result in and be resolved by migration. Migration can also provoke changes in the ways the land is used, or changes in the technological and economic orientation of agricultural production units. Lastly, the situation of non-migrants, especially that of women, can be greatly influenced by the migration of one or more members of a household, concerning the future of the land farmed by the domestic unit. The « migratory » aspect of adaptations of land tenure systems should especially be the object of an in-depth study.

A document providing instructions is included in Annex n° 2.

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II - CICRED and its Cooperation with Research Centres from Developing Countries

Thanks to its network of approximately 700 national population research centers covering nearly all the countries in the world, and its list of more than 100 national research centers for rural development, CICRED is able to provide the only logistical support of its kind in the world for drafting a series of monographs on the proposed subject. This chapter provides information on the objectives, strategies, activities and projects of CICRED.

CICRED is a non-governmental organization founded in 1972, with the objectives of developing cooperation between population research centers and providing a link between international organizations involved in the field of demography - The Population Division, UNFPA, WHO and FAO - and the research centers.

CICRED has a dual status:

- The consultative status of Non-Governmental Organizations included in the list established by the United Nations Economic and Social Council.
- The status of a non-profit organization governed by French law.

The French government's contribution to CICRED is the remuneration of its permanent staff, and provision of the premises and the material means it needs to carry out its missions. These functions are ensured by the Institut National d'Etudes Démographiques (INED), CICRED's host center.

II.1 - The Objectives of CICRED

The four main objectives of the CICRED are as follows:

The first objective is to evaluate the demographic work force of population research centers in different countries and hence, globally.

The second objective is to give a description of the output of this work force in demographic research, following an examination of the research activities of the centers of the different countries in the world during the previous year. Different international institutions have expressed the wish to see CICRED identify the national population research centers or units who could participate in international cooperation for developing certain demographic themes they consider to be priorities.

The third objective is to promote the dissemination and exchange of information among population research centers in the world. This dissemination of information is made possible by the redistribution of demographic information communicated to CICRED by the centers, but also through the organization of thematic meetings of centers (seminars), or regional assemblies of centers.

This information is included in data bases CICRED makes available to the centers in its network, through a review, or the publication of reports on seminars, through establishing a method for the classification of documents (such as the *Thesaurus*), or the information communicated by the centers in response to a proposal to take part in a seminar organized by CICRED, etc.

The fourth objective is to promote cooperation among population research centers of the world. This cooperation involves, for example, the communication of information concerning demographic changes that may have perceptible effects from a political point of view (the triggering of demographic transition, the consequences of an acceleration of the reduction in fertility, the effects of demographic transition on the

status of women, the consequences of high population growth on land pressure and shortages of drinking water, the effects of changes in the age structure, the possible epidemiological effects of international migration, etc.). It involves access to information gathered for shared use. This cooperation results mainly from meetings for the organization of studies, research, or monographs established following the same model, conclusions at supranational levels based on synthesis reports of the programs of action. Thus CICRED hopes to contribute to the effort of transferring towards developing countries demographic studies pertaining to the developing world.

All these objectives are included in the CICRED charter, established in 1972 and amended in 1993, and the objective of which is to promote the cooperation and coordination of national population research activities and to encourage new research (CICRED statutes, Article 2).

II.2 - CICRED Strategy

The strategy developed is that of organizing the cooperation of research units in the world through establishing a network of centers affiliated with CICRED.

In these conditions, the strategy developed presents the following components:

- ***The extension of the network of centers affiliated with CICRED is a first part of the strategy.***

- ***Access to a global view of the research carried out by the centers is a second part of the strategy.***

This global view will make it possible to identify lack of coverage of certain themes and regions and the multiplication or duplication of research for which the utility is doubtful.

- ***Facilitating, through all available means, the communication of demographic information among centers is a third part.***

- ***The organization of meetings of centers around priority themes is a fourth part.***

- ***Encouraging research which is lacking in a given region, or on a given subject is the fifth part, and is an essential element in the strategy.***

- ***The regular and systematic gathering of information by centers on important demographic subjects. This gathering of data, concerning transitions in which demographic phenomena may have serious social and political consequences, is the sixth element.***

II.3 - CICRED Activities

Following the reorganization of CICRED carried out in 1993, the five activities of CICRED are as follows:

First Activity: The circulation of information among centers

Eleven methods for the circulation of information among centers have been established or pursued:

- *Since it was founded CICRED has disseminated summaries of articles from all the demographic journals published in the world in the Review of Population Reviews. The English and French version of this review are on the CICRED web server³.*
- *A directory of population research centers in the world. This directory is constantly updated. All modifications are immediately entered on the demographic information server of CICRED.*
- *A listing of the research programs of the centers. CICRED carries out an evaluation of the demographic work force of its affiliated centers, of the documentation, technical means and computer equipment they have at their disposal, and of the use to which these human and material resources are put through a description of the activities of the centers. This permits enable a description of the research activities carried out by themes, countries, populations and reference dates. This will help to identify any duplication or lack of research at a national level, any innovative research programs deserving support, etc. The development of cooperation among national population research centers requires that each center be well informed about the activities of its counterparts.*

³<http://www.cicred.org>

That is why CICRED is currently conducting a survey on the activities of its member centers. The questionnaire includes 4 forms: the *A form* on which the director of the center describes the center (complete descriptions of all the centers in the world will be made); the *B form* on which the director of each research project describes studies and research (this form is filled out for each activity and this task occupied at least one full time CICRED staff member in 1996); the *C form* which only concerns centers with a library, or documentation department; and a *D form* for centers with computer equipment, even if this equipment is only one personal computer. The initial results will be available at the Conference in Beijing, in October 1997. More detailed results will be available in 1998.

The gathering of the data for this listing is currently under way. It will be constantly updated. Some of the information gathered will be put on CICRED's demographic information server.

- *The creation of a Demographic Information Server.* The CICRED computer has been connected to the INED computer system. On this server centers affiliated with CICRED will be able to consult a presentation of CICRED, *Review of Population Reviews* issues from 1993, *The Directory of Population Research Centers*, the *POPIN Multilingual Thesaurus*, and information on the latest seminar organized by CICRED. All this information is provided in French and English. Consultation of this server has increased exponentially: between November 1995 and April 1996 the server was consulted 1 700 times; between May and October, it was consulted 37 900 times; and there were 97 700 consultations between November 1996 and April 1997. The number of consultations of the listing of centers installed on the server reached 22 400 in March 1997 (400 consultations in March 1996).

- *Access to demographic documents, computer programs and data provided to the centers by the officers in charge of the demographic priority options at CICRED.* This is part of the organization of seminars, regional assemblies or coordinated operations for the circulation of information among centers (drafting of monographs, etc.).

- *The organization of seminars with centers.* It is within this framework that CICRED organized, in February 1996, a meeting on "*Demographic Evaluation of Health Programs*" and in February 1997 a seminar on "*Women and Families: The Evolution in the Status of Women as a Factor and a Consequence of Changes in Family Dynamics*".

- *The organization of regional assemblies* aimed at facilitating the diffusion of the research programs and developing the research projects of centers. It is within this framework that the regional assembly of African centers was held in Addis Ababa in December 1994.

- *The drafting of demographic monographs.* Upon the request of the Food and Agriculture Organization of the United Nations, CICRED coordinated the drafting of a

series of monographs on sub-Saharan countries affected by river blindness (see the CICRED/FAO report: "*Population Dynamics of Rural Areas Freed from Onchocercosis - For Sustainable Development - Presentation of the Results of National Population Surveys (Benin CEFORD, Burkina Faso UERD, Côte d'Ivoire ENSEA, Ghana RIPS, Guinea DNSI, Mali DNSI, Niger DSCN, Senegal DPS, Togo URD)*). With this operation CICRED will have participated in the transfer to developing countries of the results of these surveys carried out by other developing countries. The lack of equipment and of institutional multidisciplinary of these centers has not facilitated this operation. It is important to note that such a transfer of knowledge was made possible thanks to an improved knowledge of the working conditions of these centers in developing Countries and the strict application of conventions.

- *The updating of the POPIN Multilingual Thesaurus.*

- *The organization of an Information System for Centers (ISC).*

- *Providing centers with access to an interactive program for demographic projections which can be used on personal computers.*

Second Activity: An Institutional Relay Between International Organizations and Centers

CICRED is called on to propose certain population research centers to the United Nations agencies when they wish to integrate national population centers within their regional operations. This was the case for example, for the study on the repopulating of the valleys affected by onchocercosis, which required the participation of eleven centers representing the eleven countries involved.

Third Activity: The Support of Activities of Centers

This support can come under three forms:

- The follow-up of research which falls under one of CICRED's seven demographic priority options:

1 - Fertility and the Family.

2 - Mortality and Health Programs.

3 - Urbanization.

4 - Population Aging.

5 - Population and Natural Resources.

6 - International Migration.

7 - Demography, Economics and Rural and Urban Societies.

- Orientation of research through a contracts policy.
- Support for equipping centers with computers.

Fourth Activity: Support for Cooperation Among Centers

This activity can come under two forms:

- Welcoming researchers who are association bureau members.
- The exchange of researchers between centers.

This mission will be effective only when CICRED will have established a subscription fee charged to centers from developed countries. These subscriptions will be used to fulfill this objective and will also be used for orienting research through a contracts policy and for support for equipping centers with computers. The subscription will be charged only when CICRED proposes a product justifying such a fee.

Fifth Activity: Improvement in the International Coverage of the Network of Centers

The number of centers affiliated with CICRED was 225 in 1985, according to the last version of the CICRED directory published in 1985. Eight years later, at the beginning of the reorganization, 180 centers responded to the letter that was sent to them. The number of member centers rose from 260 in 1994, to 502 in 1995, 580 in 1996, and 634 in 1997. The network of centers will soon probably reach its maximum size. From 1993 to 1995, the number of centers affiliated with CICRED increased at least twofold on all the continents of the world. It has increased in much greater proportions in Africa (9 times), where CICRED was formerly very little represented. Likewise, the number of affiliated centers increased 9-fold in Eastern Europe.

80% of the centers affiliated with CICRED correspond with the Committee in English.

38% are located in developed countries (46% in 1985).

47% belong to university structures, 22% to government agencies, 26% belong to several organizations and 6% are international centers.

- CICRED has an exhaustive list of population research centers in the world.

II.4 - CICRED Projects

In 1997 the main activities of the Committee will be the following:

- The publication and distribution of the *Review of Population Reviews*.
- The installation on the CICRED server of earlier issues of the *Review of Population Reviews*.
- The continued updating of the *Directory of Population Research Centers*.
- The automatic transfer onto the CICRED server of the current version of the *Directory of Population Research Centers*.
- The continued gathering of data for the *International Listing of National Population Research* carried out by CICRED member centers.
- The installation on the CICRED server of the *International Listing of National Population Research* carried out by CICRED member centers.
- The reorganization of the *Thesaurus*.
- The installation on the CICRED server (following FAO authorization) of the final document drafted by the centers "*Population Dynamics of the Rural Areas Freed from Onchocercosis - For Sustainable Development - Presentation of the Results of National Population Surveys (Benin CEFORD, Burkina Faso UERD, Côte d'Ivoire ENSEA, Ghana RIPS, Guinea DNSI, Mali DNSI, Niger DSCN, Senegal DPS, Togo URD)*". Thanks to funds from the French Ministry of Cooperation, the report communicated to FAO was completed in 1996 and 1997 and will be published (following FAO authorization) in two versions (English and French).
- The publication of the proceedings of the meeting of centers organized by CICRED on the theme "*Women and Families: The Evolution of the Status of Women as a Factor in and a Consequence of Changes in Family Dynamics*."

- Installation on the CICRED server of a data base composed of data provided by centers who responded to the invitation to take part in the meeting organized by CICRED on the theme "*Women and Families: The Evolution of the Status of Women as a Factor in and a Consequence of Changes in Family Dynamics.*"
- The organization of a seminar on the theme "*Family Planning, Poverty and Fertility Trends*".
- The organization of a regional assembly of African centers on the theme "*Population Research in Africa: What Strategies?*".

The scientific team of CICRED will attempt to transform the meetings of centers which it organized in 1994, 1995 and 1996 and the meetings it will organize in the future, into programs of action, studies, or research, presenting developments under the form of new meetings on the theme and new collaborative publications. This will be the case for the follow-up of the regional Assembly of African centers organized by CICRED in Addis Ababa in 1994, for the follow-up of the meeting in Paris in 1995 on the theme "*Demographic Evaluation of Health Policies*" and for the follow-up of the meeting in Paris in 1996 on the theme "*Women and Families: The Evolution in the Status of Women as a Factor in and a Consequence of Changes in Family Dynamics*".

CICRED is currently working on development of an early warning system for demographic changes which may have important social and political consequences. The seminar organized by CICRED on the evaluation of health programs showed that such evaluations could sometimes be used as early warning systems. The CICRED seminar on "The Evolution of the Status of Women as a Factor in and a Consequence of Changes in Family Dynamics" showed that research of this type could alert the authorities to some of the unexpected consequences of fertility decline. In the same way the monographs on the repopulating of valleys freed from onchocercosis showed that a program to fight river blindness has to be directed towards eradicating the disease in different infected places within a region at the same time, otherwise certain areas if not included in the eradication program could "re-infect" areas which had been

freed from the disease because of migration between the areas. Certain United Nations agencies that wish to make use of the "non-governmental" status of CICRED and of the "non-official" information the committee is able to obtain from its network of centers, have asked CICRED to set up a "monitoring" or "early warning system" by asking the centers in its network to monitor certain "sensitive" demographic changes. This function would come under the form of an annual survey based on a questionnaire sent each year to member centers and in which they would have to give details concerning the origin, nature and technical characteristics of the information communicated. "Monitoring" could pertain to themes such as a beginning or acceleration of a decline in fertility, the unexpected consequences of this fertility decline in the long term, the consequences of population growth on the carrying capacity of land and possible social conflicts that it may bring about, the effects of population growth on water shortages and the possible social conflicts this may cause, etc.

CICRED activities funded by UNFPA were the object of an evaluation which was carried out between 23 April and 6 May 1997. The evaluator stressed the strategic importance of the network of centers affiliated with CICRED for the centers themselves because of the capacity for information exchange among them organized by the committee, but also because of the information capacity of the United Nations system. In fact this network favors an international policy of developing the capacities of the centers, the building of sub-networks specialized in certain themes or geographical areas, and the establishment of an "early warning" system signaling sensitive population dynamics.

II.5 - CICRED Monographs

CICRED has partly based its reputation on the drafting of a series of 56 national demographic monographs published in 1974 within the context of the World Population Year. More recently CICRED re-adopted this strategy upon the request of the Food and Agriculture Organization of the United Nations, coordinating a series of monographs in sub-Saharan African countries which had been affected by river blindness. Ten countries, including Benin and its demographic research center CEFORD, Burkina Faso with UERD, Côte d'Ivoire with ENSEA, Ghana with RIPS, Guinea with DNSI, Mali with DNSI, Niger with DSCN, Senegal with DPS and Togo with URD, prepared monographs on the population dynamics of rural areas freed from onchocercosis and the sustainable development of these areas.

This strategy proved to be appropriate for the following ethical reasons:

- The preparation of these monographs led to cooperation between population research centers able to analyze population censuses and surveys. This preparation work proved to be of great pedagogical value for the centers taking part.
- The preparation of monographs following a set model, the preparatory work sessions bringing together the heads of research from all the countries and, above all, the elaboration of a synthesis report, contributed to an awareness of the diversity of the phenomena being studied.
- The drafting of a synthesis report clearly highlights the benefits of policies reaching further than national boundaries and provides a sample of types of policy responses to the phenomena studied.
- The drafting of these monographs is part of the effort to transfer to developing countries the results of studies of developing countries, which guarantees that solutions chosen are adapted to the context under observation.

In the precise case of the establishment of a series of monographs on the **adaptation of land tenure systems to changes in population modes and structures in countries with high population growth**, other perceptible consequences are to be expected:

- The promotion of cooperation between demographic research centers which are responsible for analyzing censuses and demographic surveys, and centers responsible for analyzing agricultural censuses and surveys is essential in the study of factors of rural development, of rural economic development, for choosing strategies adapted to the land tenure situations encountered in each region and for defining policies to fight against food insecurity in countries with high population growth.
- The diversity of solutions proposed for land tenure problems, according to population modes, structures and population growth that can be extremely different, provides very important information making it possible to optimize the solutions adopted by all the countries in the world, especially by those engaged in the operation.

III - The Charter

III.1 - Reasons for the Charter

whereas the Food and Agriculture Organization of the United Nations has given priority to its food security program because of the urgency of the challenges that face the least developed countries in the world, many of which are suffering from serious food shortages,

whereas due to the young age of the population in the least developed countries of the world, policies for limiting births will not be able to noticeably reduce average population growth from 1995 to 2050 and therefore will not noticeably reduce the food energy needs of these countries,

whereas most of these countries are those with the highest rates of population growth and thus must make efforts to increase agricultural and food production by amounts comparable to those made possible by the green revolution in Asia from 1975 to 1990,

whereas some of the countries concerned by food shortages have experienced serious internal conflicts or wars during the last fifteen years, and peace in certain entire regions of the world may be threatened,

whereas since these countries are insolvent, grain imports will not be sufficient to cover the rapid increase in their food requirements,

whereas it is expected that these countries will not benefit from developments in biotechnology for another ten or even twenty years because of their lack of research infrastructure, and also because of the lack of technical training of their populations,

whereas these countries suffer from insufficient development of their human resources due to a lack of basic education and technical training, since basic education and technical training for a large young population demands investments far greater than they are able to finance,

whereas these countries suffer from serious deficiencies in basic infrastructure of all types, requiring large international funding efforts,

whereas emigration will never be sufficient to provide a real solution to the problems in the sending countries but will be large enough to create serious social problems in the receiving countries,

whereas, because of the rapid increase in their food requirements, most of these countries will have to make a real change in the scale of their development by implementing a more systematic development of their productive resources,

whereas this change of scale presupposes very costly investments at a national level which are unlikely to be covered by the international community, endogenous factors, in other words national factors, will have to be used to develop agriculture,

whereas this change in scale of development may be thwarted in many of these countries by a turning away from food production with men migrating to urban areas, an increased participation of women in agricultural activities, but also with the out-migration of the young,

whereas, contrary to the preceding, increases in productivity will be possible only on condition of increased participation of households in agricultural production,

whereas this increased participation in agricultural production will not be possible unless the insecurity of land tenure is reduced and better access to land is ensured for

women and the poorest populations, both conditions being within the reach of the countries concerned,

whereas these modifications in land tenure systems have been recommended in the program for action of the Cairo conference (ICPD 1994) and the declarations in Copenhagen (WSSD 1995) and Rome (WFS 1996),

whereas population modes, structures and dynamics, in themselves, require adapting land tenure systems, whether it be to maintain, increase, diversify or modify agricultural production and productivity,

whereas, the Committee for International Cooperation in Demographic Research (CICRED) undertakes, as a consequence, at request of the Food and Agriculture Organization of the United Nations (FAO), to assess the possibilities for adapting land tenure systems to population modes and structures in countries with high population growth,

whereas this assessment will give priority to countries whose food energy requirements will increase fastest during the next fifty years,

whereas CICRED and the FAO wish this effort of gathering and analyzing data to be carried out by the research centers of the countries concerned,

III.2 - General Conditions

article n° 1 -

CICRED and the FAO propose to allocate to those countries with serious food shortages and who will be faced with large increases in food requirements between now and 2050 the financial and technical means for the preparation of agro-demographic monographs,

article N° 2 -

these monographs will be drafted following a common procedure (see *III.3 - Procedure for the Preparation of Monographs for Each Geographical Area*), according to the same schedule (see *III.4 - Schedule of Operations*), and the final document will be presented following the same model (see *III.5 - The Outline of the Monographs*)

article n° 3 -

the main objective of the monographs will be to study the possibilities for adapting land tenure systems to the modes, structures and population dynamics of countries with high population growth, with the goal of reinforcing the security of land tenure in order to increase agricultural productivity and food security,

article n° 4 -

a related objective of the monographs will be to study the interrelationships between land tenure systems, agricultural production and population dynamics,

article n° 5 -

the monographs *can only be prepared by countries having at their disposal data from a population census* (or from a demographic survey providing a description of the population), and the heads of research will also need to have data from an agricultural

census (or an agricultural survey permitting a description of agricultural production units),

article n° 6 -

the monographs must be prepared jointly by representatives from two research centers, at least:

- *a national population research center* able to analyze data from a population census or a demographic survey allowing a description of the population, and competent in the study of population dynamics,
- *a national center for rural development* able to analyze data from an agricultural census or an agricultural survey enabling a description of the agricultural production units in the country and competent in land tenure and agro-economic studies at a local level,

article n° 7 -

the national demographic research center must be a member of CICRED,

article n° 8 -

CICRED will choose, if possible among the member centers of its network, the national demographic research or study center which generally analyses the census data of the country or, if this is not the case, a center which usually has access to such data,

article n° 9 -

CICRED will choose, from the list of centers for rural development it has at its disposal, the center which analyses agricultural census data or the country's agricultural surveys, or if not, the center which usually has access to such data,

article n° 10 -

the monographs must include results which suppose an ad hoc treatment of the population census at the level of the individual and an ad hoc treatment of the agricultural census at the level of the agricultural production unit,

article n° 11 -

five different levels of aggregation will be observed: the country, the agricultural region, the study area, the small agricultural region homogeneous (within the study area) in terms of systems of land tenure and agro-economic characteristics, and the collective unit (*see III.3 - Procedure for the preparation of Monographs for each Geographical Area*),

article n° 12 -

the centre for national population research and the centre for national rural development will benefit from a monitoring of the research by a scientific council including, on behalf of the Food and Agriculture Organisation of the United Nations, the coordinator of the unit for land tenure, on behalf of CICRED, Philippe Collomb (agronomist, demographic expert, Ph.D. in Geography), André Quesnel (economist, demographer), Jacques Véron (a graduate in political sciences, demographer, and a specialist on environment and sustainable development issues) and, as an expert, a rural geographer and specialist in geo-referenced analyses (Geographical Information System),

III.3 - Procedure for the preparation of Monographs for each Geographical Area

article n° 13 -

The centre for national population research will appoint a demographic committee in charge of preparing the part of the monograph concerning population,

article n° 14 -

The centre for national rural development studies will set up a land committee in charge of preparing the parts of the monograph concerned with land tenure and agro-economics,

article n° 15 -

the demographic committee and the land committee will jointly examine the procedure for the preparation of the monograph to define a schedule for the work periods and dates for the exchange of intermediate working drafts defining the continuation of the work, within the framework of the global schedule in article n° 61; the precise and detailed aspects of this procedure are explained by the imperative need to obtain results from different countries, agricultural regions, study areas, etc. by the need for a thorough preparation of the arguments for the choice of local study areas, and finally by the heterogeneity of the degree of technical preparation of the centres in the world cooperating in the preparation of the monographs,

Work Carried Out at the National Level,

article n° 16 -

conforming to the procedure for the preparation of the monograph (see Annex n° 3), the demographic and land committees will specify the basic geographical units adopted, which will be aggregated to form the agricultural regions, study areas and the

small agricultural regions which will form these study areas; the two committees will have to adopt the same basic geographical units (note n° 1 of the procedure),

article n° 17 -

the demographic committee will describe the population modes and structures of the country and of its agricultural regions (note n° 4 of the procedure),

article n° 18 -

the demographic committee will estimate the level of fertility and mortality of each agricultural region (note n° 5 of the procedure),

article n° 19 -

the demographic committee will make projections of the population of the country and its agricultural regions for 1995-2050, based on projections made by the Population Division of the United Nations, according to three variants regarding changes in fertility (note n° 6 of the procedure) and by possibly completing them by projections carried out in the country,

article n° 20 -

the demographic committee will prepare a series of national maps showing the agricultural regions of the country classified according to current population pressure, and according to the population pressure which may weigh on productive resources in 2050 (to be introduced in note n° 6 of the procedure),

article n° 21 -

the demographic committee will classify the rural areas of the country distinguishing isolated rural areas, populated areas dispersed along transportation, the continuum of small rural areas around (at greater or lesser distance) urban centres and rural areas around semi-rural agglomerations (to be introduced in note n° 6 of the procedure),

article n° 22 -

the demographic committee will classify the rural and urban areas of the country, distinguishing the areas characterized by large, medium or small flows of out-immigration or in-immigration (to be introduced in note n° 6 of the procedure),

article n° 23 -

the demographic committee will describe the degree of participation of the population of each agricultural region in farming activity (note n° 7 of the procedure, Annex 4.1), and in particular it will make a series of maps describing this activity,

article n° 24 -

the land committee will describe the uses of the land, agricultural outputs and productivity, the distribution of land by size of production units, the farming methods in of the country (note n° 2 of the procedure), and to do so it will use data from the census and existing literature,

article n° 25 -

the land committee will classify systems of land tenure, according to the security of land tenure and according to the length of the plant cycle allowed by the security of land tenure, and distinction will be made among the administrative districts where land is mainly state owned, the districts where mainly large properties are to be found and the districts made up of small properties (to be introduced in note n° 3 of the procedure),

article n° 26 -

the land committee will identify the agricultural regions of the country,

article n° 27 -

the reform committee will describe the changes needed to adapt land tenure systems to the population modes, structures and dynamics of the country (to be introduced in note n° 3 of the procedure),

article n° 28 -

the land committee will draw maps of the areas in which the *lack of security of land tenure* may reduce productivity, and it will have to determine the areas where changing habits or behavior would appear to be useful or even indispensable (to be introduced in note n° 3 of the procedure),

article n° 29 -

the land committee will draw up a list of the obstacles to changing from one land tenure system to another, according to the areas in the country (to be introduced in note n° 3 of the procedure),

article n° 30 -

the demographic and land committees will prepare a map of the areas which are able to market their agricultural produce because of the proximity of urban centres, or because of the existence of transportation infrastructure (to be introduced in the first stage report of the procedure),

article n° 31 -

the demographic and land committees will report on the current situation regarding the adaptation of land tenure systems to population modes, structures and dynamics in the country and its agricultural regions (first stage report),

The Choice of Local Research Areas,

article n° 32 -

the demographic and land committees will establish a list of areas which have already been the object of detailed land studies, as well as a list of areas which have already

been the subject of detailed research on population and population mobility (note n° 8 of the procedure),

article n° 33 -

as far as possible, the demographic and land reform committees will have to choose as study areas, homogeneous geographical and ecological areas and populations

presenting similar socio-cultural habits, behavior with regard to land tenure, ways of occupying land and production methods; the size of the population considered will be decided upon jointly by the demographic committee, the land reform committee and the scientific advisory council designated by CICRED,

article n° 34 -

the demographic committee and the land committee will determine, following their preparatory work, and with the help of existing literature on the agricultural regions of the country, one or two areas which will be the subjects of a detailed study (second stage report),

article n° 35 -

the reasons for the choice will take into account demographic, agro-ecological, sociological and cultural criteria,

demographic criteria:

- rapid population growth,
- increased peri-urban population density
- development of new agricultural settlements,
- high rural-urban migration because of lack of prospects
- a gender imbalance in the agricultural work force (out-migration of men and increased participation of women in agricultural activities),

- an imbalance in the age structure of the population (out-migration of young people),

agro-economic criteria:

- the development of new grazing activities,
- the development of new infrastructure leading to new possibilities for the development of resources,
- a decline in plantation-type economy, which may change the respective rights of landlords and tenants,

socio-cultural criteria:

- younger generations having been salaried no longer bow to the authority of their family or of the head of their family, etc.,

article n° 36 -

priority will be given to areas with rapid growth of population pressure,

article n° 37 -

in every case, the choice of the area to be the object of a detailed study will have to be motivated by a favourable or unfavourable evolution of land tenure security, or by a change in the transmission or the distribution of land, due to demographic changes, to economic development or economic decline, to changes in technical-economic orientations, etc.,

article n° 38 -

the choice of areas in which the study of changes in technical-economic orientations due to modifications of land tenure systems, to the departure of men and/or to inequality in security of land tenure between men and women to the detriment of women, will be encouraged,

article n° 39 -

priority will be given to areas where a longer guarantee of land tenure enables a change in technical-economic orientations and an increase in productivity for the long term,

article n° 40 -

among the guarantees in land tenure which may last a season, a year, two years, or ten or fifteen years, the choice will have to be made in favour of the shortest initial guarantees, and this choice must subsequently enable a study of the conditions for obtaining a longer guarantee and of the consequences for productivity of an increase in the duration of the guarantee of land tenure,

article n° 41 -

in fine, the choice of these research areas will make it possible to report on the effects of land tenure systems on the participation of the population in agricultural activities as well as on the productivity of main crop and livestock activities in varying agro-geographic contexts, including in areas of extensive exploitation of productive resources,

article n° 42 -

in fine, the choice of these study areas will make it easier to examine changes in the way the land is used, the increased productivity brought about by changing agrarian structures and by increased security of land tenure,

article n° 43 -

in fine, the choice of these study areas will facilitate to examination of the effects of migration in order to evaluate the following phenomena:

- problems of access to land or pressure on productive resources can result in or be resolved by migration,

- migration can provoke changes in the way land is used, or changes in the technical-economic orientation of production units,
- the condition of non-migrants, especially that of women, can be greatly influenced by the migration of one or more members of a household, according to the prospects concerning the land being farmed by the household,
- migration is also important as an element bringing about a change in the exploitation of land and water resources and perhaps, as a consequence, a change in systems of land tenure,

article n° 44 -

to sum up, the areas presenting constraining systems most frequently observed in the country in terms of land tenure will be selected, and priority will be given to homogeneous areas from a land tenure point of view which may possibly be heterogeneous from a population point of view,

article n° 45 -

the choice of areas justifying a local study will have to be approved by CICRED and the FAO,

Work Conducted at the Regional Level,

article n° 46 -

the land committee will divide the geographical area of each study zone into small agricultural regions (note n° 9 of the procedure),

article n° 47 -

the land committee will describe the size, degree of fragmentation, and the geographic dispersion of the domestic production units in each study area,

article n° 48 -

the land committee will give a description of land tenure security and details of constraints which can prevent adaptation of land tenure systems, as well as conditions for access to land, in taking care to reinstate the internal diversity within each study area (note n° 10 of the procedure),

article 49 -

the demographic committee will define the extent of participation in agricultural activities by the population of the study areas (note n°13 of the procedure Annex 4.2)

article 50 -

the demographic committee will examine the geographic distribution of ethnic groups living in each small region of each research area included in the study (note n° 12 of the procedure),

article n° 51 -

the demographic committee will describe the population modes, structures and dynamics for each of the small regions of each research area (note n° 11 of the procedure),

article n° 52 -

the demographic committee and the land committee will describe modifications in the land tenure systems compatible with the population modes, structures and dynamics of each research area (third stage report),

The Synthesis and the Qualitative Survey,

article n° 53 -

the demographic and land committees will establish, if necessary with the help of qualitative survey, the possible effects of changes in land tenure systems on agricultural productivity within each survey area (note n° 15 of the procedure), the

survey sample will be jointly defined by the demographic committee, the land committee and the scientific advisory council appointed by CICRED,

article n° 54 -

the demographic and land committees will evaluate, if necessary with the help of a qualitative study, the degree of acceptance of the local communities and their representatives within each study area regarding the changes in the land tenure systems already implemented or proposed by the different public authorities (note n° 16 of the procedure),

article n° 55 -

the demographic and land committees will evaluate the impact of the proposed changes in the land tenure systems and of the increases in productivity which these changes could generate, and the impact on the carrying capacity of the lands in each area (note n° 17 of the procedure),

article n° 56 -

the demographic and land committees will mention possible dilemmas which may have become apparent during this study because of the potential impossibility of adapting land tenure systems in certain cases (note n° 18 of the procedure),

article n° 57 -

in fine, the demographic committee and the land committee will give details of their proposals, their opinion on the feasibility of the changes in the land tenure systems proposed by the different local, national and international authorities and their visions concerning the probable changes in the study areas in the coming decades (fourth stage report),

article n° 58 -

the demographic and land committees will draft a synthesis report of the research work carried out and of the results obtained; this synthesis will serve as a national monograph (final report)

article n° 59 -

this monograph will be jointly evaluated by the demographic centre, the centre for rural development, CICRED and the FAO,

article n° 60 -

this monograph will be published,

III.4 - Schedule of Operations

article n° 61 -

each monograph will require 18 months to prepare,

during an initial period of 3 months, the national demographic research centre will be identified, the rural development centre will be identified, an initial search for available sources will be made, an examination of work carried out and a provisional report at the national level will be made,

during the second period, lasting 5 months, national and regional data will be examined, then the research site or area(s) will be chosen, an initial scouting of the terrain and the production of the first stage report at the national level and of a second stage report presenting a choice of the research area(s) will be done,

during the third period, lasting 5 months, the area or areas chosen will be studied, and if the data allow, a Geographical Information System may be set up, the data will be analysed and a third stage report will be produced,

during the fourth period, lasting 3 months, a qualitative survey will be conducted, and the fourth stage report and the final report the monograph will be drafted,

finally, during the fifth period, lasting 2 months, the monograph will be presented to a group of experts appointed by CICRED and the FAO and will be modified according to the experts' recommendations to become the final version of the document,

III.5 - The Outline of the Monographs

article n° 62 -

determining the outline of the monograph is left up to those who will draft it; however, a proposed outline is included in Annex n° 5,

article n° 63 -

the contents of the monograph will present the substance of the notes and the stage reports in substance.