

SOME ENVIRONMENTAL PROBLEMS CONCERNING  
AGRICULTURAL DEVELOPMENT PROGRAMS

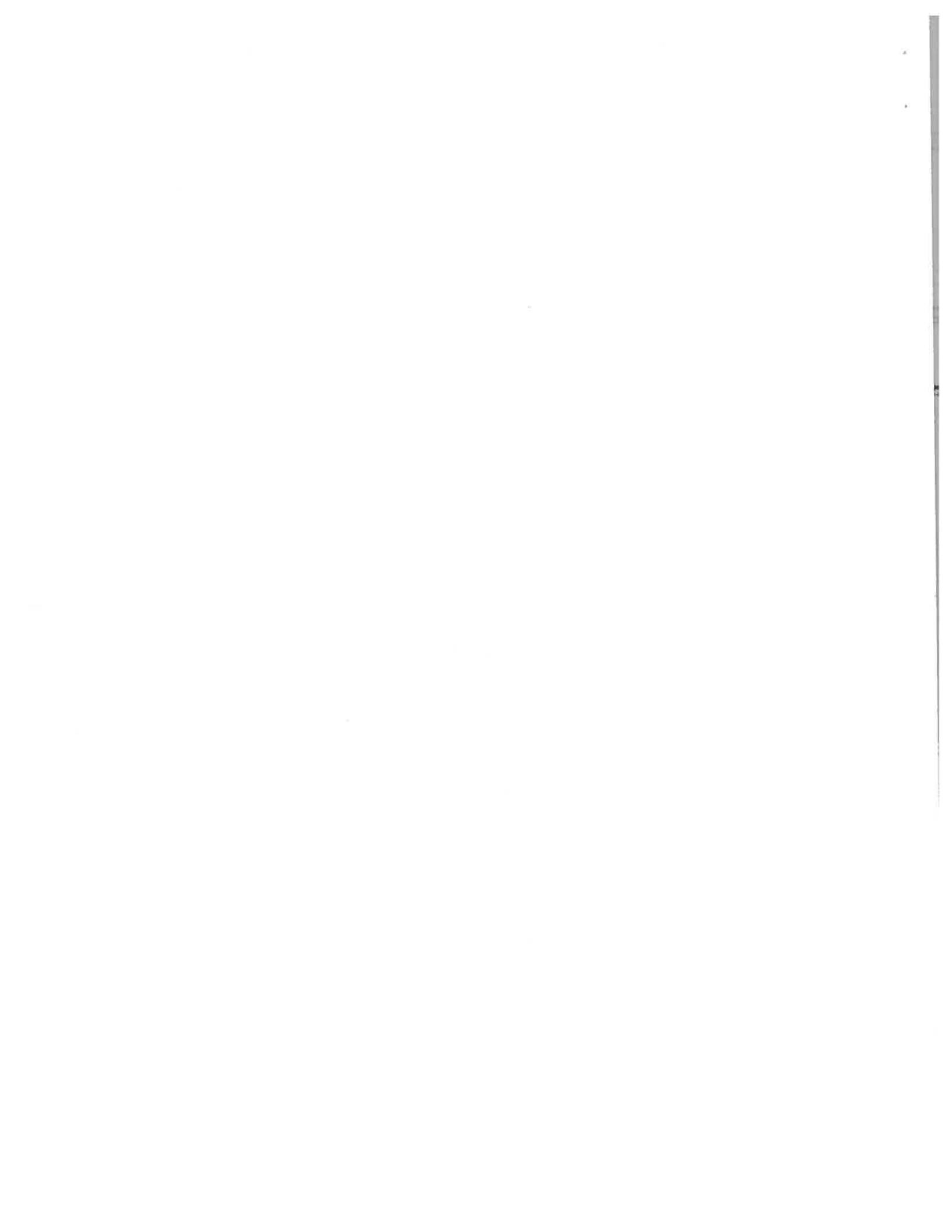
An Additional Paper

by

A. El-Sweedy and I. Anter  
Soil and Water Research Institute  
Agricultural Research Center  
Giza, Egypt

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## INTRODUCTION

Human activity aims to achieve a special benefit or reach an appropriate goal. Any activity phase is mainly accompanied by inevitably side effects for Man or for the environmental sources. This is a sustained law controlling the relationship between man and nature since the beginning of mankind. The new aspect arising these days which scared the Global society is the range of human activities which has been reached to a high condensed degree that was entirely reflected on the norm. The new environmental problems are caused mainly by some important factors. It could be said that the two substantial factors are:-

First: The explosion of inhabitants number and the prolonged effect of the accelerating man pressure on nature since it is only the **unique** source for providing all his needs.

Second: The advanced of progress in fields of applied science and technology which enlarged the influence of mankind on the **environment**. His influence, in return, became more powerful than it has used to be before.

The interaction found between the two previously mentioned factors has revealed in new serious and dangerous situations. Under the high pressure of the accelerating human needs, science and technology are progressively used in hurry but in a way that cannot avoid their serious and dangerous side effects.

There are many examples dealing with dangers facing the human environment. Various phases of human activities are environmental in agriculture, industry, inhabitation, transporting, transferring and housing. This paper concerns with problems and side effects that arises as an adjacent to human activity in the agricultural field focusing on those concerning with arid and semiarid regions. Discussion will try to tackle the problem looking for any feasible solutions which will help in overcoming these problems.

In brief, it is worthy to mention that factors involved in any problem should be inversely taken in consideration when looking for an appropriate solution. It means that we have to concentrate on items that could achieve an effective and successful development for

an agricultural process keeping an open eye on the benefit of the ecological conservation as a final target.

## ENVIRONMENTAL PROBLEMS

### 1: Agriculture and Ecology:

#### 1.1. Traditional Agriculture:

There is no doubt that man has interfered in and changed his ecology and the natural resources through a specific or several ways. The range that was available for him was very narrow specially, through proceeding the old traditional agriculture which has been prolonged used for ages with no serious damage. Globe population, on the other hand, has neither been so enlarged as it is now nor the essential needs of the inhabitants became uncountable and variable.

Eventhough the traditional agriculture systems were accompanied by some ecological problems . They can be mentioned as follows:

- a: Nutrients losses from soils, either by soil leaching resulted from heavy precipitations in humid regions or by plants uptake with no proportional fertilizer applications or recovery.
- b: Removals of forests which led to soil deterioration and shortage of organic matter content in soil.
- c: Soil erosion by both water and wind. Removal of forests also affected soil erosion to be more inevitable by heavy precipitations, long draught periods and flushing floods.
- d: The responsibility of the traditional agriculture system; which is still followed in the underdeveloped countries, enhanced creating the problem. Under the severe pressure of the accelerating needs of the consistent growing number of the inhabitants, the system revealed in continuous exhaustion for soil and water resources. Of course, these serious results are mainly accompanied by severe deterioration in soil fertility as a resultant of the condensed usage with no reliable compensation by fertilizers application.

Environmental problems accompanied by the traditional agricultural systems have special features of which they intercourse rapidly and most of them are irreversable. Correcting these side effects needs a very long time and large capitals too. The best way to avoid these problems is by better planning rather than improvement. Good planning for land use concentrating on conservation systems will protect soil & water resources and serve surplus handworkers to be directed to soil cultivation and better conservation.

### 1.2. Modern Agriculture:

Whatever we criticisizing the traditional agriculture, it is more sustainable if compared with the modern one. To apply the progressive population and the inhabitants needs, all countries are trying to drive and exploit the modern systems and technology to further limits. The environmental problems; therefore, have reached to a special degree of variations nameley expansion and critical situation that has not ever been known before. The most important features for the modern agriculture or for their effect on the environment has been

discussed by the experts committee convened by the Secretary General of the UN conference on the human environment (Kishk 1979).

The fundamentals of the experts report can be summarized as follows:

1: Vertical expansion in agricultural field means that more condensation will be followed. Agriculture condensation means high increase in inputs specially those concerning energy or chemicals such as fertilizers, herbicides, insecticides, diseases and growth regulators. These compounds will result in severe environmental problems such as soil, water and food pollution to the toxic extent. This could be realized either as sudden accidents or through the accumulating effect in plants, animals, fishes, birds and man. In addition, they may come over the natural enemies of the harmful bits which, on the other hand, have accepted a partly immunity against such these chemical compounds. The conclusion would be ended to an empty circle, it would be necessary to use more quantities and therefore more pollution and harm would be achieved.



The partly volatilization of these dangerous compounds from the ground; especially if they were atomizically sprayed, will affect the Ozon layer in the higher atmosphere cover. This will put a disaster to life all over the Globe.

2. The modern condensed agriculture is based on a commercial scale where production turns to the market's needs more than for self-satisfaction. If agricultural production is directed to economical consideration this will leads to ignoring the necessary balance needed between the two important phases: the retainable yields in short run and the conservation of soil and environment from deterioration. The accelerating exhaustion of soil will lead to its deterioration in a relatively short time specially in arid and semi-arid regions. The desertification activity will be certainly lead to a barren desert.
3. The third feature in the agricultural development process will lead to constructing major irrigation projects. This will result in uncountable side effects such as raising water table level, salt accumulation

and therefore soil deterioration, increasing erosion and run off problems and spreading special diseases found in case of the permanent irrigation system.

A good example of Man influence on Natural Hydrological Reigmes that was made by Egypt, Abu-Zeid (1980). The indispensability and importance of water projects for the country's development has caused the Government to give it due consideration and attention. On that basis, the Agriculture and Water Research Centers were established to assist and evaluate all possible water and natural resources in the country based on the latest available technological and scientific methods. Among 20 scientific institutes, the High Dam Side Effects Research Institute has been established to carry out hydrological studies of the Nile within Egyptian territories. Impacts of the High Dam (one of the biggest irrigation projects in the world) are carefully and continuously evaluated and investigated. Experience which Egypt gained in solving these side effects for such large project will benefit other developing countries which are looking on such projects

to improve their national income.

Experience showed that many theoretical approaches have proved its uselessness in solving natural water regimes affected by Man. Only single rule must be followed in trying to find out answers or solutions is Nature acts and reacts in a natural way.

4. The major irrigation projects cannot be performed without any other developmental projects for river valleys otherwise many harmful problems for human will arise.

These dangers were referred to by the Expert Consultation in their report (Project 10 - UNESCO, Map 1976). They could be summarized as follows:-

- a: Dangers on public health due to diseases spread from aquatic environments, bad nutrition resulting from shortage in fishery production, and problem diseases related to cohesive numbers of inhabitants which should be reinhabited in other places. An example, the Nubian inhabitan-  
ce project which was carried out to face the side effect of the Aswan High Dam on the area in

the southern part of Egypt .

- b: Problems due to the aquatic weeds which are accompanied by lack in fishes numbers as a result of competition in light and food in addition to difficulty in fishery production, evaporating loss, raising costs of living and increasing disease disasters.
- c: Problems in fishery production such as fish immigration and nutritional disturbance in the aquatic body.

5. Modern agriculture is in great need to agricultural machinery. Some environmental problems may arise when following improper machinery techniques such as destroying soil structure, formation of compacted sub-surface layer which impede water permeability and root penetration. Impermeable surface soil layer causes soil erosion problem due to severe run off. More depending on machinery system will lead to more consumption of generating power which affects serious pollution for a culture <sup>that</sup> has been kept clean before. It also contributes to enlarging the international famine problem. Condensation of machinery

systems, on the other hand, may result in producing serious social problems in highly populated countries such as unemployment which cannot be ignored at all .

6. For these reasons, agricultural development should be only carried out through an integrated rural developmental processing frame. Agricultural industrialization, therefore, in rural areas is of great importance in this substantial development. But, on the other hand, Agro-industrialization for rural regions may result in some other environmental problems which pollution in return will not be of the most serious effect.
7. Eventhough, the high productive varieties of cereals such as wheat, corn and rice which have been discovered and were spread in what it was called the green revolution, these new varieties may cause some harmful environmental effects. These new varieties are in need to high doses of fertilizers and insecticides. In addition, they have replaced other local varieties that have well servived with the environment through the natural selection process. Cotton and rice were

originally tropic crops but their maximum production are now realized under subtropical and moderate regions. So, it could be said that man has interfered to change the distributing map of different crops among the world.

8. There is no limitation in the economic, social and political influences accompanying the agricultural developmental processes in case of the wide variation in total income and property for the agricultural workers in most of the undeveloped countries. Modern agriculture: which our discussion have demonstrated some of its features, will not be useful except for rich advanced countries or individuals who have sufficient capitals and necessary experience.

The problem will widen the gap between rich and poor either on individual or country scale. This will affect in creating serious social disturbances which is a special phase of the environmental and dangerous categories.

9. For all these reasons, it could be seen that modern agriculture will be contributed by new modern systems that would be accompanied by many environmental

effects. Of course, it doesn't mean giving up agriculture modernization or reverse back; that is a vital necessity. Agricultural developmental planning process must take these factors in consideration in order to avoid their serious effects. Through well planning, these problems will be improved and solved satisfactorily.

## 2: Desertization and Desertification:-

There is no doubt that the reasons involving in creation of Desertology have drawn attention to the importance role of man in avoiding serious famines or disasters. Many factors are affecting the range and <sup>the</sup> speed of desert encroachment, they are concerning with climate, soil and topography. So, desertization is a process that can't be controlled by man, it is belonging to Nature. But man, on the otherhand, is the first maker in spreading desert through depressing soil productivity. So, desertification is an expression referring to the great importance of man role in creating this phenomenon. In this respect, the process is prone to his thumb consideration more than to the

environmental and climatic factors. Since desertification has been considered to be the problem of using soil drastically, so man is the maker and the victim too of the phenomenon in the same time.

The problem of desertification directly affects two thirds of our Globe, but the remainder third is still partly affected. Since arid regions cover one third of the earth surface, desert encroachment was found to be acting seriously and quickly. The expanded desertified area covers about 5-7 millions of hectares annually. So, standard of living and life would be in inverse affected for several millions of people.

A true example for desertification under Egyptian Environmental Situation is due to the ambitious planning to serve any natural resources. Water in Egypt has become a scarce source. Experience has shown that what was ones "waste" become another user's water source. Since the arable land in Egypt is alluvial, calcareous or sandy soils, it was found to be interfered with the irrigation streams and desert regions. About 40-50% of total arable land under cultivation was found to be affected by desertification process, Anter (1979). The



majority of this affected area is due to salinization and alkalization processes which are in return be reflected on the physical and chemical soil properties. Most of the reclaimed area under cultivation are saline and alkali soils. In addition, a great portion of the arable land are drastically deteriorated year after year. Another addition on non salt affected soils may be added as a result of improper land use or the uncorrect planning for some new projects. We have to put an open eye on this serious result and try to put a well planned program for soil reclamation taking in consideration the accelerated annual rate of the growing needs of population. Solving the saline and alkaline soil problems well achieve this economical and national goal.

To render these factors suitable, sophistication of all the methods must be implemented. Estimation of the best leaching methods for saline and alkaline soils, changes that may be happened during the process, and the salinity level to which it should be depressed before starting cultivation, all these factors must be concerned. Also, the required amounts of ameliorants, methods of applying soil conditioners should also be evaluated in

order to obtain substantial improvement in soil structure and to keep any further deterioration away.

Another point of view concerning the estimation of the leaching requirements needed for these salt affected soils is the chemical interaction between different salts with the adsorption complex which must be taken in consideration. The physical soil properties like water and air permeability during leaching should be included.

If soil was put under cultivation before an appropriate degree of reclamation, any fertilizer application will therefore increase the problem. Unsatisfactory germination will be achieved, seedlings also will be very weak. All money paid and efforts done will be lost, it is a foreseeable failure. In one sentence the system will be directed then to a phase of desertification again.

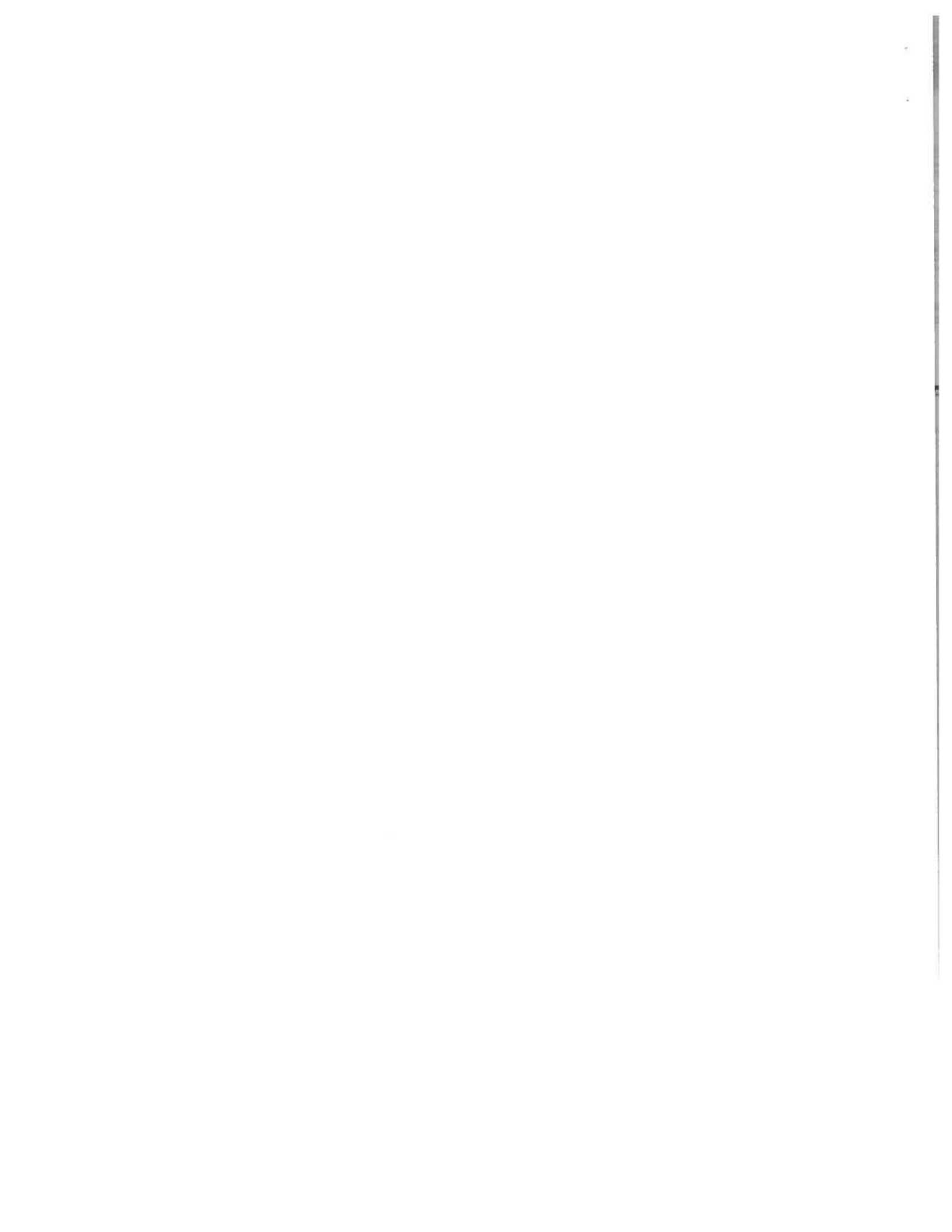
The reclamation process of salt affected or any soils under the horizontal expansion which are proposed in any developmental plan must be considered as vital necessities which should not be ignored. So, discussion must be concentrated on methods for exploitation this

important sector on technical and economical bases, keeping in mind that any soil reclamation or new cultivation is in close similarity to those concerning establishing heavy industries in any country.

Studying all variables that can; directly or indirectly, influence agricultural production must be taken in consideration when planning for such these reclamation and cultivation projects. The relationship and the integration of these variables should be evaluated. They can be mentioned as follows:-

The first point concerning with the territorial variables, those which have foreseeable effect on production and include rate of improvement, the feasibility of reclamation and cultivation projects in case of putting new areas under cultivation system.

The second, is the evaluation of any agricultural situation and its reflection on the technical and the economical feasibility. This will include all the primary and the integrated studies such as aerial photography, hydrological studies concerning digging wells and geophysical studies to estimate depths of layers that contain water. Soil surveying and chemical analyses

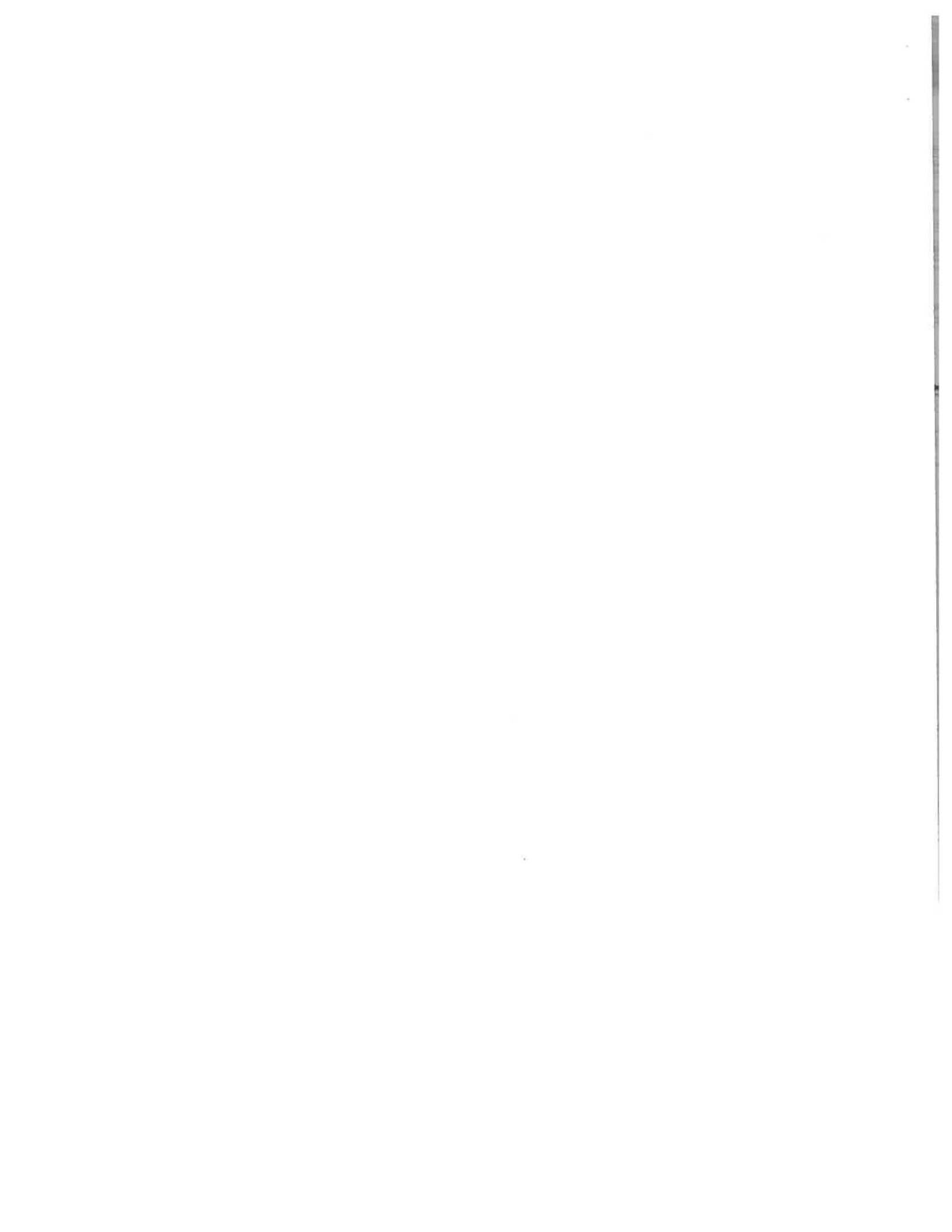


are essential in estimating the feasibility and the exploitation of the under ground or surface sources for irrigation purposes.

According to the obtained results, it could be available to survey the productivity power and its economical return of the area. Engineering constructions including specification of drains, stream courses and a complete irrigation and drainage system will be also available by surveying the physical drainage property in the area. So its drainage needs will be precisely predicted.

Detailed studies are also useful in specifying proper depths and distances between drains either for surface or covered drainage circuits. To render all these suggestions suitable, experimental farms must be established to get use of any applied studies and for collecting climatic data. Estimation of water requirements for crops must be calculated on which canals and streams will be designed to convey efficiently the proper quantities of water needed.

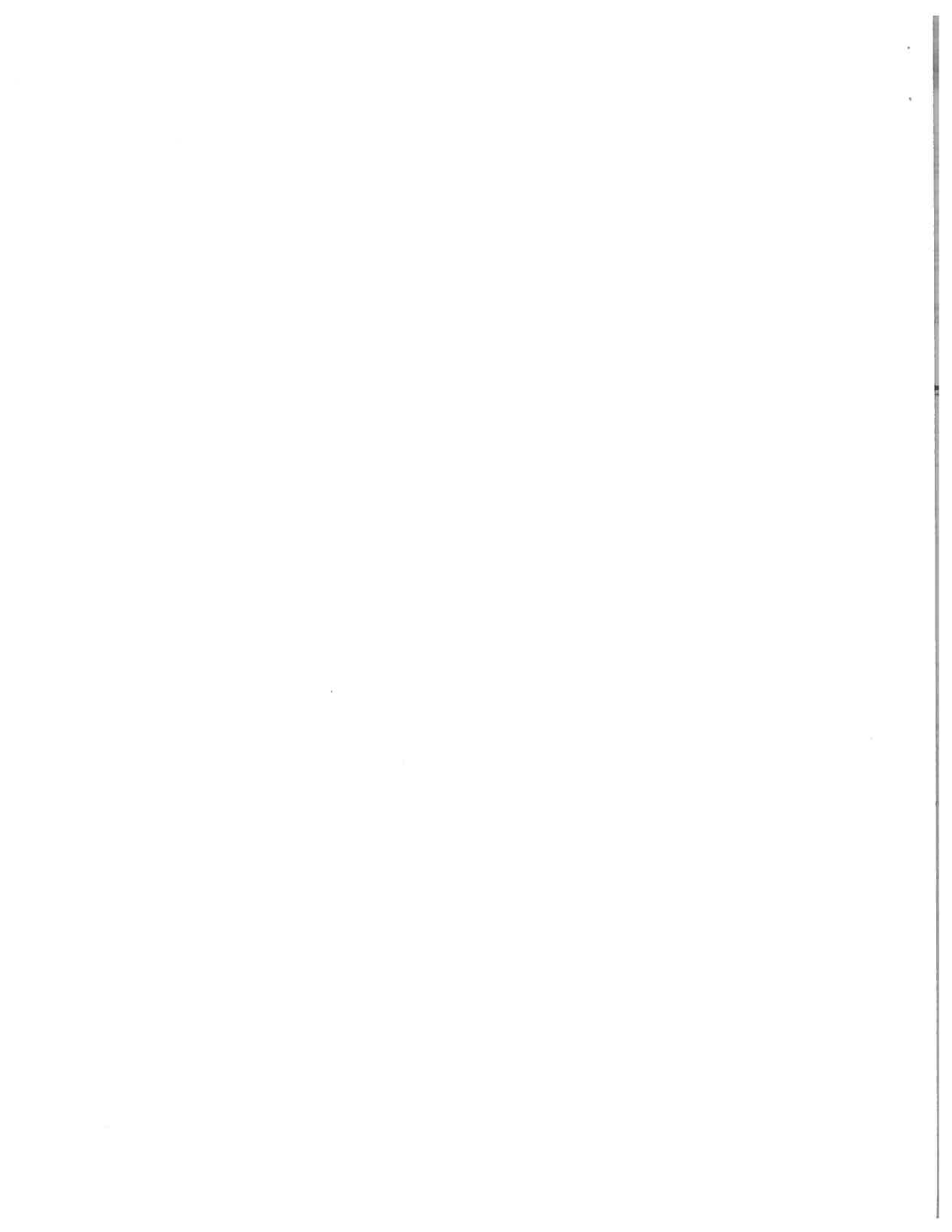
Still we have the humanity studies since the nature of a society in any area is significantly different from those in other regions



The last comment is that, since the process of development is consistent and dynamic, further studies and collecting data concerning the same area or other regions should be continued to face any change in the variables under study.

Since the human factor still be the superior, a great importance must be devoted to the urban activity and the training programs for technicals and well qualified labours.

If we succeeded in sophistication of all these methods and resources. I think that the environmental problems concerning the Agricultural Development Programs have been tackled usefully on the best and the realistic productive consideration for the welfare of man.





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