

A NEW GREEN REVOLUTION

of Desert and Stepe zone

By Moringa Trees and New Irrigation Work

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ADDRESS

Today we have many problems, namely an explosion of population, a limit of food productivity, a waste of resources, the limit of resident place, etc.

Though human culture has developed by finding many possibilities saying that we have conquered nature, it has seemed to have reached the limit in a fundamental problem.

Especially as regards the productivity of the food, the surface of the land has reached the limit. After this, it will be carried out in the torrid zone, the other undeveloped region, or a desert and a steppe area.

Of course, still we have enough possibility of a production increase thanks to a modern agricultural technical development and an improvement of productivity at the unit area, however, it is clear that the time will come when we must make use of the torrid zone, the undeveloped zone, the desert, the steppe area as a cultivated area.

This paper is introduction of the result of experiment and enforcement in cooperation with Japan India Cultural and Welfare Association, Gandhi Memorial National Fund, Indian Government, and other leaders to show in all the world as a guidepost.

Tatsumaru Sugiyama
General Secretary of I.C.W.A.

PROGRESS

In 1955, International Culture & Welfare Association was founded and it started to guide agriculture and agricultural handicrafts, the other national life and industrial technics.

In International Culture & Welfare Association, Tatsumaru Sugiyama is a founder and General Secretary of this association, and a chance of his work is as follows. His grandfather, Mr. Shigemaru Sugiyama cooperated with Dr San yet Sen of China and Mr. Ras Bihari Bose of India in deciding on a fundamental course of Asian national life and agriculture. About 1892, especially, Mr. Shigemaru Sugiyama inspected China and the other Asian countries, and then he prepared to base a study of agriculture on Taiwan.

Under his preparation, agriculture in Taiwan has achieved a great success in the world thanks to Dr. Eikichi Iso, a professor of North Taiwan University, a member of Agricultural Technical experts of Taiwan Government House of old Japan. This result drove Mr. Sugiyama to India to guide Indian people by the technics.

Then, He has investigated and experimented India since 1962 as a guiding principle.

India and Taiwan were same latitude, so the way of deciding the fundamental principle was not mistake, and yet, between them there were fundamental differences in climate and weather, geological features, and culture and history.

I had investigated these fundamental problems again, and I had studied the method of solving these problems, and I had experimented necessary matters with participants.

As in September 1974, I.C.W.A. obtained excellent the results, and yet, it has many concrete problems, it should carry out the practicable problem in each country making use of each character and each condition as soon as possible, sending some reports to all the world explaining today's condition of the world.

THE CAUSES OF THE DESERT AND THE STEPPE AREA

Many deserts and steppe areas have not cleared their causes yet. Generally, it has been considered that a bad weather, especially lack of the rainfall has brought the desert and the steppe area. Examining each desert and steppe area, however, I was aware that every desert and steppe area has not always come out only by a natural condition.

I will state some causes of the desert and the steppe area here.

1. Upheavals on the earth

The earth is divided into some earth's crust-plats. It is said that in each contact side, one plat is slipped into another plat. Then the contact side lies up gradually because of a lift movement of the slipped plat. And the water level of a water vein which streams on the surface of the earth or under the ground changes into the underground deep one.

Then, the surface of the earth becomes a dry condition far beyond the underground deep stream, and such a dry condition brings the desert and the steppe area.

2. Historical change of the earth

In the history of the earth, many changes have happened and a Continent has moved since the time when the crust was created. The history of the earth is divided into the Archeozoic Era, Abiogenesis Era, the Paleozoic Era, the Mesozoic Era, and the Cenozoic Era, from the point of geology.

Many changes have happened since the Archeozoic Era when the crust was created and since the time when the Continent was created.

Especially, the Devonian period of the Paleozoic Era had a condition which a high temperature and dryness come out and the desert was born on the vast land.

Such a condition happened at Triassic of the Mesozoic Era.

The present continent is considered to have same condition as each Era up to now, too, or even though such a condition has come to an end on the whole, some deserts have remained till now like Gobi Des, which has remained being isolated because of the far distance from the sea and a creating activity of the mountain range in the inland of the Asian Continent.

Thus, the desert has been made by the earth its own chang, the movement of the Continent, the movement of the Poles, the weather condition, the creating activity of the mountain range, and other condition. These conditions should be considered.

3. Weather condition on the slope of the mountain range

The weather condition on the slope changes in each mountain range, and the both sides of the mountain range have quite different rainfalls and temperatures.

Especially, many geographical features which construct the mountains make a deposit or an alluvial land of big gravel or soil on the plain by means of a sudden copious rainfall concentrated on a limited area, the change of the temperature, the weathered rocks by strongness and weakness of the sunbeams, the flow of soil and others which are caused by the change of the weather condition on the mountain range.

If the water level changes or the dry condition comes out in such a plain, the desert and the steppe area will be made in a section or in a large area.

4. Lost forest and grass caused by a human culture and animals

Examining the flood of the Ganges Valley, the desert, and the remains of the Indus Culture, I found many ancient bricks, the remains of stone pavement, and a heap of broken pieces of old earthen vessels and pottery.

Also, I found that abundant wood and charcoal was used for production of bronze ware and iron ware, and much firewood was used for cooking in an ordinary life.

In addition to the above mentioned historical condition of the earth, I found that the human culture has lost the forest in especially the Himalayan Mountains and Decan Hills.

Also, I found that over breeding of the animals has lost the grass. And the area having such a condition brings the desert and the steppe area.

Therefore, it is considered that such a condition brings the desert that a break of balance between the condition which the forest can exist naturally and the condition which the human culture needs for firewood or the animals must eat the grass.

The above is what I.C.W.A. has studied and investigated about the causes of the desert and the steppe area up to now. They are not all complete causes, and each desert has not only one cause, but many compound causes.

In case of making reforestation on the desert and the steppe area, the above causes should be considered, and an element considered from the above causes should be cleared.

Also, the weather condition, the geological features, the contour line, the water level, the source of a river, the condition of plants, and others should be examined.

Also, a presumptive plan should be made and the most probable desert or steppe area should be started at first.

In the history of the earth, there has already existed life before the appearance of man. In the beginning of the Paleozoic era, there was no land, but there were only sea and mountains. The first land appeared in the Mesozoic era, and the Cenozoic era, from the point of geology.

Such a condition happened at the time of the Cenozoic era. The present continent is considered to have been in this condition up to now, too, or even though such a condition has come to an end on the whole, some deserts have remained till now like Gobi Des, which has remained being desolate because of the far distance from the sea and a very aridity of the mountain range in the inland of the said continent.

SOME MATTERS OF PREPARATION FOR GREEN REVOLUTION ON THE DESERT AND THE STEPPE AREA

The former enterprises of planting trees on the desert and the steppe area could not have helped giving up or been given up till now, because the desert and the steppe area have impossible conditions for human life.

It should not be forgotten that many people have tried to plant the trees on the desert and the steppe area up to now, but in vain.

It was not until quite recently that Kibutsu of Israel or each country of Arab League having oil made some trials, and some successful examples were reported.

As I have no concrete data what the successful examples are, I cannot state clearly, but I have heard the example which has planted the trees on the desert by using vast equipments and money. Still, I cannot consider the example could solve the desert fundamentally.

Also, there is the successful example that has planted the trees and has made agricultural crops on the sand hill of Tottori in Japan, and an active study has been done for solving the desert.

Still this method is considered as solving a limited area.

The vast desert and steppe area cannot be solved by such a method.

The enterprise of planting the trees has very difficult problems, so it must examine and study in all its aspects, and it must prepare methods.

1. To examine and study as much supposed causes and process of having become the desert and the steppe area as possible, and then, to calculate each power worked to the causes and the process.
2. To examine and study the geological features of the surface of the earth and the underground, and then, to make a map and a structural map of the desert and the steppe area.

3. To examine and study the weather condition, especially the rainy season, and the change of a quantity of moisture of the underground in the desert and the steppe area.
4. To examine and study a distributed map of a stream in the desert and the steppe area and the surrounding place, the underground water vein and its water level.
5. To examine and study each variety and its botany and its growth process of plants of the desert and the steppe area.
6. To examine and study the area influenced by alkaline soil and area of the desert and the steppe area and its concrete actual condition.

The above is the fundamental matters for investigation of the natural condition necessary for planting the trees on the desert and the steppe area.

Especially, the examination and study relevant to the above matters is required, because there are various causes in the desert and the steppe area, that is, the geophysical causes, the historical change of the earth, geographical condition made by the creating activity, and a way of human culture.

Then, I will state the necessary matters of preparation for carrying out actually planting trees on the desert and the steppe area.

1. As result of the examination and the study of the natural condition, the most possible area of planting the trees should be found out.
And then, to make the plan of planting the trees to put the area on the whole area, and to make the phased plan needs planting trees the first and the second, etc.
2. To make the plan for water supply and irrigation on the desert and the steppe area.

It has much possibility that this plan will be the same plan as the above No.1's plan, that is, the convenient area for water supply has much possibility of planting the trees.

No.1's item, however, states the area where the tree can be planted as it is, that is, it needs no artificial water supply, or it needs only a slight device. In this case, it states the area where the tree can be planted by the artificial canal, oasis, lakes, seashores, or by damming up the hidden stream flowed from the mountain range, that is, needs the water supply.

3. To select a useful plant for planting trees on the desert and the steppe area, and to study and examine its botany and to make a plan.

The useful plant for planting is not only a kind of trees. It should be considered that the plants will become a different plant zone by the change of soil and the botany of plants in the geological features or the surface of the earth of the desert and the steppe area, that is, a sandy place, gravel, etc.

As the first one, a kind of grass, a middle one between grass and trees or graninaces grasses or a kind of bamboo should be planted to take root on the desert and the steppe area and to change sand and gravel into soil. Then, secondly, it is important to consider a changeable tree by compounding with other trees and to select a tree which is the most rapid growth, and makes good soil.

4. To make a plan about equipments of the water supply or irrigation necessary for reforestation on the desert and the steppe area, and to select a machine and to make know how to use it for planting trees.

The desert and the steppe area has a difficult condition for human life, so they have almost no machine. Therefore, a very difficult condition and dangerous condition will be caused by a small fault or defect without enough plan or preparation.

5. To make a plan to inhabitant and Government office on the desert and the steppe area.

It is necessary to make a plan so that they can understand this work, and they can cooperate it, and a plan for getting necessary food for them or materials necessary for this activity, or transport.

The above is the matters of preparation necessary for Green Revolution on the desert and the steppe area.

Also, it is necessary to make a center in carrying out the above matters, and select a test place, and to consider the above matters in preparation necessary for this test place.

ABOUT KIND OF THE USEFUL PLANT NECESSARY FOR PLANTING TREES ON THE DESERT AND THE STEPPE AREA

It is the most important work of this enterprise to select a kind of useful plant necessary for planting trees on the desert and the steppe area.

It is difficult, however, to plant trees only one kind however it may be superior.

Here, we must consider various conditions of the desert and the steppe area and the growing condition of plants.

The desert and the steppe area has little organic matter in the soil and the sand besides lack of water.

Also, alkalinity is shown by two conditions, a geological condition and a chemical condition. In the geological condition a lime stone bed or a rock salt bed exists in the process of the historical change of the cause of the desert and the steppe area. In the chemical condition, organic acid becomes salt by dryness.

It is necessary to select a kind of suitable tree considering animals, a native life, and climate and weather.

Also, it is required to study botany, the process of the growth of grass, a middle plant between grass and trees, a real tree, how to plant trees to grow with other trees.

It should be considered especially to select a kind of tree which is useful for the native life and people will plant trees willingly.

Also, the desert and the steppe area are ranch, so the ranch condition should be considered.

It is difficult to plant trees without considering living animals and the human life.

Enough study has not done according the above matters, and the achievement has a little suspicion, but yet, here is Moringa Oleifera as a possibility of planting trees on the desert and the steppe area, which I.C.W.A. has seeked for 10 years, also, Dr. Dogra has studied, a scientist in charge of trees Genetics Laboratory of National Botanic Gardens of Lucknow, U.P. India.

The Moringa tree belongs to a kind of "wasabinoki" or horseradish variety. There are 15 kinds of Moringa trees, and this tree can be divided broadly into two types. One is the Moringa Oriefera, and the other is the Concalenses.

The former has a sweet young leaf, bud, and fruit, and the latter has a rough one. The characteristic of this species is to strong in alkalinity and dryness.

This tree can grow on only the tropical zone. In regard to the usefulness of this tree, the young leaves, buds, and fruits can be used for food, and leaves can be used for manure, and trunks can be used for pulp wood, and roots can be used for spices.

This tree can grow very quickly. After three years, it reaches a height of 7 meters, and the trunk becomes more than 30 centimeters in diameter.

The examination and study of the growing condition has not been made scientifically yet, but this tree is suitable for planting on the desert and the steppe area.

The Prime minister of U.P. state India ordered to plant this tree on the whole state in November of 1974.

Therefore, it will be possible to make use of mountains and water at the upriver district of the Ganges River. And after 5 years to 10 years, it will be possible to prevent from the flood and the dryness of the Ganges River to some degree.

Also, it is possible to plant trees on Thal desert and the other steppe area between India and Pakistan.

IRRIGATION PLANS NECESSARY FOR PLANTING TREES ON THE DESERT AND THE STEPPE AREA

In the world, we have many example of effort to green plan and irrigation for deserts and steppes, and Colorad Dam of America, etc.

I admit that these dam are effective surely, but these dam have some problems.

1. In case of setting up dam, it is required that the site of dam has a suitable geographical features and rock board. The desert and the steppe area have few area with such a condition.
2. If there is not a river which can reserve abundant water, dam will be useless. The desert has few river like that.
3. Dam needs vast sum of money and time. On the desert and the steppe area, as the economic industry has died and most area is the area that the national life cannot be carried on, there is no base of producing expenses for setting up dam.
4. The desert and the steppe area have a little rainfall and a little quantity of water. The area where water concentrates is far from the desert and the steppe area, and also, in the weather condition, if it become a dry season, a quantity of water of dam becomes little along with the dryness of the desert and the steppe area, and dam becomes dried up.

Considering these problems, a special device is required to plant trees on the desert and the steppe area.

Also, it is necessary to consider a possible thing for people of the country, and the people benefit by this work directly.

Here, it is necessary to consider each special condition, each different cause, and each construction of the countries on the basic method of planting trees on the desert and the steppe area.

Each area has its own character of the cause of the desert and the steppe area, and structure, and condition, but it is important to begin with the most possible area and to extend it gradually in case of carrying out the plan concretely.

For this purpose, I will state necessary matters in the process of making a fundamental plan.

(THE NECESSARY MATTERS FOR PLANTING TREES ON THE DESERT AND THE STEPPE AREA)

1. Few desert and steppe area exist with a single in a very wide sphere. The desert and the steppe area always exist with a grassland, a low tree place, and a plowland. Also, they exist with mountains and hills with no forest behind them or on the center of them.
2. The desert and the steppe area has structually a fountain, a wet land, a river with a shortage of water, a tunk, a series of water point, and the tree land, and the grassland behind them or the center of them, or on the slope of the mountains and the hills, or the area where geographical features or geological features change, however they may be large or small.
3. The desert and the steppe area has structually the area or the ground line where water streams out of sight or the water stays on the process of the desert and the steppe area.
4. A current of air always occurs between the coast line, the tunk, the river, the marsh, the grassland, and the tree land besides Prevailing Westerlies on the desert and the steppe area.
5. The desert and the steppe area has a little in the absolute rainfall, but many of them have a lot of rainfall when it rains concentrately in some month of a year. Also, the dryness and the rainfall concentrate having a cycle of the weather condition of the earth. (In Asia, there are the cycles of 12 years and 60 years.) It is possible to promote the work of planting trees in this rainy season.
6. The rainwater or a trace of the stream flow from the mountains and the hills exist surely on the desert and the steppe area and the surrounding area.

It is necessary to examine the actual condition of the desert and the steppe area and the surrounding area referring to the above items, and to make the map and the map of structure and to decide the fundamental plan for planting trees.

(THE NECESSARY MATTERS FOR SELECTING IRRIGATION SYSTEMS NECESSARY FOR PLANTING TREES.)

There are two systems in the world at present-Dam system and Canal system connected to dam system, and I have already stated about their advantages and faults.

The system which will be stated here can avoid their faults and magnify their advantages.

Any system can be adapted freely, but the impossible system or the impractical system should be avoided.

The most important element is that we have capacity for what kind of activity and measure.

Especially, it is very important that the native people has. Few people live in the desert and the steppe area, and the people do not carry the irrigation by themselves, or they are pastures or ignorant, or they have no agricultural tools and other tools and the techniques.

Therefore, when we put the irrigation system in practice as a plan for planting trees on the desert and the steppe area, it is absolute impossible to carry out the whole thing.

(HOW TO MAKE A CONCRETE PLAN FOR CARRYING OUT IRRIGATION SYSTEM OF PLANTING TREES ON THE DESERT AND THE STEPPE AREA.)

1. To select one area or a few areas as the most possible area in the desert and the steppe area and their surrounding area.
2. To find a leader who understand very well and will do positively with activity among the native people of each selected area.
3. To order a number from the most possible area considering leaders and tools which the people has(the agricultural tools, and tools), and the techniques of cultivating.

THE IRRIGATION SYSTEM ADOPTED BY I.C.W.A.

Though I.C.W.A. adopted two systems of irrigation experimentally in India, it carried out one system actually.

Another is what was invented recently, and I.C.W.A. introduced it to India, but it is not carried out concretely because it needs new materials.

And yet; it is clear that the system is effective surely.

Especially, the system adopted by I.C.W.A. can be understood and carried out easily by the native people by training if there is some agricultural tools and techniques.

This system can be called I.C.W.A. system.

The basic theory is as follows.;

1. The plan of preventing flowing water

Rain water or the others flows naturally on the desert and the steppe area because of lack of forest.

We must make dams for preventing the flow of water as much as possible. And we must make small tanks on the both sides in the upper side of dam, however water may be little, so that the abundant water may be reserved without a shock directly.

Also, we must prepare a small ditch in a little below along the contour line from the tanks, and we must make the second reservoir at the properate point so that any water-concentrated water in the water line, the rainfall, and water going down on the slope may be reserved on the second reservoir.

Then we must plant trees making a set of three closely on the both sides and the above and below.

This greenbelt will prevent the stream of water which becomes a hidden water line of the underground.

We will put the above plan in practice in eath area.

4. When we promote the work of planting trees, especially, we put the irrigation system in practice on the desert and the steppe area, we must consider the convenience of the center of each area, and a capital city, and main cities, also, main cultivated areas, and transportation, getting and supplying necessary materials, and whether necessary scientists exist or not.

The above matters should be considered, and the irrigation system should be decided, and a model center should be set up for promoting the work of planting trees on the desert and the steppe area.

ABOUT A DESIGN OF DAM

It is necessary to examine the real condition of agricultural tools and technical ability which the native people has in order to decide the design of dam which prevent water of the water line from streaming.

In case of the worst condition, a mass of stone, however it may be a few or several tens, should be put in piles across the most narrow side of the water line so that any quantity of water of the stream may be little.

To speak extreamly, even if dam is 1cm. or 2cm. in case of the worst condition 0.5cm., water will stop flowing and water will be reserved on the reservoir, and the least purpose will be achived.

Generally seeing, it is effective if the reservoir of 30 cm. to 50cm. can be made on the water line.

For this purpose, it is a good manner to supply two wood or two concretes, or two reinforced concretes if possible as piles (10cm X 10cm. X 100cm.), and some woods or some concretes, or some reinforced concretes (20 to 25cm. X 4 to 5cm. X 100cm.) as dam with hammers and shavels.

2. Making use of rising of water by nature

The water level and the moisture of soil will rise naturally by prevention of a stream or reservoir water or vaporization, or a capillary phenomenon of soil and sand.

Therefore, planting trees will prevent the dryness and it can reserve water in the internal organization of the tree, and the growth of the tree will shade the sunshine and it will rise the water level.

3. Making use of convection of air

The convection of air comes out naturally between watery area and dry area with the direct sun.

Also, the convection of water of soil comes out between the shade without the direct sun, and the dry soil with the direct sun, though a very little distance and quantity.

These both convections bring the permeable pressure of water or vapor between the area where water is dammed up and water is reserved, and the dry area.

Like this, the area of the rising of the water level, that is, the area of the rising of water or vapor comes out.

I.C.W.A. system is based upon the above theory, and it plants trees on the practicable area, and it protects dam, and it reserves water, and it develops rising the water level.

If it can reserve water, it uses together with next Nippo Irrigation method.

* NIPPO IRRIGATION METHOD

Nippo irrigation method was devised for draining water in the wet area of the shore of a river or a reclaimed land in Japan.

Up to now, materials and equipments for drainage and irrigation have been temporary in case of making use of the natural materials and they have costed a great deal in construction and in carriage.

Also, the permanent concrete or the others has costed a great deal in the construction and the carriage, and the weight.

Nippo method is to lay a pipe of a sheet film made by polyethylene under the ground automatically.

It is possible to carry the pipe of the length of 100,000 meters on one motor truck of 10 tons. Laying the pipe under the ground can be carried out by traction of a tractor automatically. So, the most advantage is that it is possible to lay the pipe even any long distance at a very low cost and easily.

Therefore, it is possible to use it together with I.C.W.A. system and to supply water to a far place from the fountain, tanks, marshes, rivers, dam, or canals, or at the point area, then, it can use I.C.W.A. system and it can help to plant trees.

CONCLUSION

It is as difficult to plant trees on the desert and the steppe area as many people have tried from the ancient time, but in vain.

The above stated method is not the best one and the absolute complete one.

I would rather say that the above method is presented as a tentative plan which has some possibility.

Especially, this method is considered that it carries out the advanced or high dense planting trees on the possible surrounding area and its effect influences the desert and the steppe area, and then it arranges each condition which becomes easy to solve the desert and the steppe area, rather than it solves directly the desert and the steppe area.

Especially, we should not forget that each desert and steppe area has each own character, and no desert and steppe area has the same one as the others, and we must experiment and study enough each desert and steppe area, and we must put the plan in practice using as much preparation and expenditure and time as possible.

The most important thing is that those who engaged in this work must make much endeavours and endurance, or they must arrange the attitude that they obey the nature obediently.

However it may be succeed or not, it is necessary to carry out confirming and understanding fully one by one.

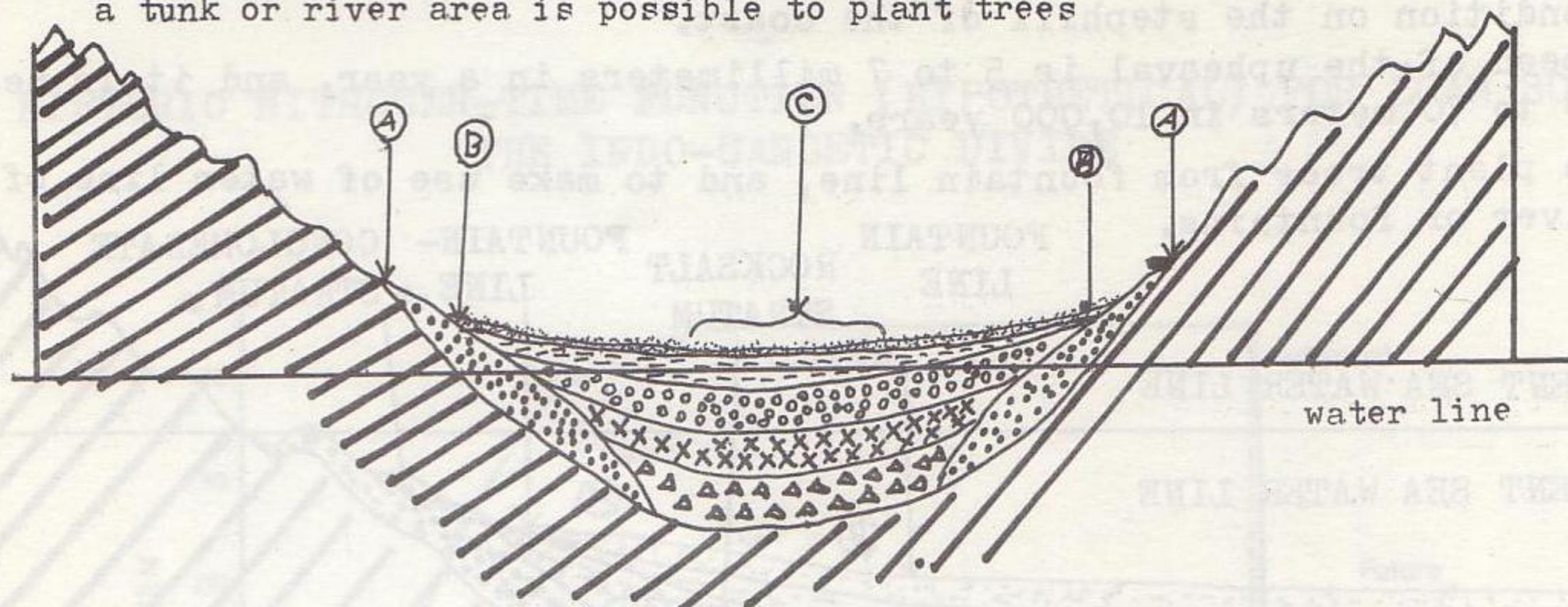
We must promote this work admitting the fact and confirming it and making a record.

ORIGINAL TYPES OF DESERT

1) The type of a pile in the hollow

To plant trees from (A) and (B)

Examine a water line from (A) and (B), because (C) -
a tank or river area is possible to plant trees

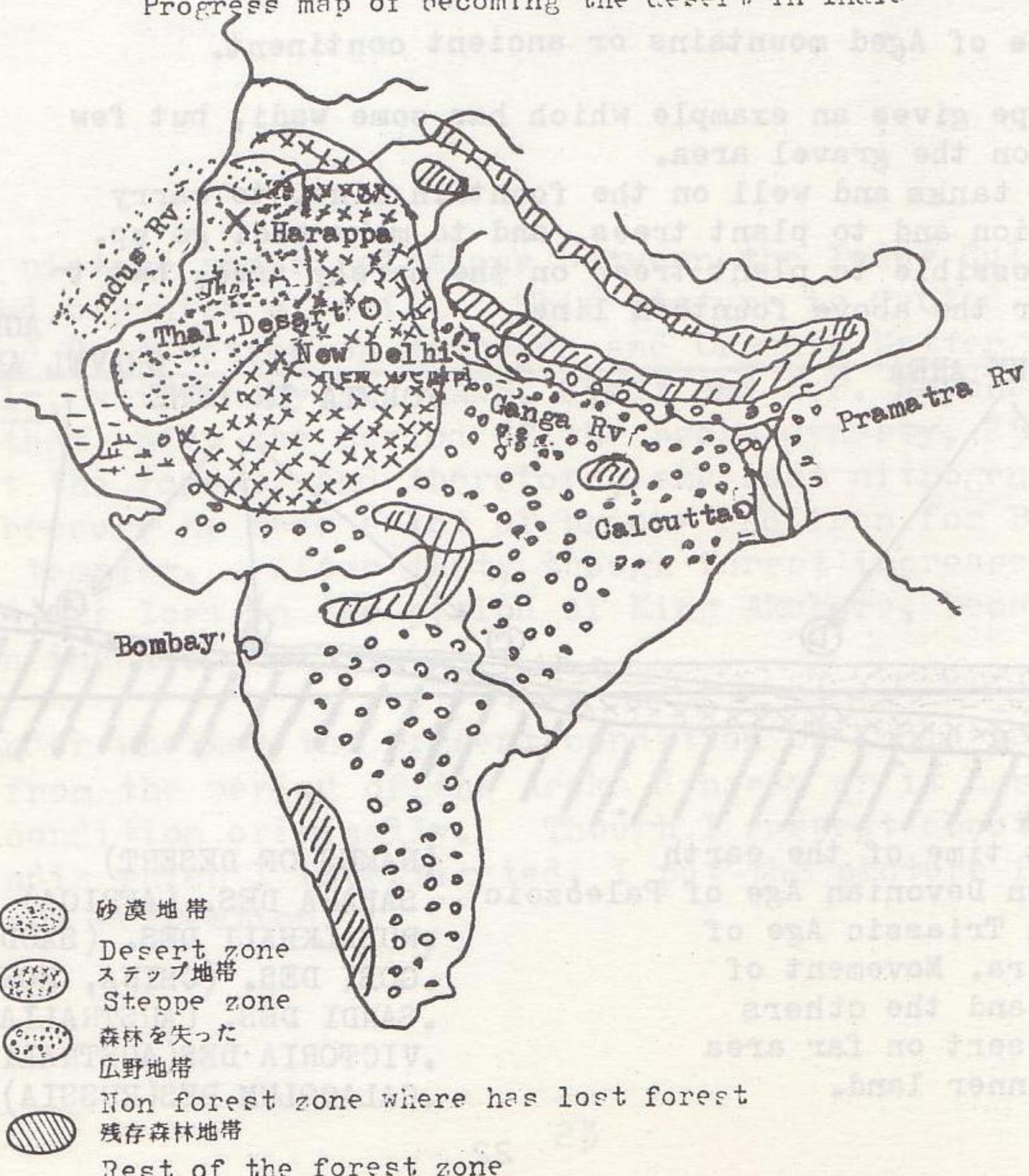


	ROCK BOARD BED		HIDDEN WATER POINT OF
	CONGLOMERATIC BED		RIVER OR FOUNTAIN
			FOUNTAIN LINE
	PILED STRATA		~ RIVER OR WADI
			FLOWING AREA OF TUNK OR RIVER
	SAND STRATUM		

(NAMES OF DESERT)	
TAKLAMAKAN DES.	(CHINA)
LUT DES.	(INDIA)
KA VIR DES.	(IRAN)
SALT LAKE DES.	(U.S.)
PAINTED DES.	(U.S.)
MOJAVE DES.	(U.S.)
INDIAN PLAIN	(INDIA)

インド亜大陸砂漠化進展状況図

Progress map of becoming the desert in India

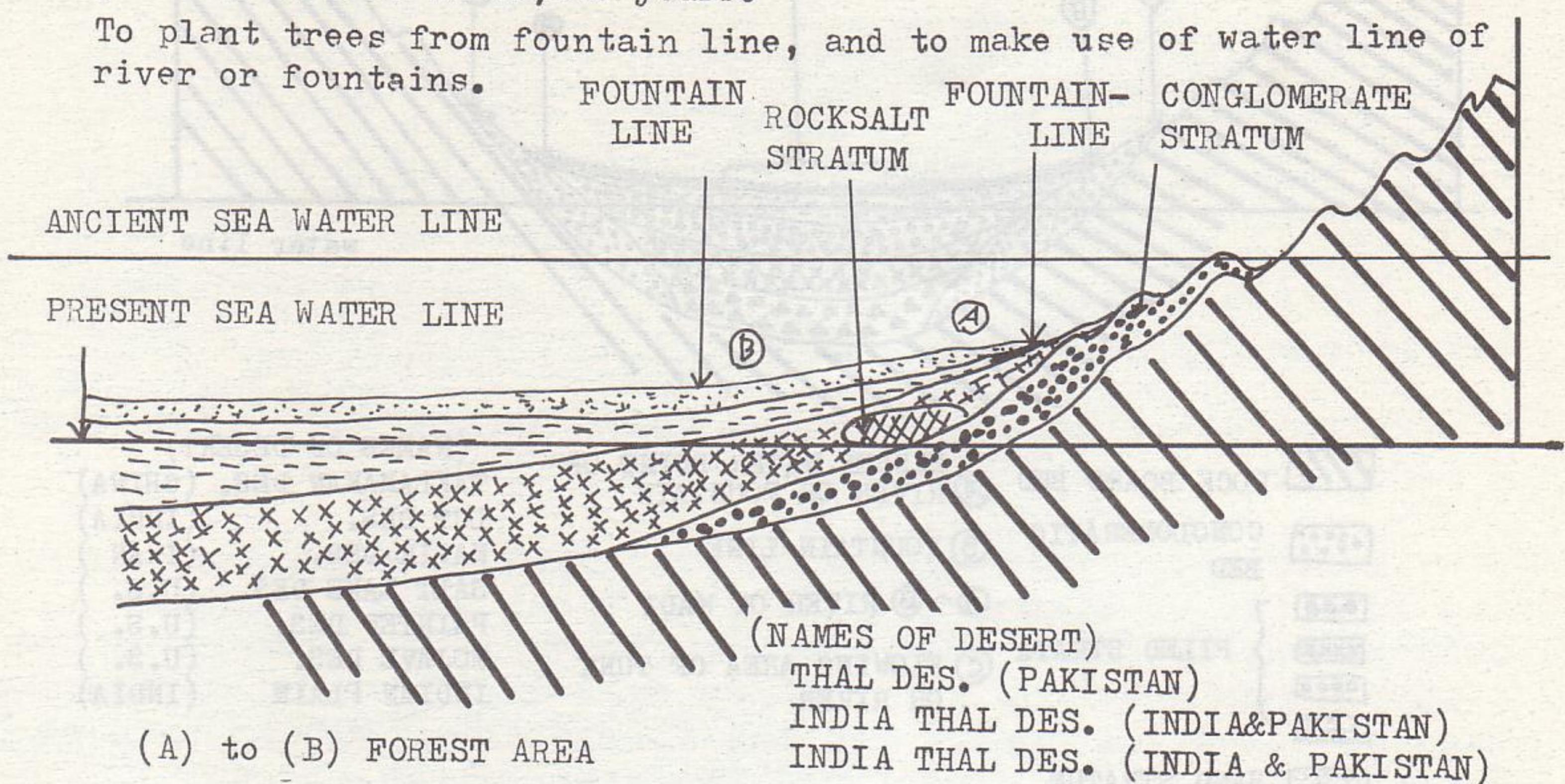


2) The type of Upheaval of Inland sea

(A) and (B) areas are weathered by a river and it remains the desert condition on the stephill of the coast.

Speed of the upheaval is 5 to 7 millimeters in a year, and it is near 50 to 70 meters in 10,000 years.

To plant trees from fountain line, and to make use of water line of river or fountains.

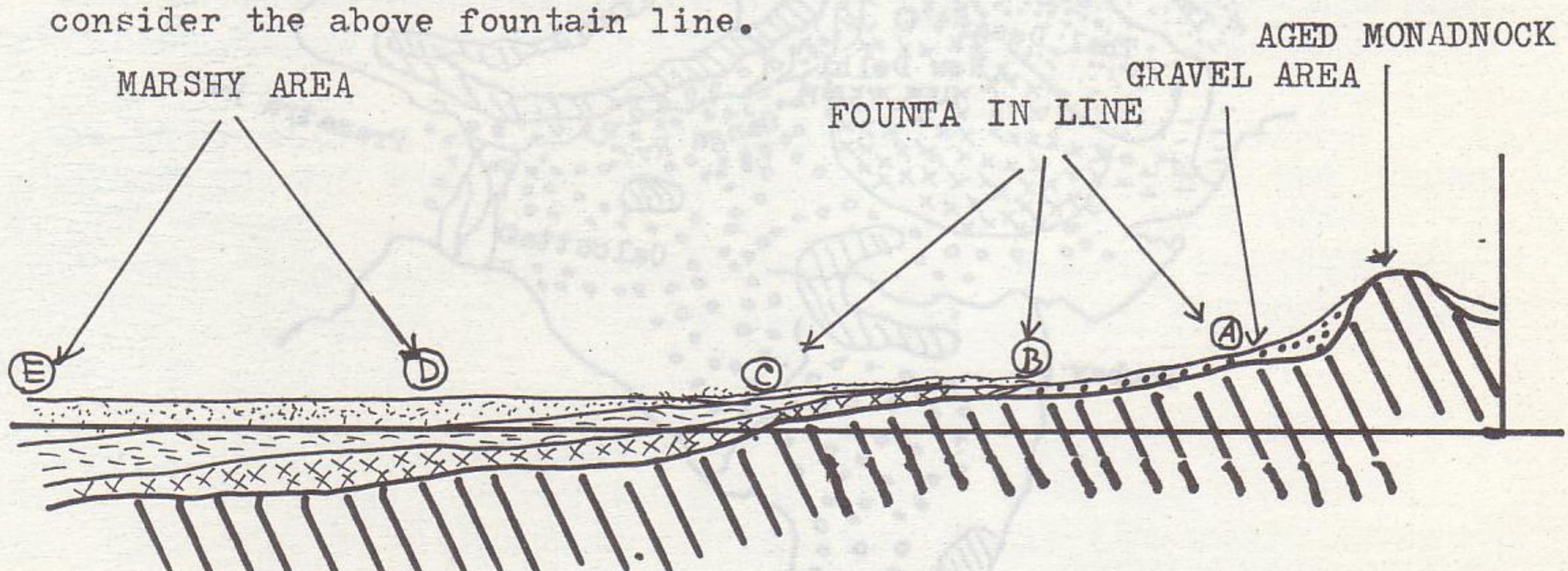


3) The type of Aged mountains or ancient continent.

This type gives an example which has some wadi, but few rivers on the gravel area.

To make tanks and well on the fountain line, to carry irrigation and to plant trees, and to make wadi go up.

It is possible to plant trees on the marshy area, but to consider the above fountain line.

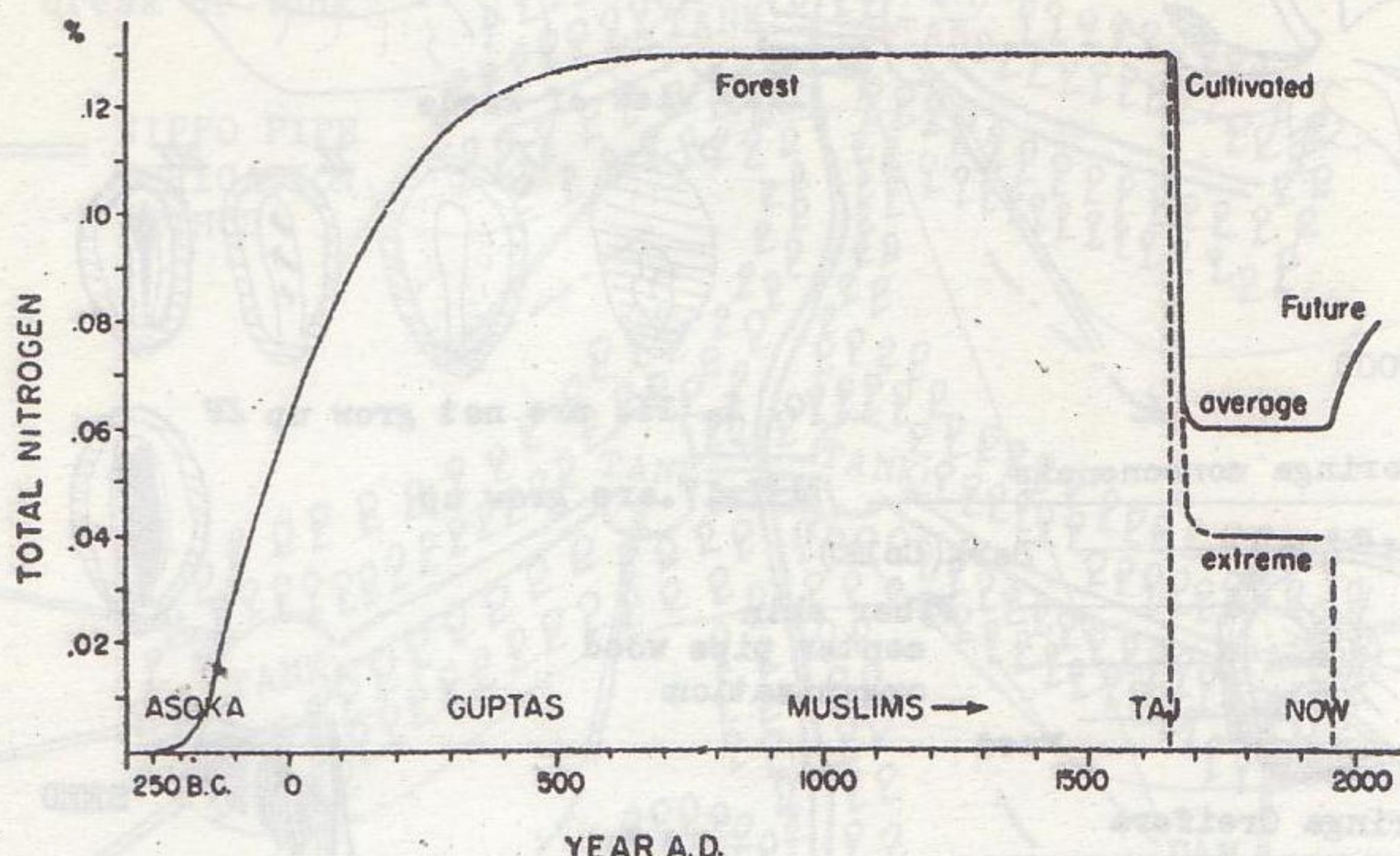


The desert time of the earth came out in Devonian Age of Paleozoic era and in Triassic Age of Mesozoic era. Movement of continent and the others remains desert on far area from the inner land.

(NAME OF DESERT)

- SAHARA DES. (AFRICA)
- RUBALKHALI DES. (SAUDI ARABIA)
- GOBI DES. (CHINA, MONGOL)
- SANDI DES. (AUSTRALIA)
- VICTORIA DES (AUSTRALIA)
- CALACOLUM DES (RUSSIA)

HISTORIC NITROGEN-TIME FUNCTION (HYPOTHETICAL) FOR LOAM SOILS OF THE INDO-GANGETIC DIVIDE



This picture shows relations between the Indus Culture and the forest and organism of soil. This picture is quoted from Effect of Climate and Cultivation on Nitrogen and Organic Matter reserves in India Soils, written by Dr. HANS JENNY and S.P. Raychaudhuri. It shows that under the period of the Asoka dynasty, 250 B.C., India lost the forest, and therefore, she lost nitrogen and organism of soil, because he made a lot of bricks and iron for Buddha's ashes and temples. After that, though forest increased naturally, the forest was lost in the period of King Akbar, because Mahammedan invaded.

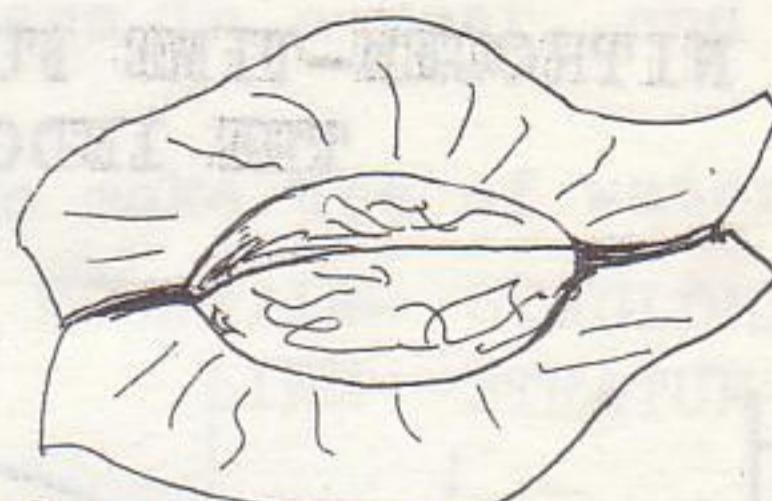
I wonder whether the present condition of India has been occurred from the period of the Asoka dynasty or it has been a horrible condition originally. Though I suspect about it under the fact of India which I investigated, I put the picture for reference with a great suggestion.

ABOUT MORINGA TREE

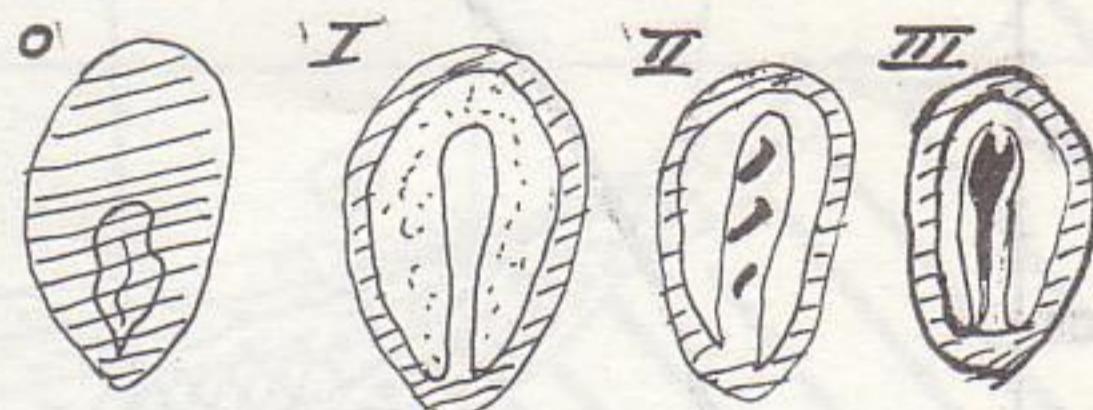
1) FLOWER



2) SEED

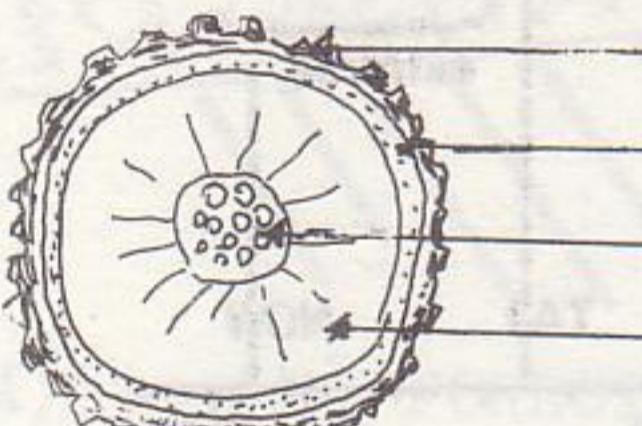


X-ray view of seeds



3) WOOD

Moringa conconencis

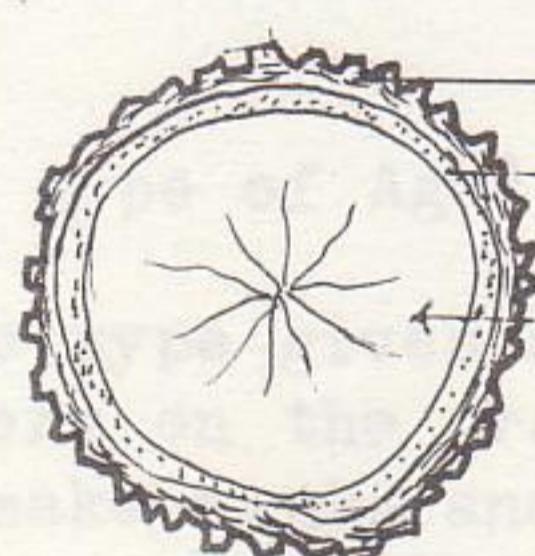


Bark (Cork)

Fiber skin
center pipe wood
organization

wood

Moringa Oleifera



Bark (Cork)

Fiber skin

wood

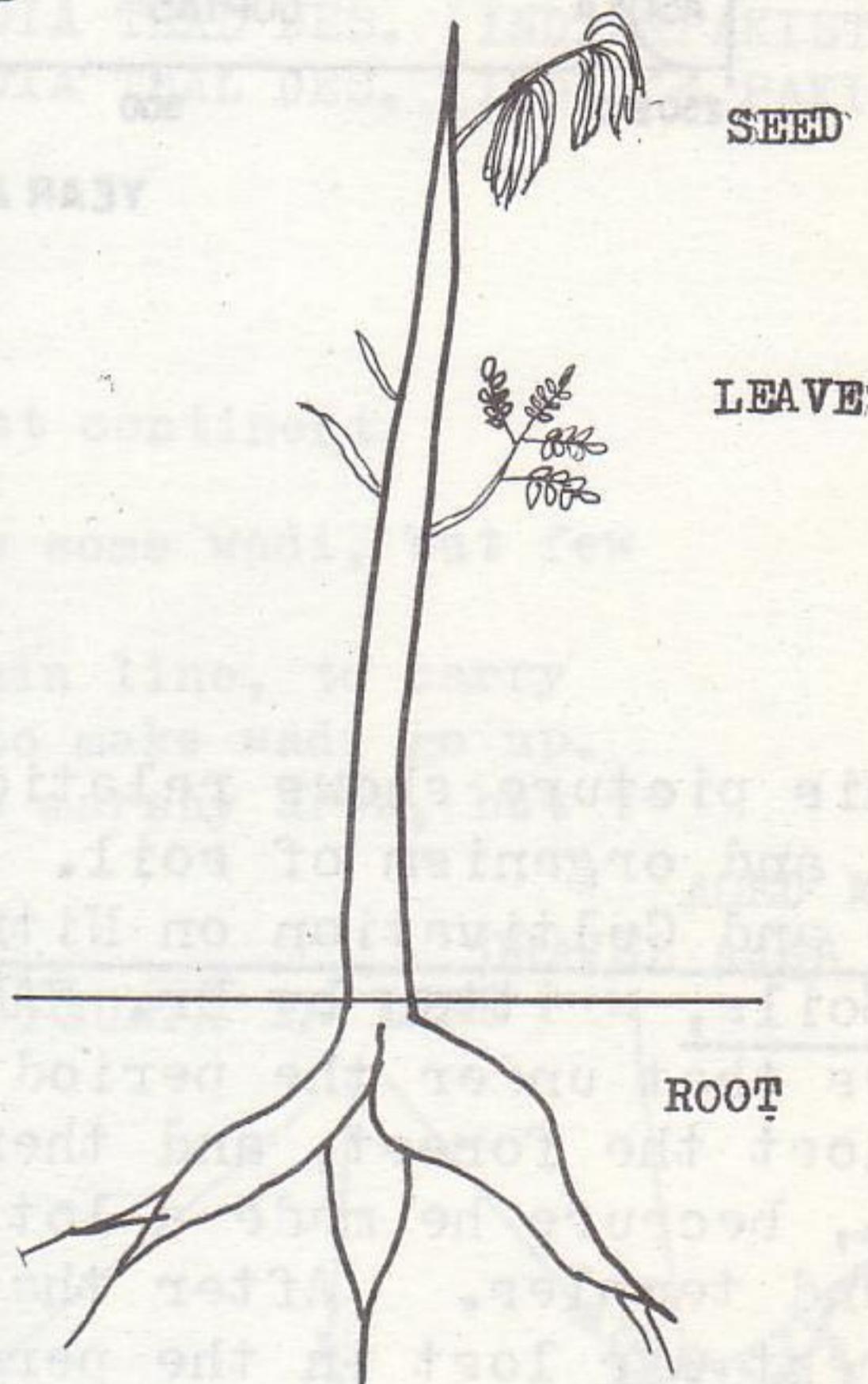
O. I. II. are not grow up \times

III. IV. are grow up



SEED

LEAVE



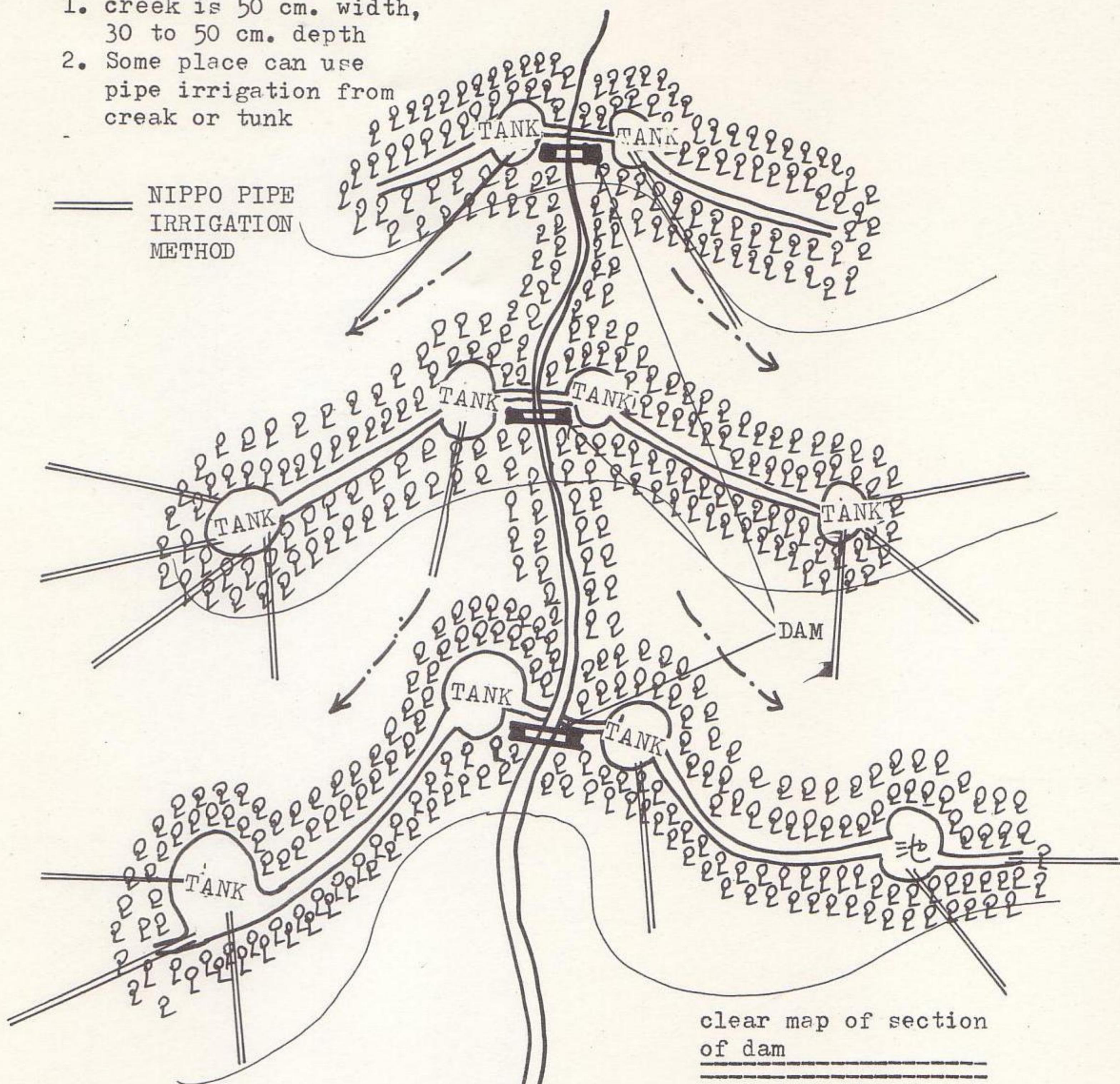
Use way

- Fruits - Protein mineral
- Carbohydrates Vitamin b&c
- Leaves - Fooder mineral supply to animal
- Seeds - Benoil painting and Lubricant for Watch makers
- Wood - Paper pulp
- Root - Vegetable & Spices and Medicem

Picture of Planting trees by Irrigation
on the Desert and the Steppe area

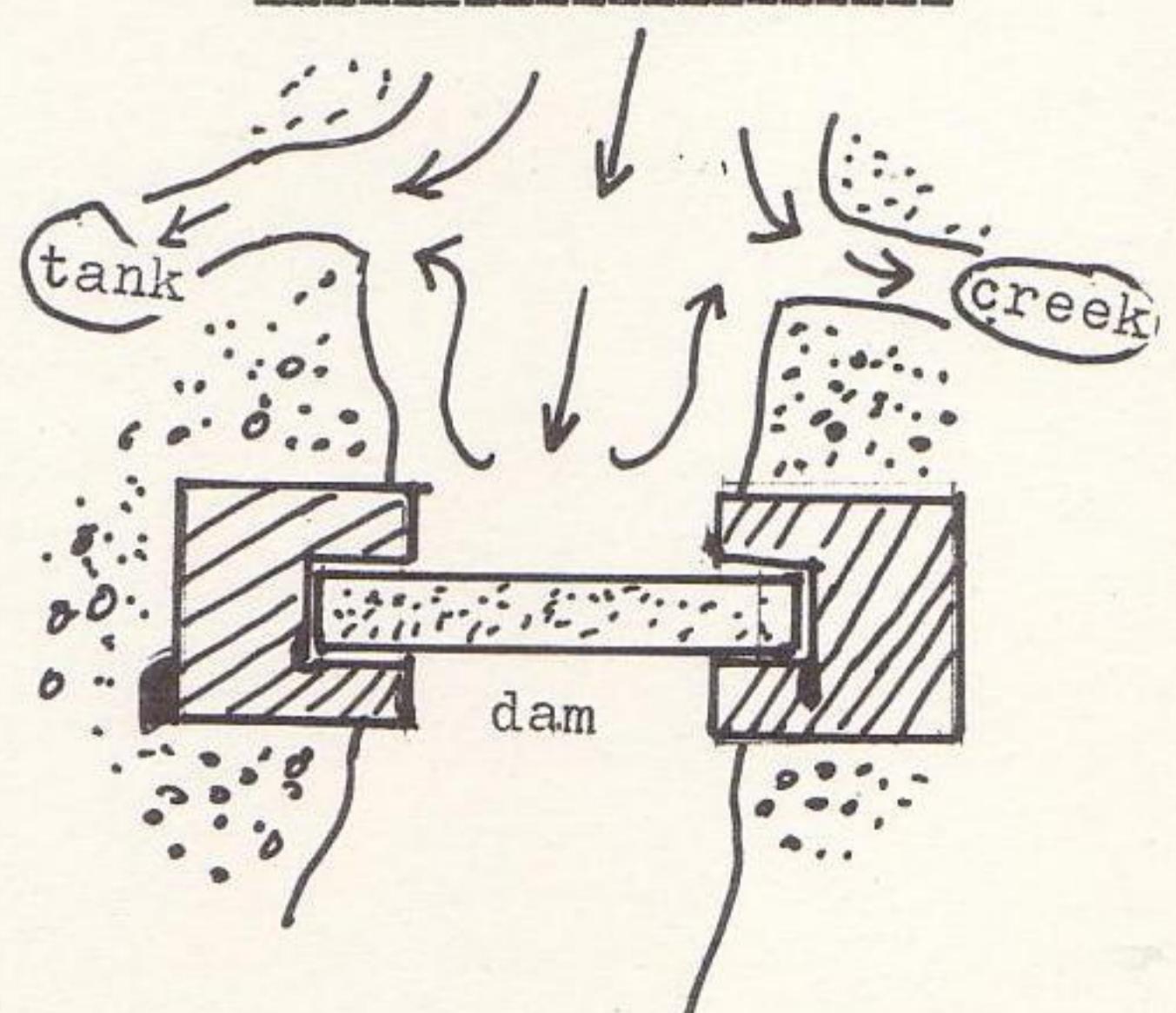
(explanation)

1. creek is 50 cm. width,
30 to 50 cm. depth
2. Some place can use
pipe irrigation from
creek or tank



- If we cannot make dam, we will put stones, or rocks, in a pile in the height of 30 cm. to 50 cm.. The rising of the water level will bring a change.

(river or wadi)



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