

PN-AAM-237  
152-156-98

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# ISLAMIC REPUBLIC OF MAURITANIA

**Honor — Fraternity — Justice**

**Ministry of Economy and Finance**

**Directorate of Studies and  
Programming**

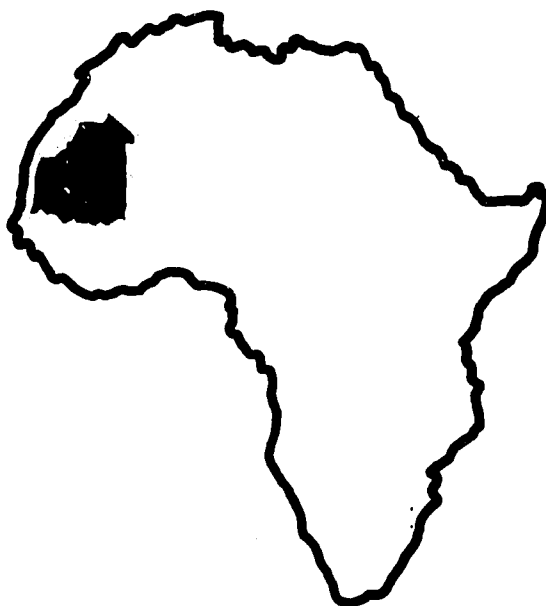
## RAMS PROJECT

**Rural Assessment and Manpower Surveys**

Consolidated Statement on Overall  
Development Strategies

OP-1

July 1981



Financed by the U.S. Agency for International Development (USAID)

With the cooperation of:

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I. Introduction and Purpose

The basic agreement between the USAID and the Government of the Islamic Republic of Mauritania (GIRM) that established the RAMS project called for the "preparation of at least two alternative development strategies and related policy and program options with regard to integrated development of the rural sector and the amelioration of employment and manpower problems in Mauritania, taking into account equity, and benefit considerations as well as production."<sup>1/</sup>

Bearing this charter in mind, RAMS with its Phase I operation produced 30 basic data and analysis papers covering various detailed aspects of the economy and social structure. A list of these studies is appended. A statistical compendium and a narrative synthesis of these reports also have been prepared.

From this information and other available sources RAMS has prepared seven "second level" or Phase II, papers.

These papers represent a consolidation and abbreviation of what was initially proposed as a series of 18 policy option papers. Of this total, 13 were conceived of as flowing directly from the sub-sector production studies, i.e., various elements of the rural sector; 3 rural health, rural diets and the implementation of modalities (sociological aspects) were to proceed from the functional studies; the employment and manpower studies were to generate two more; and additional evaluations were to lead to the remaining three papers on environment, the private sector and governmental organizational arrangements; 5 other policy papers, flowing in general from the Phase I studies, included options for marketing, training, food pricing, agricultural research and the establishment of project priorities.

The consolidation into seven papers has focused the scope more specifically on rural production and manpower, and has added the dimension of basic human needs. To cover the most important elements of the latter, an option paper on public health including nutrition has been retained.

The seven papers can be conceived of as either concerned with "methodology", or ways of putting into perspective certain specific development options or dealing with defined areas of economic activity. Three papers fall under the first category and four under the second. One of the latter, on employment, involves some of both.

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<sup>1/</sup> AID Project Grant Agreement of March 28, 1978.

The most comprehensive of the methodological papers deals with overall macro economic relationships and develops a simulation model in which rural production can be related to the performance of the entire economy and relationships between the various sectors can be postulated. The model is a useful mechanism for tracing the ways by which the various financial accounts, such as the national budget and the balance of payments, relate to and affect the resources available for development. It is a model which, in addition to highlighting important relationships, also is used to demonstrate certain cautions and limitations that must be observed, or in other ways compensated for, if development is to proceed in a rational, productive, self-perpetuating manner.

The model is directed toward illuminating the inter-relationships of the overall financial parameters. It is not designed to provide guidance or to highlight relationships of the decision-making process at the individual investment level. The second methodological paper, on the other hand, attempts to analyze the production function (GDP or value added) for the rural sector through a simplified input-output analysis that starts with the individual crop production levels and is aggregated to sector GDP. This approach also includes alternative rainfall/investment/output relationships which are not a part of the general macro-simulation model. Variations in the effectiveness of investment in increasing output due to changing rainfall patterns are extremely important for certain aspects of the rural sector. These differences are discussed in Section IV below.

The approach to Basic Human Needs (BHN) is grouped with the "methodological" papers in the sense that it is not a separate program per se but rather an equity consideration and a set of minimum standards applicable to all sectors. The macro simulation model also addresses the BHN issue but not at the same level of detail. For example, in total it postulates a minimum cost required to meet BHN for the entire economy and derives a formula to relate meeting this cost to total output. The issues of composition of BHN by type of services and individual versus collectively provided and financed services are not easily discussed in the macro model approach. Consideration in any detail of the characteristics of the recipients does not lend itself to this analysis. Lastly, there are implied assumptions regarding income distribution in the macro model which require more specific treatment. The separate paper on BHN discusses the concept and the inter-relation between growth and equity, as well as the individual components of BHN and the manner in which they are provided.

The four sector or sub-sector studies, including manpower and employment, put more emphasis on development options and less on devising methodology. The implications of a continuation of present policies is examined and contrasted with what would require to meet the maximum option such as meat and grain self-sufficiency, health care for all by the year 2000

and full employment. Between these two extremes more readily attainable but still ambitious alternatives are postulated leading toward the maximum higher goal alternatives. The macro paper presents some development options, but these are more in the nature of indicating how the model works rather than providing specific choices of policy. The policy choices set forth in the macro paper are guided by the financial constraints of alternatively following what appears to be responsible courses of action or less responsible courses, presumably Hobson's choice.

Of the four sectoral papers, two deal with the rural area. The first treats the major focus of RAMS, rural production. Rural is defined as agriculture, livestock and fisheries (excluding industrial maritime). The intermediate step of semi-industrial fisheries is included in rural as a next step beyond the level of artisan-fisheries. A second paper is a companion piece to rural production and presents in some detail options for the development of rural support services, such as research and extension.

As an illustration of a major aspect of BHN an option paper has been prepared for the development of public health services. These services are designed to be nationwide and therefore in principle should have a heavy rural emphasis. Unfortunately, as the paper demonstrates, the present situation is characterized by having all but informal, traditional services located in urban areas. This study, like the others, presents options, but here also shown as stages of intensity and comprehensiveness in a sequential effort that could guide the GIRM in advancing from one level of service and development to the next in 5-year stages.

The final paper deals with manpower and employment and relates particularly to the three sectoral options papers. The methodology employed is compatible with the macro simulation model. The study concerns itself with the supply side as related to employment and population disaggregated by type and area. Productivity issues are addressed in general and specifically relating to questions raised in the rural institutional support and public health papers. Demand consideration options obtained from the rural production paper and for the rest of the economy are consistent with the assumptions in the macro simulation model. Consideration is also given to the fact that while manpower can be analyzed as a principal factor of production in designing output strategies, employment in and of itself is a development goal. The issues that need to be considered in that context are reviewed in relation to production objectives.

In total, the seven papers consolidate the content originally envisioned in the 18 papers. At the same time, it should be noted that some of the Phase I studies, especially those on the formal and non-formal education sectors, went further than initially anticipated and contain national options for development, even if not labeled as such. In addition, the project

identification papers, prepared as a follow-on to the Phase I studies, constitute a de facto, if not explicit, presentation of limited options. This is particularly true for environmental issues such as reducing desertification for which, under the consolidation no specific option paper was prepared. An option paper for reducing sociological constraints (implementation modalities) has not specifically been prepared, though these constraints and the need to ameliorate them are discussed in the various papers. Oasis agriculture is treated along with irrigated and rainfed agriculture in the rural production paper. A substantial portion of what was intended under appropriate organizational arrangement is included in rural institutional support.

Certain subjects are omitted or given less emphasis in the Phase II redesign, such as the utilization of the private sector, food marketing and food pricing. Lastly, the establishment of project priorities, which was to be the 19th paper designed to provide the options for overall development strategies (paths), is included as Section VII below.

In developing the options as expressed in projections of output through-the-year 2000, the perceived constraints to production, largely derived from the Phase I studies, are made explicit. To the extent data and analysis are sufficient, indications are given as to how constraints may be overcome. As a minimum, they are listed as problems requiring further investigation to achieve workable solutions. Such a list of constraints is depicted in relation to an enumeration of the factors of production and the problem of combining them to derive output.

In projecting the various options, it has been essential to proceed from more specific data of the more immediate period to a longer range, less predictable future. The projections for the period 1981-85 are geared to the Fourth Five-Year Development Plan. It is understood that this period will be one of orientation, transition and adjustment, as Mauritania emerges from the effects of the years of drought and recovers from its involvement in the Sahara war. This will require budgetary restraint, sectoral balance, reordering priorities to meet more realistic goals and devising strategies to achieve them.

A substantial amount of capital investment for relatively large projects has been programmed and funded during the Third Plan period. Disbursements have begun on a number of these and experience gained as to their applicability to Mauritania and difficulties of implementation. Thus, there is a momentum carried over from previous development activities that will have to be overcome cautiously.

This is not to say that the period of 1981-85 will or should be a period of relative inaction while reflecting over alternative approaches to development. Rather it will be a period concerned with (a) following through expeditiously on projects large and small that have started and warrant completion, (b) seeking ways (actions) and pursuing them to remove or lessen constraints to development, and (c) undertaking, as conditions and resources permit, a well-orchestrated series of smaller projects designed to promote development goals. Obviously, data collection, analysis and planning will continue concurrently to improve performance during the near term, as well as to prepare for the ensuing periods of the Plan.

The initial goal for the RAMS study to produce several alternative paths for Mauritanian Government review has evolved as the work has developed, resources and information have become available, and discussions with the government have progressed. Instead of "either-or" options of possible equal merit, comparisons have been developed between continuing present policy and level of activity, on the one hand, and pursuing the maximum results or goals of the Government, on the other. Options have also been developed for suggested, presumably reasonable though still ambitious, middle goals. In some cases, specific suggestions have been made for variations of the middle ground. The same methodology can be applied to project more or less ambitious results by varying the inputs and/or changing the assumptions about the relationships that underlie the projections.

It should be emphasized that RAMS is presenting options for consideration in choosing development strategies. It is not making recommendations. The objective is to help the GIRM shape its evaluation of development alternatives and ascertain the consequences of these choices. The GIRM clearly is the final arbiter of the choices.

The key factors in the projections are the various relationships that are explicitly postulated throughout the option papers and constraints that are noted. In a number of cases quite heroic assumptions had to be made based on a minimum of experience and restricted data. If the RAMS options and the projections set forth are to be instrumental in designing courses of action for the Fourth Plan, then these assumptions and key relationships must be subjected to further scrutiny.



## II. The Setting for Development

The development potential in Mauritania is based on a limited and extremely fragile resource base, and the problems to be resolved are indeed difficult and persistent. This is borne out in various RAMS studies as well as reports by international organizations such as the IMF and the IBRD, and most importantly as recognized by the Mauritanian Government itself<sup>2/</sup>. There is no short-range solution to the basic development problems confronting Mauritania. There is, however, an immediate need to accelerate the process by which appropriate long-range policies and programs are set in motion. The preparation of the Fourth Five-Year Plan is an essential step within this process. Long-range goals for the year 2000 are being formulated, while specific plans for the immediate transition period are being carried out and further refined in order to enable progress toward a greater degree of self-sustained growth, economic independence, and improved equity.

Prior to independence a workable equilibrium was self-sustained by having a traditional rural economy that provided for most of its own basic needs, albeit at an austere level, coupled with a far smaller, less demanding urban sector than at present. The rural sector consumed a substantial portion of its own output. Largely unrecorded movements of cattle to neighboring areas (now countries) following seasonal migration patterns financed the acquisition of imported items. Limited export earnings were obtained from the production of gum arabic. Independence accelerated a number of trends which disturbed this equilibrium. In addition, a severe drought struck the country, and disadvantageous movements in world prices greatly exacerbated the difficulties of the emerging nation.

Since the services of the colonial government were so limited and its reach outside of the small commercial sector so minimal, only the rudiments of a trained administration were in place to launch the new nation at the time of independence. Perhaps less investment for future nationhood was made in Mauritania than in any other colony. Independence brought the requirement to establish a functioning government, despite the lack of trained manpower in all relevant fields. As the capital, Nouakchott, and the mining and shipping centers, F'Derick and Nouadhibou, grew, there was also a rise in the demand for government services of the sort that all independent governments are obliged to provide. The various services were established and employment and urban concentration increased. This constituted a magnet for additional migration to the expanding urban areas. Given the limited physical infrastructure and limited manpower base, the few social services were almost exclusively restricted to these urban areas.

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<sup>2/</sup> Ministry of Economic and Finance, Socio-Economic Situation of Mauritania. April, 1981.

Unfortunately, the growth of the modern sector did not bring with it a corresponding growth in production of the sort that either earned foreign exchange or saved it by virtue of import substitution. To the contrary, the demands for exchange markedly increased for a wide variety of consumption items not previously demanded by the traditional sector. While there were several attempts to invest in enterprises that were designed to contribute to foreign exchange availabilities, such as the sugar and petroleum refineries, these projects have not, thus far, worked out as anticipated. They have, in fact, been a drain on foreign exchange resources, though there are still official hopes that in the longer run they will benefit the nation.

Territorial claims to the abandoned former Spanish Sahara embroiled Mauritania in the armed conflict that eventually erupted to the north. The economic impact on the country's resources were dramatic. Additional domestic and foreign exchange expenses were required to strengthen Mauritania's armed forces, and the conflict disrupted Mauritania's iron ore mining operations, its single most important source of foreign exchange earnings .

Within the second decade after independence, other external factors adversely affected Mauritania's development prospects as well. Oil prices began their monumental rise, and the world-wide economic downturn reduced the demand and prices for the products of its mines.

In the rural sector two events conspired to make the development possibilities more difficult. The principal disruptive factor was the severe Sahel drought that began in 1968 and did not run its course until 1977. Despite the fragile ecological balance that characterizes the Sahelian countries, the area had survived droughts in the past - in the 1940's for example - but with smaller human and animal populations to maintain and adapt to harsher surroundings. It would appear that there was more over-grazing in the 1968-74 period than had previously occurred and, therefore, more irreversible damage was done to the pasture land. Ironically, improvements in animal health due to the introduction of more modern veterinary medicine may have contributed to over-production and over-grazing. Land was lost to the desert that probably will not be recovered. This contributed to increased rural-urban population movement. Prior to the latest drought, migration to urban areas had not been thought of as an alternative to rural misery because urban areas in Mauritania hardly existed. The small regional administrative towns did not offer services to maintain displaced rural people.

In both the rural and urban sectors the relation between food supplies and population has been exacerbated by demographic factors. Mauritania is in the classic situation where the death rate is beginning to fall because of greater availability of limited medical services, while the development process has not proceeded to the point where the natural birth rate begins to decline of its own accord as the population gains a more modern outlook and alternatives to unlimited child-bearing are perceived. A population growth rate, currently estimated level at 2.5%, produces a doubling of the population every 28 years and a lowering of the average age of the population in a way that significantly increases the dependency ratio.

Urban migration negatively affects rural production. It is the people of child-bearing age who move to the urban areas where health facilities are more readily available. This enhances population growth. Meanwhile, back on the farm it is primarily the elderly, the young, and the women who are left to cope with the agricultural tasks. Under these circumstances, productivity declines.

The demographic problem is likely to become more severe before it improves. The death rate most likely will decline further, before overall economic development produces a natural decline in the birth rate. Only outward migration is likely to affect this balance in the near future. Whether or not this would be beneficial depends upon who is left behind to be supported by dwindling per capita resources.

The affect of this combination of difficult circumstances and the problem it presents for development can be observed from a comparison of food production and population in 1960 and 1979. The two were roughly in balance in 1960 and foreign exchange was available to finance consumption plus development requirements with concessional foreign assistance as an added resource. Now, there is a food gap which can not be covered by existing foreign exchange earnings. Since only about 20% of cereal needs are met from domestic production, a portion of the aid provided by external donors must be used to meet basic nutritional requirements, leaving a smaller residual to finance other consumption requirements plus development needs. The problem is further compounded by the fact that previous borrowing on both concessional and commercial terms has now begun to constitute a very significant call on existing foreign exchange earnings, and their very size has the potential of discouraging further assistance.

The seriousness of the demographic problem is also brought out by an examination of the employment/manpower situation. Calculations indicate that there are now approximately 70,000 unemployed concentrated in the "modern" sector, and 400,000 new jobs will have to be created by the end of the century. The rural-urban movement

brings into focus the disguised under-employment that has always prevailed in the rural areas and becomes more obvious when transported to bidonvilles. With a view toward economic growth and urban employment, the the government made or encouraged a number of investments designed to modernize the economy by developing the mining and industrial sectors. Although mining ventures and the private commercial and small industry sectors provided jobs for thousands, many of the industrial ventures were unproductive. In any case, these activities are not labor intensive and their contribution to relieving unemployment was minimal, dramatizing the fact that seeking growth does not automatically mean mass employment or equitable sharing of the economic benefits.

In total, the development task facing Mauritania is very difficult and urgent. An improvement in the situation will require a political will, perseverance, planning and management skills that are not easy to obtain and maintain.

Mauritania has a professed goal of achieving greater economic independence. This in effect means reversing the trend toward increasing dependence on foreign financing that started when political independence was achieved. It also underscores need to reverse, or at least slow down, the rate of rural-urban migration, which increases the import bill for food. Previous five-year plans have announced this objective, but programs that would increase rural production and income have not been easy to mount. A case on point is the attempt to expand the lands under irrigation. The Third Five-Year Plan (1976-1980) called for the development of a capacity by the government (SONADER) to add 3,000 ha. per year by 1980. In fact, only 1,700 ha. were added by the public sector plus another 1,100 ha. by private efforts in the 1976-1980 four year period.

Ironically, since these disquieting trends leading to increased economic dependence were not discerned at the time of political independence, Mauritania was then perceived as a country with a food consumption/production balance that would enable it to use its iron and copper ores, then commanding relatively high prices to modernize in ways its seemingly less fortunate neighbors were not able to do.

Because of the various factors noted above, coupled with a late recognition of the basic development problems, Mauritania has had to go through a difficult adjustment period prior to confronting directly the task of increasing output, promoting long-term self-sustaining growth and addressing the basic human needs of its population.

The adjustment is still going on. The Mauritanian Government on its own and with the help of the IMF and the international community has undertaken a number of significant actions. Hence, the process of gearing up for development has already begun.

A major step in freeing its resources for development purposes occurred in 1978 when Mauritania removed itself from the armed struggle to the north. A second factor has been the negotiation and the recent renegotiation with the IMF of a standby agreement. This action not only makes available certain financial resources from the IMF but also commits the government to a reasonable but still stringent program of fiscal and monetary policy reform as well as balance of payments restraint, while also freeing resources for productive investment. Considerable relief was obtained recently through debt renegotiations with the major creditors.

An important study and specific recommendations have been made for new investments in the mining sector, designed to maintain this principal source of foreign exchange. Unfortunately, the prices of mining equipment and machinery continue to rise as world-wide inflation continues, while depressed iron ore prices reflect the world-wide recession. The GIRM doubtless will continue to review its investment decisions in this area to assure their economic viability. There may, however, be no other immediate option to follow than the present course. Funds to finance the modernization of the mining sector are almost all committed from foreign sources and are in the process of disbursement.

There are also some infrastructure investments in irrigation and public works which are partially completed with the longer-run potential to facilitate increased rural production. Concurrently, there has been an interest in increasing governmental planning and administrative competence at the regional level and in providing decentralized authority to better carry out country-wide programs. RAMS has participated in some of the initial efforts in this regard. There is a great deal more to be done if there is to be effective local administrative competence and community organization geared to development objectives.

In addition to the task of planning for effective financial and economic management, there are a host of problems to solve related to organizational and human management that are part of the development equation. The best laid plans will count for little unless they are accompanied by measures to maximize the performance of the human factors. These are particularly vexing problems in Mauritania's case where both government administrative and private organization are little evolved from what they were before independence. They clearly need to be strengthened and motivated to play their roles in rural development on the scale called for by the government's objectives.

A large element of the government organization problem is how to organize government services, particularly in rural areas, for them to gain acceptance, understanding and relevance by the people. The expense of making such services available on a wide spread basis will indeed be substantial and difficult to carry out. If these services are not of adequate quality and understood, and provided in a way that people will accept, then the investment and effort that goes into them will be largely wasted.

Designing appropriate and relevant interventions is not an easy task in the traditional and geographically dispersed society and requires skills not easily found and cultivated. The seemingly similar solutions of other countries are not easily adapted in a relevant manner. Unless care is taken, the establishment of new private and parastatal services may only lead to increased employment in the service industries, located primarily in the urban centers, rather than the provision of needed and useful services to enhance national welfare and improve equity. They become a claim on scarce financial resources rather than the basis for improving the quality of human resources.

The formidable tasks facing the Mauritanian Government are clear. The purpose of RAMS' Option Papers is to outline various scenarios for the government's review as it decides on its development strategy for the immediate and longer-term period ahead.

### III Methodology For Reviewing and Evaluating Mauritania's Growth Options

In the period since independence, it would appear that little detailed and systematic strategy has been followed by the GIRM in pursuing its economic and social development. There have been three Five-Year Plans and a fourth is now under preparation. These Plans have specified general objectives such as increasing production, particularly in rural areas, and small industry, extending social services, increasing equity, as well as lessening dependence on external financing. They have also contained listings of specific project activities and spending intentions. The Plans, however, have not contained strategies for development that facilitated projections into the future, analysis of the restraints to be tackled, or indicated in any detail the priorities to be followed when choices have had to be made. No meaningful evaluation of the consequences of possible or likely courses of action has been prepared.

As a result of these deficiencies, what may have been good intentions in the development field as expressed in the successive editions of the Plan have been overtaken by events which have led to almost contrary results. Measured in terms of food self-sufficiency and dependency on external support, the situation of the country has seriously deteriorated. Since independence, agricultural productivity has notably declined and production as well. While there has been a substantial rural to urban movement, output in the urban sector (other than government services largely measured by government expenditures), has not markedly increased. Such services have not reached the rural areas in any significant manner.

Government expenditures for infrastructure have included some rural irrigation and road building activities, but even these have been over-shadowed by allocations for mining and port development. It is doubtful that the equity situation has improved. In 1978, an estimated 75-80% of the population were dependent on agriculture which, according to the IMF report,<sup>3/</sup> accounted for 23% of GDP. The rural sector constituted an estimated 65% of GDP in 1960, at the time of independence. While there are no precise figures on employment in prior years, indications are that the percentage engaged in agriculture was not very much higher in the earlier period. The implication is that in the rural area, which was already the sector with the lowest per capita income, per capita income has declined further.

It is recognized that a part of the disappointing performance is due to external factors such as the severe drought, international price movement and the Sahara conflict. Even so, there were actions the Mauritanian Government could have taken to lessen their impact, if there had been a systematic way of continually reviewing and planning development strategies, as well as taking the more immediate operational actions of implementation and adjustment. It could be argued that the very existence of such potentially significant disruptive forces required even greater awareness and preparation.

The one reasonably consistent policy has been the priority and emphasis given to the mining sector and, to a lesser extent, to the development of commercial fisheries in order to maintain the main sources of foreign exchange earnings. This has, no doubt, been essential though the degree to which the general population, particularly the rural 80%, has benefited is questionable.

As an initial step in facilitating the process by which the potential consequences of actions taken in the development field are projected and, hence, to establish the national priorities necessary to meet objectives, a macro economic simulation has been outlined as an illustration of how these issues could be approached.

3/ IMF Report on Mauritania (SM/80/91) of April 11, 1980.

This model is designed and presented in a way that highlights the macro financial constraints to development; not that these are intrinsically more significant for development than, say, social or ecological constraints. They are, however, critical areas of overall government management for which policy is essential. Guidelines need to be established and decisions taken to formulate the framework within which decisions regarding social organization and investments are made.

Once this optic and its inter-relationships with the macro financial parameters are determined, subsequent review and ordering of priorities can be brought to bear on how other kinds of concerns can be tackled. Other RAMS papers indicate how investment decisions in the rural sector can be more systematically evaluated and the components of production better aggregated in estimating rural GDP. The separate review of Basic Human Needs and their relation to growth options is a further expansion of a systematic consideration of Mauritania's development pattern in terms of national objectives. The employment Option Paper provides an added dimension both in terms of resource utilization as well as meeting employment and equity goals.

The major purpose of the macro simulation model is to demonstrate mathematically that these financial variables can have a significant effect on growth and the resources available for growth. It is a methodology for testing the effects and, hence, reasonableness of policies in the areas designated by the variables. This is done both by examining the past and projecting the future.

Consideration of the model and its components should provide a set of guidelines by which policy options can be examined for reasonableness and prudence, as well as the likelihood of stimulating growth. As is noted in the discussion of the model, actual specific investment decisions which will, in fact, produce the growth will have to be based on specific information that goes beyond the intended level of detail of the model. Consideration of the model only provides the guidelines within which such individual decisions are made.

The basic building blocks of the growth model are:

- a. The definition of sectoral and sub-sectoral growth areas. The universe is divided into five sectors: traditional, industrial, construction and public works, transport, commerce and services, and government services. The traditional sector (rural) is divided into four sub-sectors and industry into three. The total value added of these sectors equals GDP at factor cost.



- b. The growth of the sector is a function of the amount of investment made in each sector. If capital input/value added ratios (ICROs) can be estimated for each sector, then total GDP can be estimated. If assumptions are made regarding the distribution of capital between sectors, then total capital requirements can be estimated to produce a given growth rate. Conversely, if the growth rates are set, capital investment requirements can be obtained.
- c. Going one step higher in aggregation, if this gross investment (both public and private) is added to total consumption (both public and private), then gross domestic expenditures (GDE) can be estimated.
- d. The next step is achieved by subtracting GDP, the amount of GDE that can be financed from domestic resources. The resulting amount is the resource gap, the total of expenditures that can not be met from domestic sources and is financed by foreign donations and loans.

These are the elements of the simplified growth equation. Presented in this fashion, one can separate various financial constraints to growth; factors that must be considered in designing a public consumption and investment policy and the encouragement or restraint placed in the private sector in its spending. They can be viewed as obstacles to be overcome or ameliorated over time. Policy-makers must be aware of these factors. Creation of this awareness is the main purpose of developing this methodology.

The result of the equation is the identification of the resource gap, the difference between what one needs to live with plus what is required to promote growth and what one has. The question arises how does one keep this gap within reasonable bounds, finance it and diminish its importance, and, hence, its constraining effect over time? This can be considered in various aspects:

- a) The Budget Deficit. Solely on the consumption side, there is a tendency in most developing countries for expenditures to out-run revenue. Prices increase as a result of world-wide inflationary trends and domestic bottlenecks. Awareness of the

modern world without necessarily joining it generates requirements at a more than arithmetic pace. Rural-urban migration highlights the needs for increased government services and usually swells government employment without necessarily increasing output, except as arbitrarily measured at factor cost. Revenues, on the other hand, are concentrated in the commercial sector and are often generated from exports where the desire to further their growth competes with immediate revenue needs. Traditional privilege may make difficult the collection of domestic taxes on wealth (land and cattle herds) and income. Tax administration may not be highly developed. Except, for special prestigious projects, the capital (or investment) budget may be largely a residual item, particularly if there are high military budgetary requirements. Funds for the maintenance of the existing capital stock also may receive inadequate priority, leading to disinvestments.

In general, making money available for public investment from the budget is difficult. What so often happens is that public investment is made from funds provided by international donors since they are willing to give monies only for such purposes. Grants or concessional loans are usually for infrastructure projects whose effect on production and earning potential is long-range, perhaps well off in the future, if the investment is for services such as schools and health facilities, and less so if it is for roads and irrigation.

If a government deficit is incurred to finance current expenditures (consumption), then the first call on foreign loans and grants will be for this consumption, thereby lowering the amounts available for investment. If foreign suppliers' credits are used to finance the seemingly more immediately productive investments, care must be taken to insure that (a) the higher loan terms in fact offset the longer pay-off of loans from international or bilateral agencies, and (b) the investments are well chosen.

Overall, self-imposed budgetary restraints will have to be observed if long-term growth is to be realistically planned. How much of an austerity program a government, an economy, a society wishes to attempt is obviously a sovereign decision. This model, in a simplified, but dramatic way helps view the options and their likely financial consequences.

- b) Balance of Payments. The same type of problems can be viewed from the balance of payments perspective. The gap in the balance on current account is largely financed by foreign loans and grants. If imports are allowed to rise unchecked and exports grow less rapidly, there is a greater requirement for external support. If a major portion of such external support is financed from loans year after year, there is a danger that the debt service requirement can (i) consume a substantial portion of the foreign currencies obtainable, and, therefore, decrease the amounts available for either current consumption or investment, and (ii) scare off or discourage potential lenders and donors in the future, by the nature of its size and proportion.

Hence, the government is presented with another way of observing danger signals, i.e., a growing negative balance of payments forebodes the need to better restrain imports and encourage exports within the limits available. International price factors outside of the government's control may be a major element. Foreign exchange policies and actions, such as devaluation, are not a part of this model though, under certain circumstances, these measures would be appropriate. An important factor could be the terms under which foreign assistance is available, the rate of interest and associated terms, as well as the loan/grant mix. The balance of payments accounting system allows the planners to be aware of potential dangers and make appropriate decisions to minimize adverse conditions and maximize the affect of favorable factors.

- c) Debt Service Ratio. (interest and principal payments as a percentage of foreign exchange earnings). This particular model takes the debt service/export ratio as the starting point for examining the other variables in the model and proposing growth patterns. A "reasonable" figure of 18% has been chosen, "reasonable" in the sense that most donors are likely to consider it a good measure of prudence and over time it provides considerable resources available for investment to promote growth after paying the debt service. The terms-of-financing assumptions are middle-of-the-roadish and could be improved upon by the government through more active search for better terms among potential donors.

Starting with the prime assumption of the limiting debt service/export ratio, coupled with a balanced budget for current expenditures, rather positive expectations regarding mineral and fisheries export earnings (the less visible livestock exports are largely omitted), what is left are the funds

available for investment primarily in the public sector (including state-owned or partially-owned enterprises). At this point, there are two essential and related questions: (a) what is the rate of return in investment in each of the defined sectors and sub-sectors, and (b) based on this and other considerations, how are available funds allocated between sectors and sub-sectors.

The figures used for purposes of illustrating the model are at best rough approximations. To the extent possible, past history has been used as a guide, but the data are fragmentary and perhaps inappropriate for making projections. Hence, one of the major tasks left to make this model more useful in projecting output is to better ascertain incremental investment/output ratios for the various sectors, sub-sectors and down to the project level as a basis for projecting the results of any given investment policy. A number of the RAMS Phase I studies should be useful in this effort.

Hence, given the central role of the rural sector in RAMS activities, a separate effort has been made to develop a methodology and organize existing data to separately estimate and project GDP. The process was begun by assembling the available historical physical output data at the individual crop and animal type level. Common denominators were obtained to aggregate the physical quantities and then given values that approximated rural GDP.

Noting that one of the major constraints to increasing output has been inadequate rainfall, the individual series for rainfed crops and animal production (excluding poultry) were projected on the basis of three alternative rainfall patterns derived from past history. This adds a much needed dimension of variability to the more simplified assumption of a direct investment/output ratio. Obviously, portions of the agricultural sub-sector, the livestock and the forestry sub-sectors are as much influenced by rainfall as by investment or, in other words, the effectiveness of investment is highly dependent on rainfall.

In a further attempt to devise a method to assist in making appropriate investment decisions, the same crop and animal production series were organized into an input-output table. This highlights the kinds of costs (inputs) that must be made to produce output of any given crop or animal and to trace the flow of activities that result and have to occur between sectors or sub-sectors for investment to produce this output. Admittedly, a number of the figures used are approximations and based on limited information. The process, however, is demonstrated and future efforts can be taken to improve the data.

Lastly, in developing this separate method of calculating and projecting rural GDP, a calculation was derived to relate rural output to food consumption requirements based on population growth estimates and nutrition standards derived from the evaluation of Mauritania's nutritional situation as developed in RAMS Phase -I studies. Given the

Mauritanian goal of lessening its dependence on food imports and hopefully, becoming self-sufficient, such a method is useful in ascertaining what is required to reach established goals and what will be the effect of rainfall variations in attaining them.

As might be anticipated, the data on rural GDP based on the more detailed micro analysis differs from macro figures developed for the simulation model. These differences are more fully discussed in section IV, "Rural Production Options".

As indicated earlier and as the paper presenting the macro model clearly states, the major assumption in developing this model is that the binding overall assumptions on growth are the financial constraints and the debt service constraints which place the upper limit on the resources that will be available to finance growth.

There are other constraints listed in the discussion of the macro model, but they are not made variables of the model itself. In addition to rainfall, there is a category of "sociological factors" that must be taken into account if investments are to become effective means of increasing output and income. Social organization and cultural patterns can affect people's willingness to utilize the factors of production. An obvious and previously noted example is land tenancy. Investment to bring land under irrigation that people will not work because of disputes and confusion over ownership and the right to share in income is obviously ineffective. A number of examples of such constraints, as well as some indications as to how they might be resolved, are to be found in RAMS' Phase I and other reports. Section IV that follows, on Rural Production, provides limited discussion in this area.

Two other types of constraints to increasing rural production also cannot be explicitly expressed as variables in either the macro model or the input/output model. (They have an analogous role in the other sectors as well.) These are the availability and quality of government supportive services and the availability and capacity of manpower. They are areas where government intervention will and must occur and, hence, require thought and planning. These areas are not unrelated to the social phenomena noted above.

A separate Option Paper has been prepared on the services considered desirable, if not essential, to support increased rural production. It is discussed under Rural Production below. The implications derived from the manpower and employment Option Paper are discussed in Section VI.

Bearing in mind that there are the foregoing kinds of constraints which would affect the ICOR (incremental capital output ratio) ratios in the sense of making them higher than might be hoped for but which could be subject to improvement if efforts were undertaken to do

so, one can use the simplified simulation model to project (not predict) several growth paths to the year 2000 based on varying investment assumptions. The point of these projections in comparison with periods of the past, when financial restraints were not taken into account, is to demonstrate that economic growth is possible if consideration is given to these financial constraints and cumulative burdens such as an excessive external debt are not permitted to occur.

It should be emphasized, however, that a far more accurate knowledge of investment/output ratios and how they could be improved in the future is required for actual planning. This model is devised for better use of such information in a systematic way to reach development goals. It does not provide the specific data.

A major factor and issue of primary interest in formulating alternative development strategies is the question of equity -- the distribution of income and other benefits of development. As noted, post-independence Mauritania's economic history clearly indicates that, if attention is not given to this subject, the situation will deteriorate, certainly in a relative sense and probably in absolute terms, particularly as population expands.

The macro model is largely growth-oriented. Income distribution factors have not been taken into account. They are, however, an important factor in the decision-making process of allocating investments by sector and sub-sector. Professing a desire to invest in the rural sector and in labor-intensive industry is an expression of a desire to improve income distribution. This element could be made explicit in the model. To do so, however, would require research and analysis not yet undertaken.

An alternative approach to equity considerations is the concept of Basic Human Needs. The attempt here is to put a floor on poverty rather than deal directly with the issue of relative income distribution. Of course, the BHN program will affect income distribution, at least initially, through direct redistribution and, eventually, by improving the earning capacity of the poorest element of society.

The macro model is not easily adaptable to consideration of the composition of BHN, and only somewhat more so to the growth/BHN trade-off issue. In developing the model, a formula has been constructed relating total BHN (expressed as a single monetized figure) to total growth, but this subsumes the important and interesting aspects of the composition of BHN which are explored in a separate paper and discussed in Section V below.

The sections that follow review the specific elements of the RAMS' Phase II Option Papers.

#### IV Rural Production Options

Three of the Phase II Option papers contain projections of the rural or traditional sector output (value added) to the year 2000; the Macro Economic Simulation Model, the Framework for Calculating Rural GDP, and the Rural Production paper. Each of these approach the issue differently, i.e., different variables are used and different points are underscored for government officials to consider in weighing alternative development strategies.

It must be emphasized that in none of the cases are projections of the future "right" or "wrong". They are developed and used to illustrate points that present and future planners should take into account in constructing alternative strategies. If, in fact, history proves some of the projections to be accurate, it will be on the basis of hindsight not foresight.

As regards historical data, the model for calculating rural GDP attempts to improve the existing compilation by more thorough and careful aggregation of available series and adding aspects of rural GDP not heretofore included. As discussed below, this yields a much higher current level of GDP as compared to official figures. The use of individual series to compile GDP from the "bottom up" not only raises questions regarding the accuracy of the accepted GDP totals but also provides detail that may assist in developing some of the key ratios essential in making investment decisions. Such knowledge can better indicate where investments have the greater pay-off and are less dependent upon other variables difficult to control. Overall, the model provides a novel and fresh approach to GDP calculations, tailor-made for Mauritania.

The Macro Economic Simulation Model stresses the proposition that, if the government is prudent in observing the financial constraints, particularly in not exceeding the prescribed debt service ratio, and at the same time limits consumption expenditure in total and in terms of foreign exchange, there will be funds available for investment which can be used to increase growth, and to improve the Basic Human Needs situation as well. It assumes that a sufficient volume of available investment funds will have been appropriately allocated during the period in question to ensure that the country will continue to earn and expand its foreign exchange earnings.

To the extent there are funds available for investment, the Model highlights two kinds of issues to be considered. The first is the proportion of total investments that will go to each sector or sub-sector,

and the second is the rate of return that will be obtained in each area. Given the fact that most long-term investment in Mauritania is made by the public sector (including public corporations) and that private investments can be and is influenced by government actions, the allocation decision is a political one. On the other hand, the issue of the rate of return is based on a number of factors many of them complex and not easily susceptible to government manipulation, even though officials may have the responsibility of doing so. This difficulty of not being able to predict, much less control, the rate of return is particularly true in the traditional sector. The rate of return on investment in irrigation may depend upon how well land tenancy issues are resolved. Investment returns in improving agriculture may be a function of how effective the extension service is and the extent to which the farmers listen and follow suggestions to improving productivity. The list of potential constraints or bottlenecks that must be confronted and overcome is long and formidable. A number of these are listed in general categories in the RAMS' Macro Economic Simulation Model.

The Simulation Model does not have the specific answers to these kinds of questions. It hypothesizes certain relationships and then demonstrates the mathematical results. It shows what could happen under assumed circumstances. It follows that if the GIRM wants the economy to develop in this manner, then it has to create the circumstances, as for example promulgating a realistic and effective land tenancy law and ensuring its enforcement so that newly irrigated lands reach their full production potential.

In demonstrating the Model, the assumptions regarding the allocation of investment by sector are based on several general propositions, but the numbers are arbitrary and different allocations could be made under these same general conditions. First of all, the GIRM has on numerous occasions stated its aim to lessen economic dependence on the outside world. A substantial element of this desire is translated as a desire to reduce, if not eliminate, the cereal deficit while maintaining meat self-sufficiency.<sup>4/</sup> An objective that goes hand and hand with increased agricultural output is that of reducing the present high rate of rural-urban migration which in turn can be related to the desire to invest in labor-intensive activities in rural areas rather than capital intensive enterprises located in Nouakchott or other major urban centers. These factors argue for a substantially larger allocation of investment funds to the rural sector that has been the case to date.

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<sup>4/</sup> It should be noted that self-sufficiency in cereals, meat and fish products does not constitute food sufficiency. Imports of tea and sugar have a greater value than the entire agricultural GDP. Wheat, as well as a number of other commodities are also major import items.



Continued availability of foreign exchange, however, dictates continued investment in mining and fisheries. BHN concerns require a certain allocations of investment monies for the government services sector. Certain government financed infrastructure projects will be in support of increasing rural investment opportunities. A major function of the Development Plan is to balance these competing demands for investment funds within the general criteria of development objectives that the GIRM has adopted. Given the allocation of investment funds by sector and sub-sector, then total output will be a function of the return on these investments. For purposes of the Model, this measure of productivity of investment is the Incremental Capital Output Ratio (ICOR). It expresses how many ouguiyas of investment in a given kind of production it takes to obtain one ouguiya of output (value added). The higher the number (ratio), the lower the rate of return.

There is little empirical data readily available to calculate what these ratios have been in the past, though additional research and analysis including utilization of RAMS Phase I studies undoubtedly could shed more light on what has happened in this regard. When one attempts to project what these ratios might be up to the year 2000, the assumptions are indeed heroic.

The relationship between investment and value added by sector for the period 1975-79 (except for mining because of the Sahar. conflict disruption) were taken by the Macro Model as the starting point. The ICOR for the traditional sector, for example, was 4.3, a relatively high ratio as compared to a number of other countries but much lower than that calculated for industry, construction and public works in Mauritania.

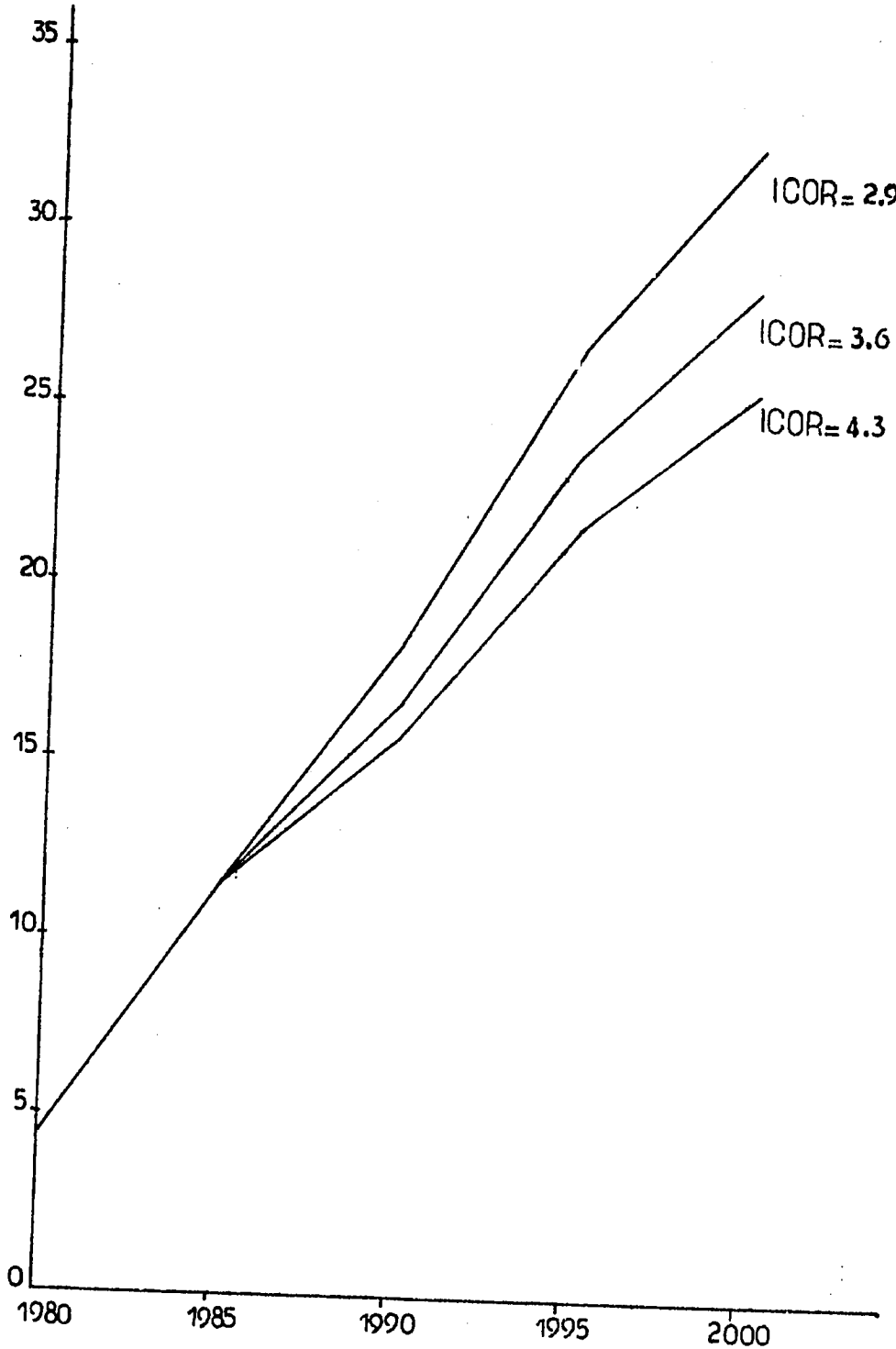
These ICOR were then used to project growth until the year 2000. On this basis the rate of overall growth was much greater than earlier periods, particularly the recent past, because more funds were assumed to be made available due to prudent adherence to financial constraints and because more investment was being channelled into the rural sector with the considerably lower ICOR.

If the projection of the 4.3 ICOR for the rural sector is to be considered a continuation of current tendency, then presumably one can postulate a more favorable situation for the future as ways are found to improve the productivity of investment. Hence, two other scenarios for the rural sector were calculated based on ICOR's of 3.6 and 2.9, arbitrary numbers used to demonstrate the process. All three production curves are shown in Chart I. They indicate rates of growth substantially higher than that developed in the other two Option Papers.

Chart I

Macro Simulation Model projected rural sector GDP growth based on alternative assumptions of incremental capital output ratios (ICOR)

Billions of UM, 1980 prices)



It should be emphasized, however, these are not predictions. They are projections based on many assumptions both implicit and explicit that may not be realized either because the measures required to do so are not considered appropriate by the government or measures undertaken to do so are not sufficiently effective.

The methodological paper on the Framework for Calculating Rural GDP takes as its basis the development of an historical series for rural output, in value added or GDP at factor cost. The total series is derived from the summation of 34 individual series characterized by type of output (e.g., crops, animal species) rather than rainfed, recessional or irrigation agriculture which are the categories utilized in discussing investment in the more aggregate allocations.

The development of this large number of individual output series is done with the specific intention of adding to the rural production total, activities or products not covered or under-represented in the presentation of the data to date. As a result, GDP for the traditional sector for 1980 was estimated by this method as 9.5 billion of ouguiyas, or 43% higher than the figure contained in the IMF report of April 1980 which obtained its data from official sources. New output series have been added, such as poultry and certain aspects of forestry, and greater account has been taken of informal cross-border trade with Mali and Senegal. Determination of the "accuracy" of the two sets of figures as they appear in the IMF report and as reported in the Framework would involve an in-depth review and analysis of the basic data and how they were collected. Such an exercise is beyond the scope of the RAMS studies.

This expansion of historical production data does not, by itself, necessarily facilitate the making of projections into the future. It, however, provides a higher base and allows the disaggregation of the projections to an increased number of component series whose growth patterns may vary. As discussed before, this could be useful in evaluating and rendering decisions on specific investment proposals.

One of the important achievements of the Framework is to attempt to discern which of the components are significantly affected by one of the most important variables for the Mauritanian scene - - rainfall. It is postulated that the output of certain rainfed crops, as well as animal production, (except poultry) are highly dependent on variations in rainfall. For these kinds of production, both rainfall and investment are necessary conditions, but neither one by itself will be sufficient to assure a sustained increase in production

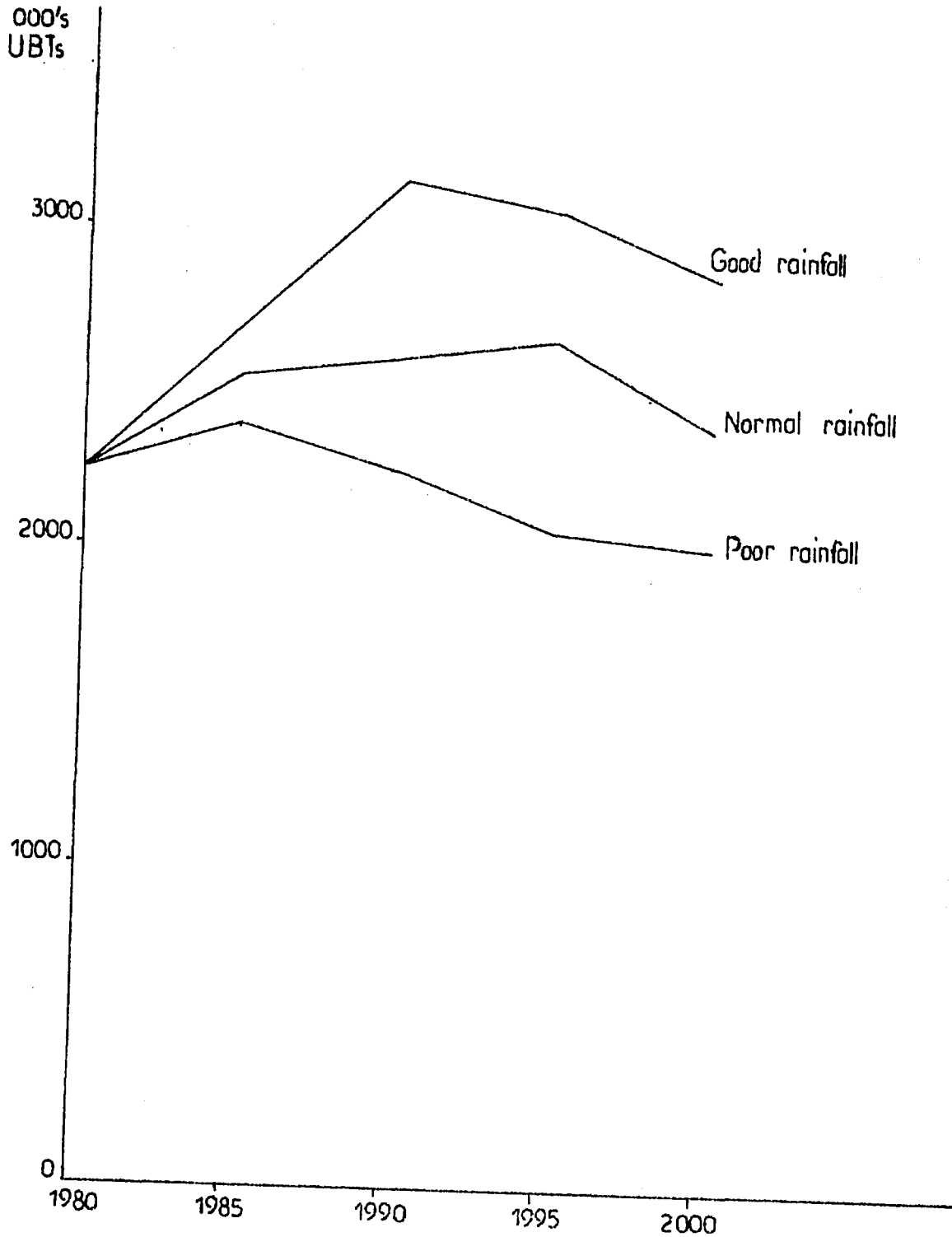
equal to the needs of the people and the objectives of the government. Within a narrow range, rainfall and investment are thought to be interchangeable, i.e., certain investments will sustain or provide a small increase in production even with a moderate decline in rainfall and vice versa. However, this relationship has not been quantified.

Utilizing rainfall data extending back to the 1920's, three equally probable twenty-year rainfall patterns have been identified. A formula was hypothesized for relating output to rainfall and tested by recreating historical production series for periods of known rainfall data. On this basis, three projections of livestock output were made for the 1980-2000 period as depicted in Chart II. Here, a surrogate has been used for livestock production, the Unite de Betail Tropicale (UBT) a standard measure of the animal feeding capacity of rangeland. The rationale for this substitution is that Mauritanian experience has shown that livestock raisers will increase their herds up to, if not beyond, the limit of the available forage supply. Since, in the short term, the pasture area is more or less fixed, it follows that the amount of UBT available will depend on rainfall. Thus, the link between rainfall and the maximum possible livestock production seems clear.

There are two implicit assumptions underlying the projections. First, is the assumption that government investments in the livestock sector do not result in greatly expanded rangeland. The projections are based on a continuation of current trends, policies, and practices, which do not include sinking new wells in virgin pastureland. The second assumption is that livestock raisers continue to behave as they have before, adjusting herd size in harmony with available forage. This does not imply a good balance; only that the herd is built up when there is enough forage and reduced when there isn't enough to maintain the herd. The latter assumption is affected to some degree by meat and livestock prices, but no account is taken of prices in the projections.

A word of explanation is in order regarding the interpretation of Chart II. All three rainfall scenarios must start with projections of the 1980 level of UBT availability. It is obvious from the immediate projected improvement of production under all three rainfall scenarios that even the poor rainfall projection is made under assumed rainfall conditions superior to the recent past. The highest production, occurring in 1990, corresponds to the availability of 3.15 million UBT which is in agreement with the size of the national herd before the recent drought. Therefore, the projection does not exceed what is

Chart II  
Projections of Total Livestock Production  
Based on Alternative Rainfall Patterns  
(Thousands of UBT's\*)



\* Unite de Betail Tropical

known to be possible. The low point of the poor rainfall scenario, occurring in the year 2000, shows that herd size could fall to a level below the present unsatisfactory level at a time when population would have grown 64% from the present.

The important point to keep in mind is that the timing of the three scenarios in Chart II is entirely arbitrary. Any one or more of the three could just as well shift to a different horizontal position on the chart. Because of the year 2000 cut-off date, the scenarios were not projected further into the future which would give a fuller hypothetical picture. Thus, the chart shows what can happen, but it does not show what will happen.

There is another potentially important aspect to this rural GDP analysis. Through the use of a simplified input-output model, it illustrates the kind of relationships between industries that determine output/value added ratios on the crop-by-crop and animal species basis. This kind of information should assist in estimating ICOR at this level of disaggregation. When ICOR estimates are made at the sector and sub-sector level, they are obviously an average of a large number of investments in different kinds of production within the sector. It should follow that as assumptions regarding investment/output ratio are made or past performance projected at the individual series level, they may prove better indicators of reality than if they are derived from broader aggregates. Considerably more work and refinement will have to be undertaken, however, if the series are to be made useful in this manner. There are data and analysis in the Phase I reports that will be useful for this purpose.

The Option Paper on Rural Production is designed to indicate the kinds of projections that can be made by assuming different levels of investment in various sub-sectors of agriculture as well as live-stock and fisheries. This disaggregation is made to demonstrate that production in the different areas of the rural sector respond differently to investment inputs. Investment inputs in the rainfed sector are complementary to technological inputs. Those in livestock are highly dependent on rainfall. Irrigation requires more capital intensive inputs than other forms of agriculture. Fisheries is separated between riverine and maritime and between artisanal and semi-industrial, each requiring different kinds of investment programs. Industrial fishing is classified outside the rural sector.

The question of what kind of improved technology and how it is introduced is covered by reference to the separate Option Paper on Agricultural Institutional Framework. It is assumed that, if

investment is made in improved seed, fertilizer, pesticides, etc. these inputs will be appropriately used because adequate investment will have been made in the research, extension, credit and other necessary facilities. The investment in developing these institutions will not appear in the rural sector but rather in the public sector. These investments are costed separately and discussed below.

The rural production projections take note of the social obstacles to be overcome, but do not build these constraints into the projections. It is assumed that these issues can and will be resolved. The proposition is made that these are the kinds of results that will result from varying of investment if, a very big IF, (a) farmers and herders are convinced to adapt to more modern, but practical, production techniques and are given the means to do so, and (b) the social impediments deriving from a traditional but varied social structure in the throes of undergoing the considerable pressures of recent history are resolved.

Bearing this framework in mind, the sub-sectors of the rural sector are examined under three kinds of options plus some sub-variations:

1. Adequate investment to achieve cereal and maintain livestock self-sufficiency plus a fisheries surplus;
2. A continuation of present trends which the GIRM has already adjudged to be less than satisfactory; and
3. An intermediate goal which involves considerable progress but does not strive for full self-sufficiency.

In addition, for each of the three major sub-sectors an estimate of manpower requirement is projected. It should also be noted that output is expressed in terms of both production and value added, though in all cases the series tend to move together.

The agricultural sector is subdivided between rainfed, irrigated and oasis. Irrigated is further divided between recessional and year-round irrigation, and recessional has two sub-divisions. From the point of view of technological options, however, recessional is classified as being more similar to the rainfed situation.

The main variable examined in the agricultural sector is the level of technology, i.e., the use of better seeds, fertilizer,

pesticides, inter-cropping, and credit to facilitate these improved techniques. The Option Paper distinguishes between:

T<sub>1</sub> = traditional (present) technology

T<sub>2</sub> = improved technology

T<sub>3</sub> = modern technology

T<sub>1</sub> and T<sub>2</sub> are defined as that which would be applicable to rainfed and recessional agriculture, and T<sub>3</sub> is that which would be applicable to fully irrigated lands. The added costs are the direct ones to the farmers and the construction of irrigation facilities. They do not include the GIRM agricultural services which make these new techniques understandable and affordable.

Hence, for rainfed and recessional agriculture two options are actually presented: continuation of present practices and the choice of improving them up to the point of but not including mechanization. The introduction of animal power is, however, included. The estimated difference in production resulting from relatively small increase in costs is substantial from 54,000 tons of cereal, accounting for 18% of total demand in 1980, to 96,000 tons, representing 30% for a larger population. This can be seen more dramatically in Chart III.

It should be noted, even though rainfed agriculture is included, the projections do not account for any variations in rainfall. In part, this is because the more sensitive recessional constitutes only a small percentage (13%) of the total and because no investment/rainfall relationships have been calculated. It is assumed that rainfall conditions are "normal" four out of every five years. In the rainfed agriculture area of 450 mm or more of normal annual precipitation, this is a statistical probability over the long term. Whether or not farmers would be willing to incur additional costs based on that kind of risk calculation remains to be seen. There might be crop insurance schemes that could be devised to help them bear the risk.

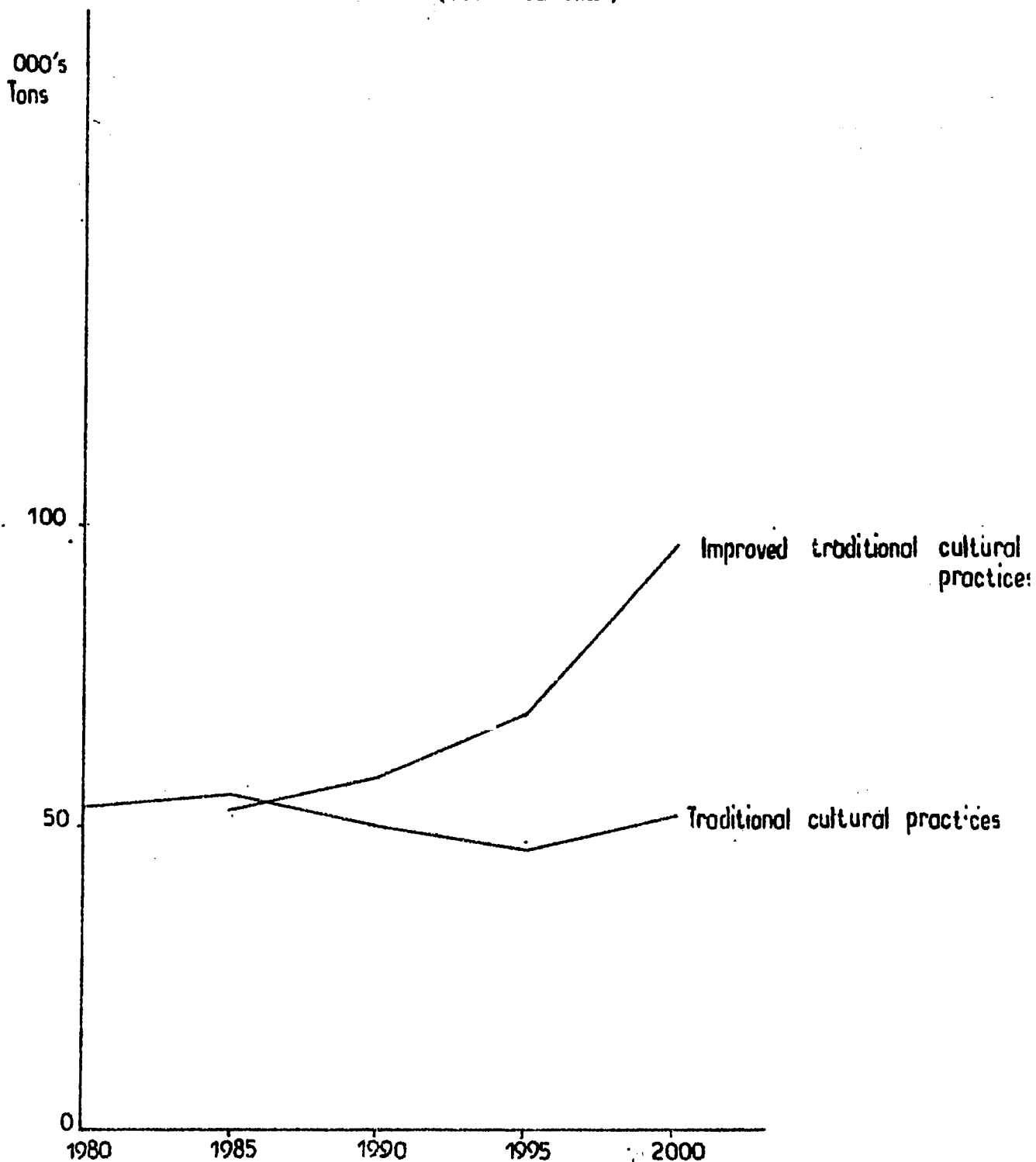
T<sub>3</sub> represents the modern technology to be used on irrigated lands. The assumption is that the heavy investments in irrigation would not be made unless the technology required to warrant the investment would also be employed.



Chart III

Projected Agricultural Production for Rainfed and Recessional Crops Based on Alternative Assumptions Regarding the Level of Technology Employed

(000's of tons)



Three options are projected for the  $T_3$  situation representing different rates at which additional lands are brought under irrigation, i.e., perimeters are expanded. Within each of these options there are two different assumptions regarding yields, which could be considered as variations in the technology applied. There are also two variations for each yield as to the rate at which double-cropping is introduced, though this only affects the 1985-90 plan period. On this basis, there are twelve alternatives, though the six relating to double-cropping are less significant. This variation is shown in Chart IV.

The oasis sub-sector is projected with three options of technology whose levels depend upon investments in safe-guarding against further degradation of the environment and, secondly, the creation of new ecosystems to mobilize the deep-water resources.  $T_1$  is a continuation of present trends and current levels of technology.  $T_2$  involves the addition of the measures to safeguard the present oases plus upgrading cultural practices.  $T_3$  involves the measures included under  $T_2$  plus the investment required to add an additional 500 hectares of oasis cultivation. Under the maximum option, production would more than double by the year 2000 on the basis of an ICOR of less than one. It should be noted that oasis agriculture currently accounts for only 5% of the rural GDP and its potential for increase is very high in value relative to the rest of agriculture, but the land area available for this type of production is extremely limited.

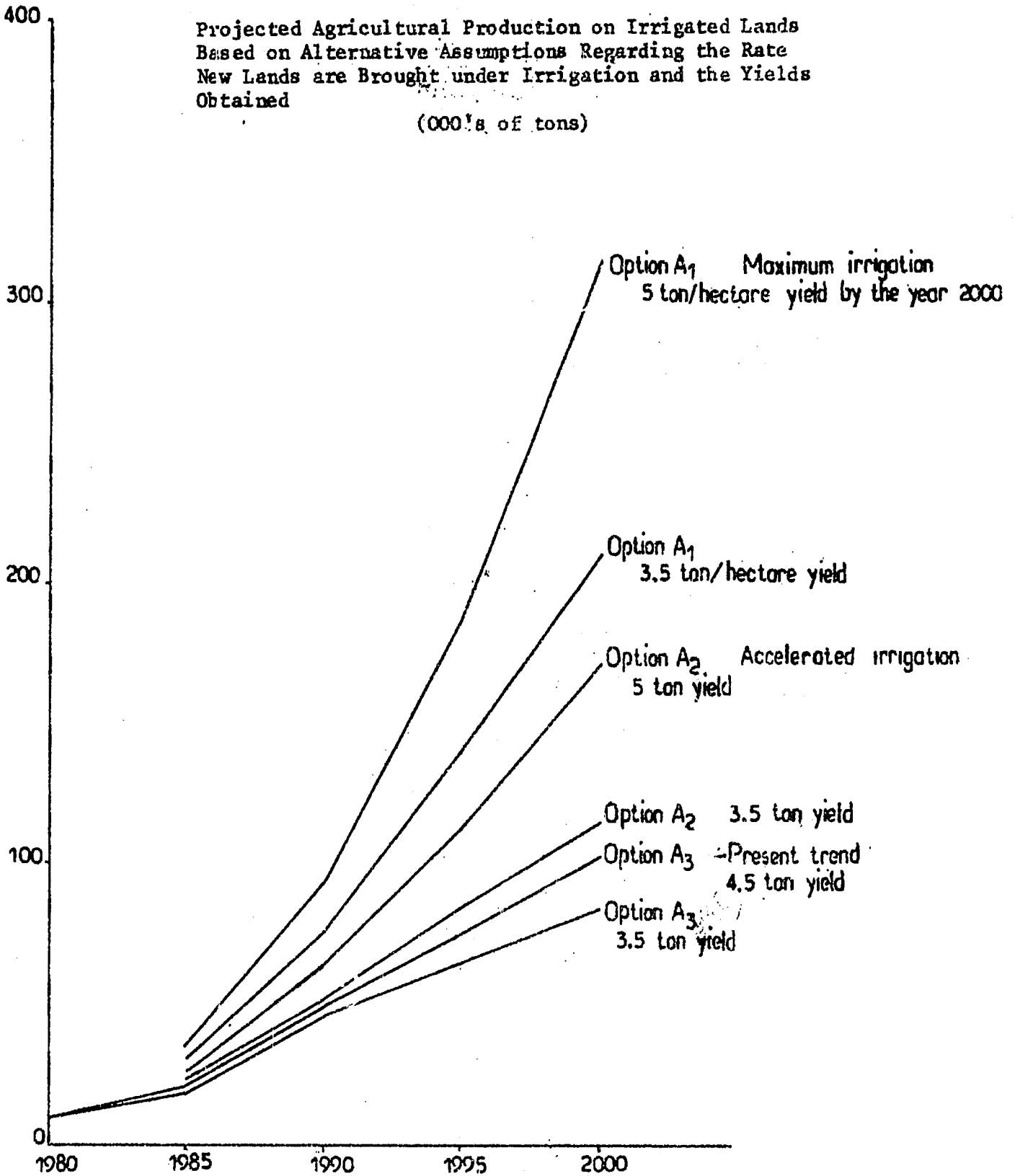
The livestock sector offers possibility for considerable expansion, but only in the long term. In the short and medium term, the possibilities are less than for other areas of the rural sector for two basic reasons. Primarily the current level of livestock production is reasonably well in balance with the available resources, certainly relative to the other sub-sectors. There are limits to which current soil and rainfall conditions can accommodate increased herds. There may be some animal health and management practices that could be improved but, in general, animal production on an extensive rather than intensive basis is close to being maximized. The breeds used appear to be those most appropriate to the environment.

The rationale for the adherence to extensive livestock raising is that it is inefficient to use scarce agricultural land to raise animal feed when it could be used to raise food for people. If livestock could be sold at a price that would remunerate the producer and pay for the importation of the food that could be grown on the land used to grow feed, then it would pay the nation to encourage widespread intensive livestock raising. That is not the case. Furthermore, a substantial part of the livestock production of Mauritania

Chart IV

Projected Agricultural Production on Irrigated Lands  
Based on Alternative Assumptions Regarding the Rate  
New Lands are Brought under Irrigation and the Yields  
Obtained

(000's of tons)



goes over the border as unofficial exports to earn freely convertible currency, not all of which is repatriated either in the form of currency or goods.

In the case of a deficit food producer such as Mauritania, the investment in shifting to intensive production would have to be reckoned in terms of the direct costs of support services and the alternative cost of importing the lost food production. This would appear to be excessive and out of proportion to the expected rate of return. It is unlikely that it would be seriously considered as a viable option. This is not to say that intensive livestock raising based on the use of agricultural waste is uneconomic, but it will in all probability remain a minor element in livestock production.

The second reason for the limited short and medium term possibilities for livestock expansion has to do with the long term nature of the regeneration of degraded rangeland. This can only come about permanently by a successful program of range management, a notoriously slow but very worthwhile process. Indeed, it is because of the benefits of a full program of range management that Mauritania has the long term prospects for retaining its position as a major livestock exporter and continuing to produce sufficient meat for a growing population beyond the year 2000. But during the next 20 years the country will do well if it can regain the production level of the pre-drought years, assuming the early adoption of an adequate range management program. Without such a program, Mauritanian livestock production can increase for awhile but will then find itself in decline, perhaps permanently. This would present the spectre of Mauritania joining the ranks of meat importers or suffering a drastic change of diet.

Past experience indicates that Mauritanian livestock raisers will expand their herds up to the limit of the carrying capacity of the range and, indeed beyond. This has been the cause of great abuse of the rangeland, especially around watering points during the years of drought. Animals did not die of thirst; they died of starvation as vegetation was exhausted by over-grazing and by trampling. Further afield, the sparse cover that served to stabilize sand dunes also disappeared with passage of herds seeking forage, and the dunes have become mobile. Large areas are degraded to the extent that some experts have doubts about the natural ability of the range to regenerate, and desertification has become a matter of great concern.

The degradation has occurred on pasture representing about 64% of Mauritania's potential carrying capacity. The other 34% is on rangeland that is presently unusable because it lacks wells to provide animal drinking water. Because of this idleness, the unused range is the richest potential source of animal nutrition. Had there been wells, it is probable that this range too would by now have been degraded. To open these grazing areas by the establishment of watering points without a program of range management to rationalize their use would be planned degradation of the land, not development.

Range management of the area would have to begin soon in measured stages with watering points established in tandem and not exceeding the area that could be effectively controlled. This would provide for the relief of part of the presently used range to give it a chance to regenerate, also under range management. There would be no substantial rational increase in production for at least 10 years and possibly longer because it would take that amount of time to establish effective control and allow regeneration. After ten years of concerted effort on the part of government and the herders, organized for the purpose into local associations, it is possible to look forward to an increase in UBT beyond pre-drought highs. It is at this point that the government can begin to look to increased production sustainable in the long term if the increase is in harmony with rational use of pasturage.

The foregoing description of a range management program coupled with improved government services to livestock constitutes the maximum option for investment. Because of the time frame and the absence of substantial increase in production during that time frame, this option was not projected. It does, however, merit the most serious consideration by the government and further study, because without such a plan Mauritania's milk and meat supply, even for domestic consumption, will be seriously jeopardized by the end of the century. The RAMS Livestock Sub-sector Study Supplement - Range Management and Development discusses the subject in detail.

The middle option for livestock covers improved government services to livestock without the opening of new rangeland, and the low option, as with other rural sectors, is the continuation of present trends and levels of government activity. Because of the great variability of rainfall and its unpredictability, it is academic to postulate a set of government investments for application for one or another scenario. Range management is the long-term key to survival, and in

the short-term, firebreaks, animal health and emergency feed supplies can reduce losses in times of local or widespread disaster. For this reason, only a continuation of present trends are projected to act as a baseline under three rainfall conditions.

The carrying capacity of existing usable rangeland is projected for the three rainfall scenarios developed in the GDP and input/output methodological paper, and since Mauritanian livestock numbers grow to fit the available nutrition, production is a direct variable of carrying capacity, although there may be a year or so time lag. Chart II, p. 26, shows these projections in terms of Unite de Betail Tropical (UBT), the standard measure of carrying capacity used in the Sahel as elsewhere. It refers to the amount of vegetational nutrient needed to support various animals, e.g. a camel's requirement is 1 UBT/year and if an area of rangeland is rated at 0.1 UBT/ha, then it will require 10 of those hectares to support one camel. Mature cattle are rated 0.75 UBT; one mature sheep or goat 0.15 UBT. The pattern of the projections is due to the variations in year-to-year amounts of rainfall within each historical pattern and the response of vegetation to those variations. A discussion of the relationship appears in the rural GDP methodological paper.

The normal and good rainfall scenarios yield projections of production from approximately 8% to 28% higher than current production. But with an expected 64% increase in population by year 2000, it would seem that the present export surplus would be increasingly needed for domestic consumption in the coming years, and may even prove insufficient to cover the need, if rainfall is below normal for an extended period.

Internal demand for nutritional intake from animal sources was calculated from the RAMS nutrition study. These are presented separately for the rural and modern sectors allowing for other sources of nutrition, i.e., agriculture and fish. The indications are that, if rainfall follows a less than the "normal" pattern, there could be a deficit by the mid 1990's. This could be overcome by following the investment pattern set out under option L<sub>2</sub>, which may yield a higher production (off-take) for the same number of heads because of better production methods used and improved composition of the herds.

It appears that if rainfall follows the "normal" pattern, there will be self-sufficiency in meat but not the surplus that had been hoped for. Population increase will consume the present surplus that is currently "unofficially" exported to neighboring countries.

The fishing sector is considered as an area of Mauritanian production with considerable potential for future development. This optimism is based on two considerations. The first is the possibility of expanding inland or fresh water fisheries through aquaculture, i.e., the development of ponds concurrently with the expansion of irrigation for rice production. This would supplement current river fishing which is highly dependent on river levels which vary with rainfall in the highlands of Guinea. Hence, production levels would not only be increased but also be stabilized. The second opportunity would be to better profit from the maritime resources which currently are largely exploited by foreign fleets. There would be possibilities if improved artisanal coastal fishing plus obtaining greater returns (licenses, catch sharing, etc.) as well as expanded training opportunities from the foreign fleets. There should also be expanded possibilities for fish processing, but this is defined outside the rural sector.

Again, three fishing options been projected. Option  $F_1$  relates to the development of a national industrial fleet after achieving  $F_2$ , which involves improving coastal artisanal fishing to the point of having a semi-industrial maritime fishing capacity as well as the development of inland fisheries. The difference between artisanal, semi-industrial and industrial is a function of the size and capacity of the boats, the length of time they remain at sea, hence their range, and, lastly, the degree of processing and preserving they can undertake at sea.

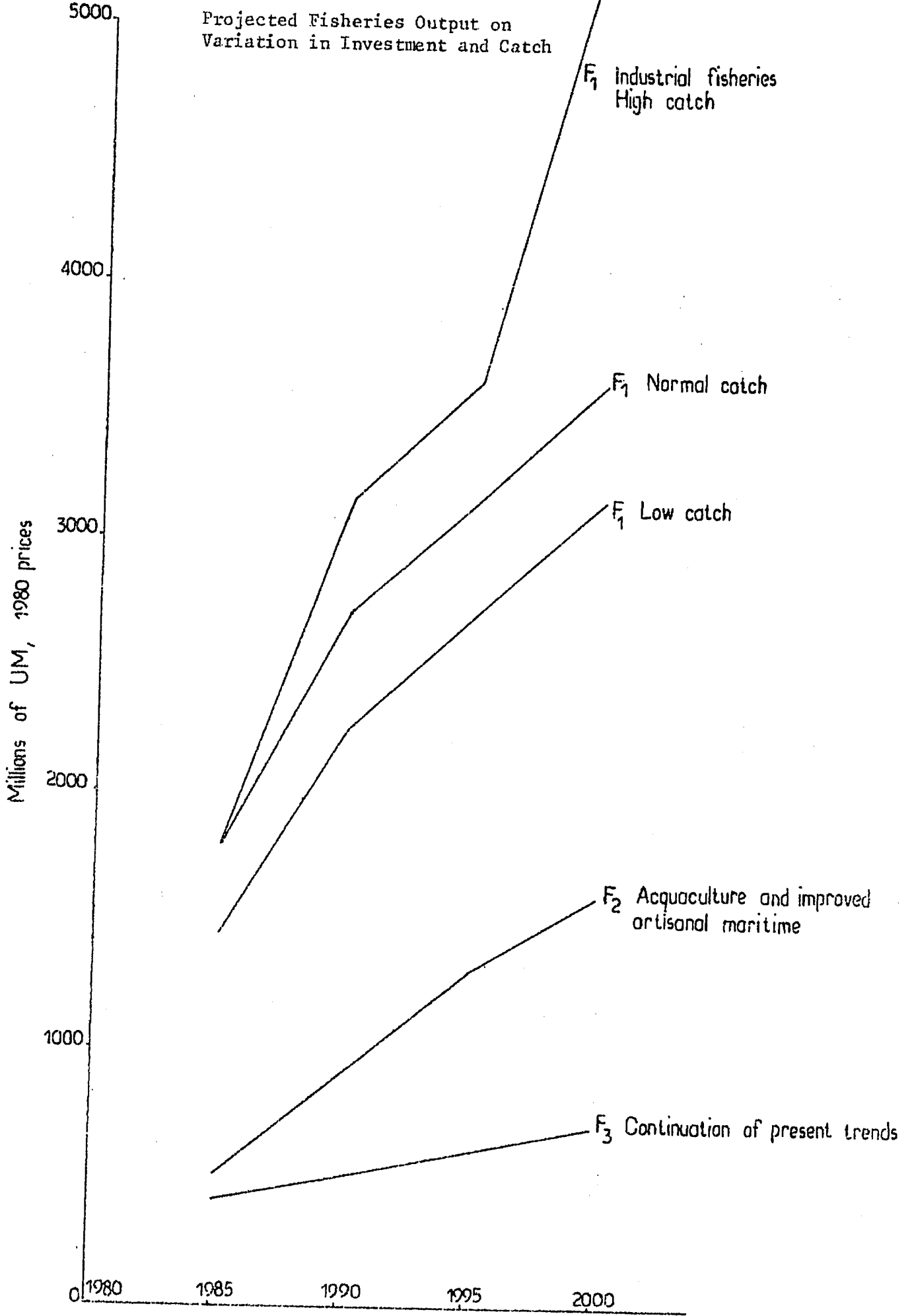
Industrial fishing is a complex and sophisticated industry. Mauritania will have to learn from the foreign fleets and perhaps can induce them to share their know-how as part of the price for permitting them to fish in Mauritanian-claimed waters. So far, the cooperation in training and joint ventures has been more pro forma than real. It is hoped that the development of a semi-industrial fishing capacity will be the necessary step toward acquiring an industrial fishing fleet. This may be difficult to achieve.

Option  $F_3$  is a continuation of present tendencies. The anticipated output of the three options are shown in Chart V.

Production estimates have also been compared with nutritional demand as derived from the paper on this subject. Two factors emerge. Most of Mauritania's present nutritional fish requirements could be met from fish resources, and additionally fish production even under option  $F_2$  could be expanded to exceed anticipated future increase in demand.

Chart V

Projected Fisheries Output on  
Variation in Investment and Catch





The Rural Production Option Paper combines the options in the different sub-sectors and their several elements into three broad options to be considered in designing a development strategy. Given the numerous variations presented, there are obviously more than three total combinations possible. The ones selected are:

Option A, which maximizes the various possibilities and thereby indicates the investment costs necessary by the year 2000 to attain cereal self-sufficiency to maintain animal self-sufficiency, and to develop an industrial fishing capacity and an aquaculture program that would produce a surplus for the export of fish products.

This options assumes the use of improved but not mechanized techniques for rainfed agriculture, coupled with the maximum rate of expansion of irrigation where modern techniques are used and rice yields are assumed to reach 5 tons a hectare by the year 2000. The oasis culture is assumed to involve both safeguarding the existing facilities from degradation as well as adding 500 hectares and using improved techniques. For livestock the normal rainfall scenario is used and the maximum investment level is assumed for improving husbandry and health, opening new pastures under range management and improved conditions along herding routes by provision of water and supplementary fodder.

Option A for fisheries includes the development of aquaculture for inland fisheries, improved techniques for artisanal coastal fisheries and putting into operation a substantial semi-industrialized fleet that should lead in the future to industrial fishing capacity. The high catch level is assumed under this option.

Option B, which is the intermediate, presumably more realistic alternative also includes the development of aquaculture for inland fisheries and improvements in coastal and maritime fisheries. As will be noted, the attainment of objectives indicated is far from automatic, and there are many constraints not analyzed in the text that need to be successfully confronted.

For rainfed agriculture the same production is projected as is the case for Option A, i.e., improved techniques in the use of improved seeds, fertilizer, insecticides, animal power but not mechanization. For irrigated agriculture a lower pace is postulated for putting additional lands under cultivation, but a yield of 5 tons per hectare is still assumed to occur by year 2000. The technology remains the same as under Option A. For oasis agriculture Option B

assumes improved techniques and measures to safeguard against environmental degradation but does not include bringing additional hectares under cultivation.

Option B for livestock assumes a "normal" rainfall pattern and a level of investment that improves livestock production services and range management but does not open new pastures.

The fisheries component of option B includes increasing and stabilizing inland fisheries production by the introduction of aquaculture, plus improving maritime artisanal fishing as it gradually becomes semi-industrial. The level of catch assumption is about 90,000 tons.

Under Option C, which represents the continuation of present tendencies, rainfed and oasis agriculture continue to utilize existing practices while no effective steps are taken to prevent environmental degradation. There is expansion of the irrigated perimeters but at the present rate which is approximately one-quarter of "planned" levels. It is assumed that newly irrigated lands will be cultivated with more modern techniques. A yield of 4.5 tons per hectares by year 2000 for irrigated land is assumed. For livestock, the "normal" rainfall production model is still utilized though investment costs to provide services to herders remain at their present low level of less than .05% of the national budget.

Fisheries under Option C continues what is at best stagnation if not decline of river fishing once the Manantali dam is built, unless aquaculture is developed in other ways (e.g., ponds in connection with paddy culture). It is assumed that artisanal coastal fishing will continue moderate growth with Mauritania meeting minimum nutritional demands but with very little or no contribution to the balance of payments.

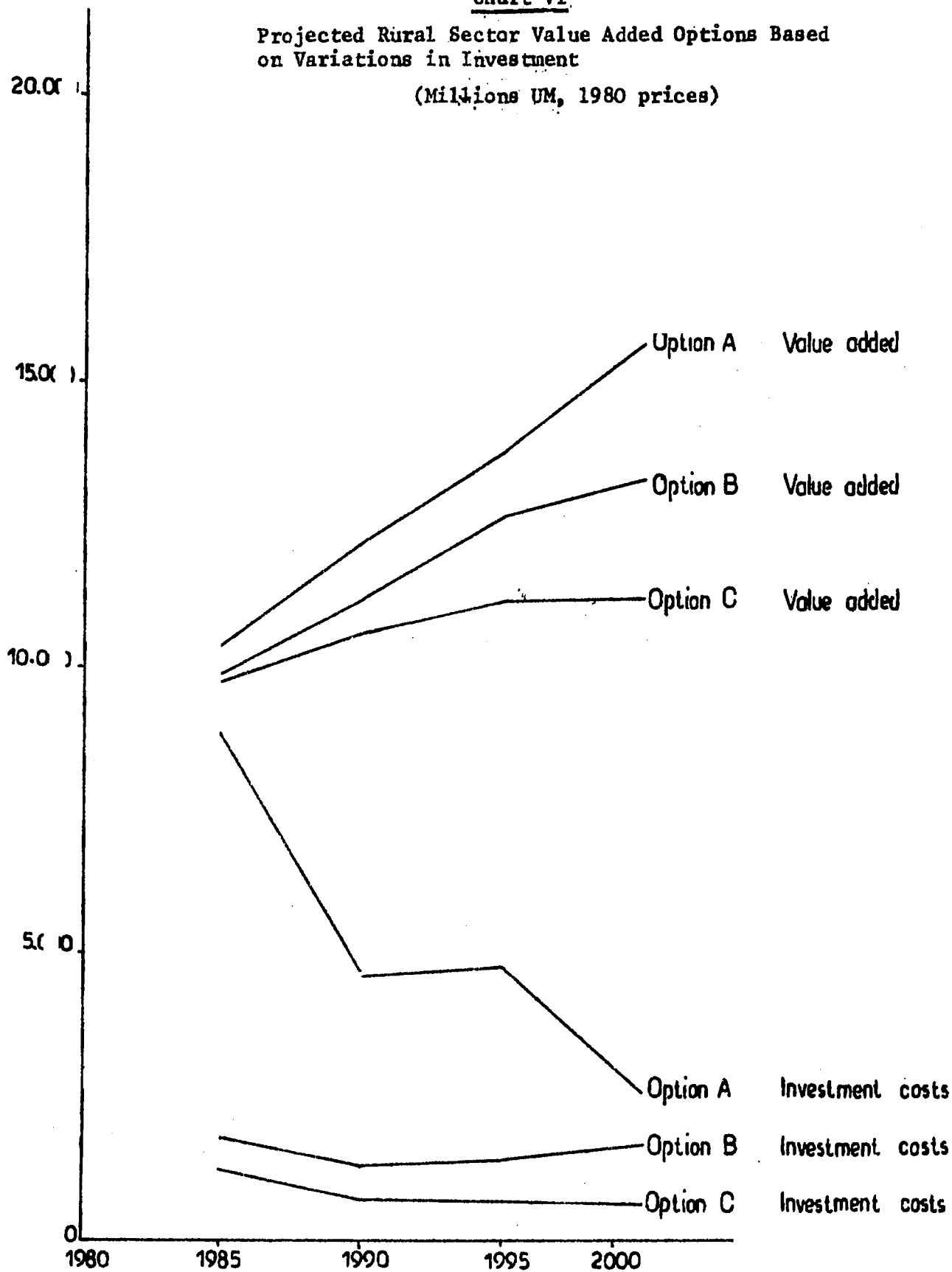
The three production and investment cost options for the total rural sector are shown in Chart VI.

Another essential aspect of development in the rural sector concerns the type and effectiveness of government service institutions that are developed to assist farmers, herders and fishermen. A separate Option Paper, Agricultural Institutional Framework, was prepared on this topic. It discusses the human and physical constraints that must be addressed if the rural sector is to be effectively served and

Chart VI.

Projected Rural Sector Value Added Options Based  
on Variations in Investment

(Millions UM, 1980 prices)



reviews existing services and facilities. Three options are then developed indicating the services to be provided, as well as cost and manpower requirements. The most comprehensive option envisage a systematic global, centralized system of support to rural workers in all areas with adequate trained staff to confront the wide range of problems that exist. The second option is more selective in forming a service that includes regionally integrated nation-wide services that will undertake specific interventions to meet particular needs at the regional level. It suggests a number of specific sites to provide integrated services as opposed to more global coverage. The third option is to continue the present program and pace in expanding its level of activity. Staffing requirements and organization are provided for Option A and B. All three options are costed out as well, though such figures do not include the cost of effective land reform, price supports and risk guarantees or physical infrastructures. They do, however, include credit facilities which, in fact, are the most costly item in the suggested budgets.

This paper provides the basis from which the GIRM can begin to evaluate the budgetary needs, the manpower training requirements and the orientation required so that government services will be provided in a way that farmers, herdsman and fishermen will be motivated to accept and use them.

#### V. Basic Human Needs

The Basic Human Needs concept is understood to be a primary concern of Mauritanian policy. This is clearly indicated by the government's listing of "le bien-etre de - 'homme mauritanien" as its first priority in the Third Five-Year Development Plan.<sup>5/</sup> Noting this priority, the RAMS Option Papers approach BHN from several different aspects. First of all, an attempt is made to relate BHN concerns to the macro economic simulation model. Realizing, however, that the model does not fully lend itself to a consideration of all aspects of the concept, a separate paper has been prepared to provide an analysis of the principal components of BHN and to indicate how they apply to the Mauritanian scene. Preliminary cost projections have been made to indicate the order of magnitude of the expenditures that the GIRM would have to incur to

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<sup>5/</sup> Toisieme Plan de Developpement Economic et Social, 1979-1980.  
Page 69.

ensure that the lower 20% of the population does not fall below a minimum poverty standard. In addition to an overview of BHN, there is a separate Option Paper on health and nutrition, two of the most important BHN components. Finally, the paper on Employment considers this subject not only in terms of a basic factor of production but also as an area of policy in and of itself, since having and holding an income-producing job is an essential demand of human dignity.

The macro economic model takes the global approach of assuming that a certain level of capital, hence, total GDP, will satisfy BHN. From this assumption the rates of growth that will produce this level of income by a given year are derived. Conversely, the year in which minimum BHN will be met can be estimated if growth rates are given or assumed. It is a method by which, in overall terms, the speed and rate of achieving this target can be calculated or, conversely, the resources can be projected.

This approach is not a guide as to the kinds of actions and investments that must be made if all the essentials of BHN are to be dealt with, which is the task of the separate paper. The latter covers all the major components but does not discuss the issue of fertility which, govern GIRM current policy on the issue, is not a variable to be influenced by government intervention. A category for energy (for cooking), not always included in BHN discussions, is added because of its special significance to the Mauritanian scene.

The illustrative costing exercise in the BHN paper deals with additive investment and recurring costs that would be required in successive five-year periods to bring the lower 20% of the population up to the prescribed minimum level by the year 2000. This assumes that only the lower 20% are below the BHN poverty level. Given the limited data available on income distribution this is a reasonable basis upon which to proceed for illustrative purposes. In fact, it may be that more than 20% are below an absolute poverty line, depending upon the standards used to define "absolute".

Using the 20% target goal, the figures illustrate that during the 1981-85 period approximately \$11 equivalent per affected person per year would have to be spent to begin the program. By the 1996-2000 period, when objectives are being met, about \$70 equivalent (in 1981 prices) per affected person would be required (still assuming the target group would be 20% of a new larger population). These projections are amounts that must be added to current expenditures

to bring the disadvantaged up to the BHN minimum level, recognizing that people are already spending money on themselves and the GIRM has public service programs to which these expenditures are added.

The macro economic model does not distinguish between what is now provided and that which is missing. It postulates, without analysis, that 20,000 UM in 1973 constant prices is the total per capita income required for the society to meet BHN minimum.<sup>6)</sup> Implicit in this approach are some simplifying assumptions regarding income distribution and the mix between satisfying BHN through community expenditures (education and health services) and through individual income support (food and clothing). Secondly, as noted, the composition of BHN is not analyzed. Translating 20,000 UM at 1973 prices to 1981 costs results in about a \$910 per capita income, approximately triple the present estimated level of per capita GDP. If, in fact, the situation is that desperate, it is doubtful that only 20% are below BHN standards. The fact that the BHN paper postulates that by the end of the century only \$14 per capita (to benefit 20% of the population) will have to be spent to meet the shortfall in BHN indicates that the two approaches are considerably apart as regards magnitude. The BHN paper may have under-estimated some of the costs in meeting even the minimum. Also, meeting the minimum may involve more than the lower 20%. The macro paper in choosing an admittedly current but arbitrary figure may have set "absolute" standards "relatively" too high for the realities of Mauritania. The disparity between the two papers, however, is not too significant since each paper is developed under different assumptions and approaches. The figures used therein were never intended to coincide.

The separate Option Paper on health and nutrition provides a partial check on the reasonableness of the data used in the BHN paper. While health is obviously a major component of BHN, the paper is not quite cast in these terms. A purest approach would be to say that adequate health care for all -- possibly with a slight leeway in the "all" -- is a sine qua non of BHN. It should be noted that not only is there a difference in the amounts to be spent presented with the various options of the paper but also, and more importantly, in the way they are spent, i.e., an emphasis on preventive rather than curative public health under rural rather than exclusively urban conditions.

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<sup>6/</sup> The macro economic model uses an inflator of 216.5 to convert to 1981 prices.

Hence, while the maximum option in the health paper only represents an 11% increase by the year 2000 over the cost of continuing present tendencies, the funds under the two situations are spent quite differently. The fact that the total costs are not so different might tend to support the BHN paper which indicates that a relatively small per capita increase is required to meet BHN for health.

Another issue that is a reflection of the need to have several approaches to BHN, and one that directly affects the decisions as to priorities of the GIRM, is the subject of growth versus equity. The macro paper basically deals with growth. The BHN paper is primarily concerned with humane and human dignity issues of putting a floor on poverty. The question of whether these are competing or mutually supportive factors in the total of integrated social and economic development, and as well as the balances that have to be struck, must be faced in formulating development strategies.

As evidenced by the text of the Third Development Plan, the GIRM is aware of these considerations. The projects and the subsequent expenditures made, however, demonstrate that analysis is required if the objectives of growth and equity are to be concurrently met and an appropriate and intended balance achieved.

Current philosophy on the BHN vs growth issue as, say, represented by the World Bank's World Development Report, 1980, emphasizes the inter-relationship between the two, as well as the inter-relationships among the various components of BHN as disaggregated in the RAMS Option Paper discussed above.

In addition to growth and BHN, there are the related objectives for generating increased employment opportunities and reducing inequalities in income and wealth. Simultaneous progress in all four of these objectives (growth, equity in both relative and absolute terms, and full employment) is what provides dynamism in a society and the forward movement toward the desired self-perpetuating "take-off" point.

Studies have shown that the absence of any of the major factors of BHN, as reflected by functional literacy, high mortality and morbidity rates, malnutrition, substandard housing and sanitary conditions, etc., inhibit growth. If these deficiencies exist in concert, their negative effects are mutually reinforcing. If efforts are made to provide a measure of improvement in all these areas, the total positive effect on growth and well-being exceeds the results achieved by the programs carried out individually. This point is made

in the health Option Paper where Option D is put forward as providing health care in a climate of overall integrated economic and social development.

The above-mentioned World Bank report, as well as related studies by the ILO, also make the point that growth is indispensable to BHN and related human resources development goals. Investments must be made in productive enterprises if there are to be the resources available to provide literacy, health care and more satisfying employment. While some BHN services are provided through collective action and community subsidy, there are a substantial portion that are purchased individually by people holding jobs and earning wages from productive enterprises. The macro simulation model, which makes investment the key to growth, provides for investment in both public services as well as production-oriented activities. One of the prime factors that determines the effectiveness of investment in all sectors is the productivity of labor. For example, there are numerous examples where literacy and numeracy have increased growth. Workers are better able to understand instruction and grasp new techniques. Their minds are opened to new ideas.

All countries developed or in the process thereof, are faced with choices in making their investment decisions as to the balance between human resource development and economic growth. The point to be emphasized is that these are not "either-or" decisions but rather ones of the appropriate mix. The issue is also related to employment and measures taken to affect relative income and wealth distribution. Obviously, the more limited the resources, the more difficult these crucial choices become. If resources are used inefficiently in a country such as Mauritania, the consequences are far more serious than in a more affluent country. In Mauritania, more people are close to or below the poverty line. An inefficient health program means that more children die. An education program that allows a substantial portion of the population to remain illiterate perpetuates an already too low a level of productivity. Industrial investment policies that do not produce output and jobs reflect a situation where there are few financial resources to sustain a human resources development program that will make industry and agriculture productive. The vicious circle remains. The appropriate development strategies are those that choose the interventions that will help break this pattern and provide mutually reinforcing economic growth and human development. Clearly, this is more easily said than done.



VI. Alternative Development Paths and Conclusions from the  
RAMS Phase II Methodological and Option Papers

The alternative strategies examined in the RAMS option papers span the entire spectrum of possibilities lying between a continuation of past and current practices and the full achievement of the government's stated goals to the planning horizon of the year 2000 as they apply to rural development and manpower and employment. To maintain the current way of doing things -- the same development policies, same human and financial means applied in habitual ways -- will result in a progressive deterioration of production, income, employment and, thus, the standard of living that can be assumed, when the facts are known, to be unacceptable on political, if not humanitarian, grounds.

Indeed, with a 2.5% annual population growth, it will take a substantial change in past practices and much greater government effort and effectiveness in raising the level of production, income and employment merely to maintain the status quo -- not in terms of the macro-economic "per capita GDP" but at the human level in terms of the same proportions of the population actively employed producing or, earning enough to be able to consume the same package of goods and services. It is hard to conceive that maintaining the status quo would be chosen as a development objective.

Any strategy that entails greater achievement than the maintenance of the current low level of popular well-being runs into a series of constraints and raises issues that must be confronted before any progress can be reasonably expected. These constraints concern the availability of financial resources, investment opportunities, manpower, and social and institutional impediments to progress.

Availability of Financial Resources

The RAMS approach to analysis of the availability of financial resources for development is a macro-economic simulation model that is used to determine the amount of resources needed to achieve the growth implied by Mauritania's development objectives. This amount less the amount of domestic savings results in a resource gap that represents the need for external financing.

The analysis indicates that following a period of adjustment and assessment, if prudent measures are taken, there will be adequate resources for both the urban and rural sectors. If balance of payment and budgetary constraints are observed, while a reasonable debt service ratio is set as the key guide to financial restraint, then anticipated export earnings plus foreign grant and concessional monies should suffice to fill the resource gap.

But, as the government proceeds along the development path, careful decisions will have to be made regarding the allocation of these resources. The assumptions require that existing resources be consistently and effectively managed. Unproductive expenditures, particularly if made on a grand scale, could undo Mauritania's potential for obtaining financing.

The government recognizes that it must go through a transition period to shift and adjust present development policies. There is a need for a more stringent and, in some cases, austere approach to achieve accelerated growth with equity to revitalize the rural sector. Specific programs of rehabilitation have previously been outlined, IMF assistance granted, and steps taken to stay within financial constraints. Negotiation and actions are well along in an effort to ensure the continued availability of foreign exchange earnings from the mining sector. The government can also in the immediate future question itself to ensure that already committed programs in all sectors are directed in the short run toward identified priorities with clearly long range development objectives.

#### Investment Opportunities

On the assumption that the government will husband its resources for development, the more difficult tasks will be in finding the appropriate investment opportunities and undertaking them well. Before deciding on specific investment decisions, the decisions on the sectoral allocation will have to be made. This will require balancing the use of funds between productive enterprises and providing the services that make it possible for such enterprise to function and following that, deciding specifically on the kinds of enterprises that warrant investment, and how much and for what.

The RAMS approach to identification of investment opportunities is via the study of activities to be undertaken in order to achieve the government's rural development objectives. These studies are embodied in the various option papers concerning alternative development strategies. The productive investment opportunities are an outgrowth of the rural production options, and the sum of investments required for each strategy represents the level of productive investment opportunity. The levels suggested by the option paper are substantially lower than the level of investment that would be possible according to the macro-economic model used to determine the availability of financing. While there are factors that could explain a good part of this difference, the strong implication remains that there is a potential for investment for which no ready set of programs seem to be in mind.

### Manpower

Lack of manpower is not a problem, at least in terms of numbers. To the contrary there is a problem of finding enough new jobs to employ those entering the labor market. If current practices are followed, the present estimated 70,000 unemployed, largely in urban areas, could grow to 400,000 by the end of the century. This would represent an alarming percentage of work force. The figures cited do not include rural under-employment which is believed to be widespread. As discussed below, there is a manpower constraint to be overcome, but it is one of the shortages of trained manpower from the entrepreneur to the literate unskilled laborer.

The constraints to development, therefore, are not primarily monetary but, rather, social and organizational, coupled with a lack of trained as opposed to general manpower.

### Social Issues Affecting Rural Development

The ethnic diversity complicates a number of social issues bearing on rural development. Varying attitudes about health, nutrition, education, individual versus cooperative endeavor, agricultural labor, risk aversion, individual versus hierarchical control of the land and its production, and land ownership are issues that can frustrate attempts to establish universally applicable laws, regulations, and practices in areas inhabited by two or more different ethnic groups. Development programs that do not take these differences into account and try to accommodate them risk alienating the disaffected group or groups and jeopardizing their participation.

There are undoubtedly many such constraints but a few of the more obvious ones readily come to mind. There is a problem with respect to land tenancy -- how this issue affects who should work the land, and for what rate of return, and who should or will make the necessary investments if the land is going to produce effectively. As noted earlier if these kinds of issues are not resolved, then government investments in irrigation infrastructure and other aspects of agriculture will not produce the growth potential the economic models indicate is possible.

The entire area of price policy, particularly for agriculture, complicates the formulation of an appropriate program for agriculture investment and protection. Decisions regarding the prices of farm products affect farmer income, hence the decision to invest and produce. If prices are kept artificially low, or foreign aid agricultural commodities are dumped into the market, there are disincentives to produce. On the other hand, there are pressures by consumers, particularly those in the urban areas closer to the seat of political leadership who may carry more political weight, to keep prices to consumers artificially depressed.

### Work Attitudes

There is the entire question of attitude toward work and education. Are existing attitudes a hindrance to development and, if so, at what pace and how should they be changed? What should be the role of public education in this process? Is the role of functionaries to be helpful to the people they serve or is public office an escape from being involved in these kinds of problems?

All these issues are a reflection of a complex traditional society whose exposure to modernization is only recent. The complexity in Mauritania is compounded by the fact that there are a number of societies living side by side with varying degrees of overlap and conflict and in the process trying to share political power, if not leadership. These factors impinge on the political decisions relating to development as well as complicating the task of carrying out those decisions once taken.

### Urban-Rural Competition for Resources

Independence brought forth the emergence of an urban sector which hardly existed in the colonial period, except to provide minimal services for the rural areas, and a small separate economy based on mineral production that dealt with the outside world. The emergence of government functions created urban areas, particularly Nouakchott, which were viewed as outlets for the under-employed and those with low and uncertain income in the seemingly more disadvantaged rural areas. A movement of people to Nouakchott started and build momentum reinforced by the effects of periodic drought. Initial settlers in urban areas called forth their rural dependents to join them. Services for the swelling urban areas, though inadequate, constantly attracted people from the stagnant rural areas. The availability in urban areas of a wide variety of appealing modern gadgets plus subsidized food added to the attraction. Today, there is little obvious evidence of malnutrition even in the squatter areas on the edges of Nouakchott. As urban population grows, more pressure is placed on government to shift the balance of power and allocation of resources to urban areas. (Compare the situation regarding the agricultural price policies noted above.) Another example is the emphasis in public health expenditures which are very largely made for visible, curative facilities in Nouakchott, even though the Third Five-Year Development Plan indicated that regional facilities were to be created.

The escape from this vicious circle is only in part to take the difficult and perhaps politically unpopular decision to reverse the balance in the allocation of resources to the rural areas. This, by itself, may be exceedingly difficult, if not impossible, to accomplish. The countervailing pressures may be too strong. An expanding level of overall resources, however, makes it possible to satisfy in large part the various contending pressures. The macro-economic simulation model

postulated investments in manufacturing and industry, as well as the rural area. If the figures used have some element of reality, funds would be available for economy-wide development and thereby result in achieving progress in both areas. If rural production is not maintained, then the non-rural area will have to buy (or receive as grant assistance) more food from abroad while sustaining an even greater rural-urban migration. On the other hand, if there is more productive enterprise in the urban sector, this will provide expanding markets and opportunities for the rural areas, thereby lessening the pressure on rural-urban migration.

#### Stemming Rural-Urban Migration

An area of compromise which is worth considering is to attempt to diffuse the rural-urban movement by offering more opportunities in towns. It would agglomerate people in smaller groupings but still in sufficient numbers to provide economies of scale in public services. Secondly, the rural-urban movement would occur over relatively shorter distances and a portion of the people could remain a rural setting while still working in the urban sector. Different family members could, therefore, work in different sectors while still living together. It would be less disruptive of the social structure.

The issue is to determine the projects that could be located in provincial centers and be undertaken by the people themselves as entrepreneurs (public, semi-public, or private), managers, skilled workmen and literate unskilled workmen.

Government policy has to encourage labor-intensive industry and, with few exceptions, on a case-by-case basis, discourage capital-intensive projects. To do so, however, efforts would have to be made to identify new industries at the individual project level. The identification process needs to include specific location and provide emphasis on spreading small-scale manufacturing and processing plants throughout the country. To the extent these activities can utilize materials from the rural sector (e.g. food processing) or find its market in the rural sector (e.g. agricultural implements), then the process would be made easier and have greater opportunity of success.

#### Education and Training

If both agriculture and small-scale-intensive industry are to be made more efficient and expanded, there must be a drastic overhaul of the educational system. Possibly, this may have to be at the expense of certain cultural values and the government's leadership will have to face this fundamental decision. If, however, output and income are to be expanded and unemployment reduced to acceptable levels, a better trained labor supply is a sine qua non. At the start, provision must be made

available in the education budget to increase literacy and numeracy for both men and women so that a level of at least 70% literacy for those in work force can be achieved by the year 2000. (RAMS report on Education as a Development Tool provides specific proposals for educational reform, including a mass literacy effort.) This could largely be accomplished by shifting funds from higher education, though at the primary level there would have to be qualitative changes. The primary level of study for the foreseeable future for by far the largest segment of the population for both men and women, would be terminal. Primary education would, of course, also remain as the base for proceeding on to higher levels on a functional basis. In this manner primary education would serve both the mass of the population that go no further and the much smaller number that continue.

Another fact of the employment/manpower and, hence, education issue is the more selective one of increasing the supply of trained manpower from the skilled worker and agriculturist categories to the managerial and entrepreneurial levels, both for the public and private sectors. Hence, hand in hand, while searching for and designing labor-intensive employment opportunities, there would be a need to ascertain trained manpower needs and to design a nation-wide policy and program to require, or encourage, the public sector to provide the necessary facilities.

#### Grass-roots Planning Inpu

The process of assessing specific needs to meet development goals may have its origin in global terms at the national level but can and should also be carried to the regional and community levels. RAMS, in fact, has participated in the beginnings of such a process through its role in the regional seminar program carried out over the past year. This initial effort indicated that communities can be organized to inventory their resources, postulate additional or expanded productive activities, both rural and urban, catalogue the shortfall in services, manpower, markets, infrastructure, and other factors which inhibit the application of existing resources to new opportunities and from this derive practical local development plans. Both the public authorities and the community private leadership can be mobilized in this effort. Building on such local initiative, a program could be worked out with national authorities to provide the missing ingredients. The national authorities would have the task of coordinating such plans from all the different areas and adjusting them to the availability of resources. This very process would upgrade the planning skills of regional authorities and involve community leaders in the process. Initial judgments would then be made by the persons closer to the scene but reviewed by those with a national outlook. Such an effort would require trained national leadership and selective training for regional staff.

The issues raised above represent alternative strategies for development in the sense of indicating that present practices and programs do not appear to be leading toward the GIRM's development goals. Key issues must be confronted and, in large part, resolved, if a growth in output with equity is to be achieved. Once basic decisions are taken, the alternatives become more a matter of degree and tactics. For example, as noted, there is a fundamental decision to be taken with regards to land tenancy. Are the present practices and systems really to be altered in order to provide the incentives to increased output, despite all of the social resistance that this may meet? If the answer is positive, then there are varying tactics to be followed and different rates or time over which different activities will take place, but these would not be truly alternative paths of development.

The same kinds of decisions will have to be answered explicitly or de facto as regards the provision of education or public health and other social services. Are basic changes envisaged that will lead toward development in the modern sense, or is it considered socially more prudent, if not desirable, to preserve and quite possibly expand the existing traditional systems, even if there are only limited resources to do so. The Option Papers support the latter.

The foregoing discussion deals with the economy in total and makes the point that the problem of the rural area are not independent of the rest of the economy. The RAMS charter was, however, centered on a "Rural Assessment", and RAMS studies, both in Phase I and II, dealt specifically with this major component of the Mauritanian economy.

One set of alternatives before the GIRM is between continuing the present course of action which, particularly for agriculture and fisheries involves an under-utilization of available resources and, on the other hand, technologically up-grading the present system. A more drastic shift would be to move from technological improvement for the existing pattern of production to a concentration on new systems, i.e., irrigated paddy lands as the main element in agriculture, plus the development of industrialized maritime fishing. As noted above, the basic issue is not entirely an "either-or" situation but rather one of emphasis. In the several option cited, cultivation practices are to be improved for rainfed and recessional agricultural while irrigation perimeters are to be expanded as well.

In summary, among the many decisions to be taken and issues to be confronted by the GIRM in pursuing its development objectives, the RAMS studies and Option Papers have highlighted the following that must be considered no matter which of the rural production options are selected:

- a. Is the government prepared to observe the budgetary balance of payments and debt service restraints necessary to generate the funds for investment in both rural and urban areas? Recent agreements with the IMF indicate that they are.
- b. Will realistic analyses be undertaken to ascertain the social constraints to increased investment in agriculture and effective programs be designed to ameliorate them? A major issue here is land tenancy.
- c. Will a critical look be taken at GIRM technical services to agriculture livestock and fisheries to make them more effective, to reach a larger audience and to have more acceptability? Will the necessary complementary facilities such as credit be made available so that more modern techniques can be introduced?
- d. Will agricultural economic policies, such as decisions on the price and importation of cereals be made to encourage agricultural production?
- e. Will efforts be made to establish specific policy guidelines integrating BHN with growth objectives and assuring that services, such as public health and education are extended nation-wide and, in particular, to the rural areas?
- f. Will the education system be revitalized in order to move toward universal literacy and begin to provide the trained manpower required for development?
- g. Can development authority be shared at the regional level, and can regional staffs be augmented and better trained to accept this responsibility?
- h. Will efforts be mounted to identify and elaborate labor-intensive agriculture related small industries that can be located in the smaller urban centers?
- i. Lastly, will consideration of these issues be given in the context of an overall planning process which requires not only training of personnel and adequate budget but also endorsement and continued support at the highest level of government?

## VII Project Priorities

As a follow-on to the data and analysis contained in the RAMS Phase I and II reports, 12 specific project suggestions have been prepared as illustrations of ways in which the RAMS report can be useful in developing specific project proposals as the Mauritania Government pursues its development objectives.



The particular selection of illustrative projects for presentation does not represent any comprehensive ordering of priorities of activities deserving first attention or indication as to how funds should be allocated. They are illustrative of the way in which the RAMS effort can be further pursued to the point of individual specific development activities. The projects should be seen as part of RAMS overall function in the areas of its competence to provide background material and formulate Options to facilitate the GIRM in its task of setting objectives, determining priorities, allocating resources, and undertaking specific activities.

There are, of course, certain broad objectives to be found in the development plans of all developing countries and which have already been set forth by the GIRM as key issues of concern. The illustrative projects focus essentially on the protection of the environment and employment generation, two key areas of importance to the realization of Mauritania's development potential. Fisheries and agricultural production projects also are identified.

All of the identified illustrative projects have been written up following the Comité Inter-Etat de Lutte Contre la Secheresse au Sahel (CILSS) project format. They are presented in RAMS' report entitled "Project Dossier".

While the RAMS Phase II methodological and Option Papers have not been used to develop specific proposals in the CILSS format, some additional possibilities emerge that could easily be elaborated. For example, the paper on the Framework for Computation of Rural GDP involves the construction of an illustrative input-output table which could be further developed and refined as a tool to identify and evaluate specific investment opportunities in the rural sector. The Basic Human Needs paper pinpoints areas where GIRM action is required to raise minimum living standards above the poverty level. The Public Health/Nutrition and Agricultural Institutional Framework Option Papers suggest a broad spectrum of choices of projects. The Manpower/Employment Option Paper suggests the development of an Entrepreneurial Code in lieu of the Investment Code as a basis for promoting labor-intensive investment. This Consolidated Statement provides some general guidelines on a training and data analysis project in regional development planning. Specific project proposals could also be derived from the Rural Production Options Paper.

As the GIRM is well aware, undertaking a series of seemingly worthwhile but largely unrelated projects is not a substitute for planned development. On the other hand, once the guidelines are established, priorities set and broad resource allocations made, then implementation will occur on specific projects. Resources will flow to the projects that are ready to go.