

Lord Curzon Lecture :

Increasing Agricultural Production*

by

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Part II. WORK IN OTHER COUNTRIES

During the last 25 years and more, a tremendous amount of research work in agriculture and allied sciences has been done in many countries. Specialists in each branch of study have made valuable contributions to existing knowledge and quite often their results have revolutionised present concepts.

The base exchange phenomena in soils, the assimilation of nutrients by plants, the action of different fertilisers on crops under different conditions of soil and climate, the evolution of high yielding varieties, and the efficiency of pesticides and fungicides have all been studied in great detail. Recognising the importance of water as a limiting factor in crop production, special attention has been paid to irrigation agronomy and to problems arising therefrom, like water requirement of crops, salinity, drainage, and the development of diversified cropping under irrigated conditions.

This is also the age which has seen and is seeing the greater and greater use of machines for agricultural operations. Tractors and bulldozers, for land reclamation and land preparation, pumps and sprinklers for irrigation, drills for sowing, machines for reaping and harvesting crops, and host of other mechanical devices, which have increased the efficiency of human labour, have become part and parcel of agricultural development in many countries.

Besides all these, purely agronomic experiments like seed rate and spacing, the intensity and frequency of irrigation, selection of suitable crops for rotation, the dosages and times of application of different fertilisers, improvements in existing cultivation practices, have been conducted in many places and given pointed results. All these studies so far enumerated have been carried out with the ultimate object of increasing productivity and obtaining higher yields. The adoption in practice of methods based on the results of these valuable studies, constitutes today, what is broadly referred to as the technical methods in agriculture.

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Of these, four main features are important. They are, (1) Irrigation, (2) Fertilisers, (3) Improved seed and (4) Control of pests and diseases. Other agronomic practices based on research must also be followed, but these four are important and must find a place in all plans for agricultural development. In a sense, these four are fundamentally interrelated. Improved seed and high yielding varieties remove more plant nutrients from the soil, and to replace these, the application of fertilisers becomes necessary. It is well known that full utilisation of fertilisers is not possible unless there is adequate irrigation. And when all these have been attended to, a sudden attack of pests and diseases, will nullify all the good work done. All these are factors which limit production, unless due place is given to them in the plan.

The importance of water as a limiting factor of production is brought out by some staggering figures. It requires 1.25 million gallons of water to raise an acre of rice, 1.85 million gallons for an acre of sugarcane and 0.80 million gallons for an acre of cotton. An interesting evaluation made in the orchards of California shows that 4,800 gallon of water must pass through the citrus tree to produce a glass of orange juice.

An experiment in Hawaii on sugarcane showed that Improved seed contributed 40 to 45 per cent, Irrigation control contributed 25 to 35 per cent, Fertiliser application contributed 25 to 35 per cent and Control of pests and diseases contributed 10 to 15 per cent.

The total effect of all these factors operating together, was to increase the yield of sugarcane from 60 to 100 tons per acre and of sugar from 6 to 9 tons per acre.

Only a few countries, today, are adopting these improved methods suggested by research and they are all well known for their high productivity level. A great many countries, however, have not yet changed their old practices, due to many causes. Technical knowledge is not available, and, among other causes, political instability prevails and the administrators are not in a position to assure adequate compensation to the farmers for the produce of their labours.

If these countries could be developed to the level of the more advanced countries, a combined attack by the whole world on agricultural production becomes very simple. Many advanced countries, like the U. S. A., are giving technical assistance and aid to various countries. The United Nations with its specialised agencies, the W. H. O., the F. A. O., the U. N. I. C. E. F. and others are rendering assistance in various ways. Since its inauguration in

1947, the F. A. O. has sent over 1,000 experts to several underdeveloped countries to render technical advice based on scientific study of the conditions and the result has been that in many of these countries, agricultural development has been planned on proper lines. There are of course some lacunae in the execution of these plans, but the over all picture, leads one to hope that the future of mankind is not so bleak as it was some year ago.

A few instances of F. A. O. assistance to some countries are given along with a few others, where the people are applying themselves to the task of increasing agricultural production with admirable courage. These instances will serve as a background when the situation in India, is considered.

The Mediterranean Project : Almost from the dawn of human history, the Mediterranean region has been the cradle of great civilisations, which flourished and triumphed, then decayed and tumbled down. Greece, Rome, Egypt, Granada, are all names to conjure with, whenever human achievements of a colossal magnitude have to be enumerated. Their prosperity in the hey day of their glory attracted foreigners and invading hordes, to enjoy the riches and economy of these countries. Today, the countries of the region depend for a good share of their economy on tourist traffic, which is attracted to view its ruins, which still have the power to leave the visitors staggered. The regions' greatness in the past was due to the importance given to land use and agriculture, which was accompanied by enviable and enduring creations in art and literature. When land use was neglected, agriculture and production decayed and economic distress followed, accompanied by an increasing population, which in this region increases at three per cent,—double the figure computed for the world. The population today is reckoned as 180 millions, nearly the same as that of the U. S. A., but the out put is only one-tenth.

The chief causes for this decline from the past is the decline in productivity of the land. This again has been brought about by the ruthless destruction of forests, and wasteful uneconomic methods of cultivation. How to rehabilitate the region? Can one put the clock back and bring back fertility to an impoverished land? Will it be enough to attain the former level, or should one aim higher with the help of modern science?

The development of this region has been one of the principal aims of the FAO which has taken it on hand and constituted in 1960 a FAO Mediterranean Development Project. The plan envisages a scheme to double the per capita income of the countries of the region as a first step, over the next twenty years, till 1980. The first objective is to put a stop to the

drastic deforestation going on for so long and embark on a scheme of planned afforestation. This will protect soils and crops from erosion and enable reclamation measures to be put into operation. It is also proposed to discourage indiscriminate grazing, to promote new pasture lands separately, so that proper integration between agriculture and livestock farming may be brought about.

The second objective is to increase the productivity of the land by the adoption of basic technical measures like irrigation, fertilisers and so on. A net work of pilot development schemes has been inaugurated to serve as centres for testing new techniques and some of these have already given 35 bushels (3,000 pounds) per acre of wheat as against 10 bushels from rainfall only. In Greece, fertilisers have brought in an increase of eight to nine bushels more from an acre. This increase has been observed to be 15 per cent on good land and as much as 80 per cent on poor land. In the same country 25 per cent of the increase in yield has been attributed to improved seed. In addition to nitrogenous fertilisers the need for phosphatics has also been demonstrated.

Machine sowing, machine harvesting and deep tractor ploughing, have in addition to reducing expenses also minimised the risks against weather, by enabling operations to be carried out in time and according to schedule. Today the consumption of fertilisers is in the region of 7,00,000 tons of nitrogenous and 6,00,000 tons of phosphatic manures. The F. A. O. survey has indicated that this amount must be trebled to meet the demand of the region. Similarly, as against the present force of 1,90,000 tractor units, an additional force of 1,30,000 units will be required.

Investigations on proper use of water, to avoid the hazards of salinity and over irrigation, the cultivation of cash crops in place of low value ones, the development of orchards, the rotation of crops to make maximum use of land are going on. One advantage of irrigation is that it permits intensive cropping, with water available all the year round.

The F. A. O. expects these several measures to bring an output of five billion dollars per year as against the present one billion dollars only. By 1980, the total output will exceed the 10 billion dollar target.

The mediterranean region consists of a number of countries of different sizes and different political ideologies, but the F. A. O. is giving overall assistance to make it one productive unit fighting against hunger and poverty. One great advantage of such collective campaign in a good cause is the availability of technical knowledge, assistance and machinery

to all the countries. It brings the people of different countries closer together in a spirit of understanding. Ere long, we may expect the region to be one vast green fertile area, which it was in biblical times and earlier.

East Pakistan: The Ganges Kobadak Project (shortly referred to as Gangtok project) located in East Pakistan is the first major irrigation scheme designed to increase agricultural production in the country. With a total area of 35 million acres the country has 20 millions under rice and about two to three millions under other crops like, jute, sugarcane, pulses and others. Rice is commercially classified as *Aus* (Autumn), *Aman* (Winter) and *Boro* (Spring), of which *Aman* varieties are the most important. The acre yields are very low as exemplified by rice with 824 pounds, wheat 484 pounds and sugarcane eleven tons. The cropping pattern is to grow only one crop on a land every year, since lack of irrigation in the dry season and of drainage in the wet, sets limitations on improving existing conditions.

Occasionally, a mixed crop *Aus* and *Aman* is grown together. The *Aus* which is of short duration is harvested after three months, leaving the longer duration *Aman* on the field for a further two to three months. This practice has evolved from a desire to take maximum advantage of the rains received during the Autumn and to give an early start to the *Aman* crop. It is similar to the practice obtaining in the Tanjore district of Madras State of growing *Kuruvai* and *Samba* together.

Under an agreement with the F. A. O., an Expert, Mr. Peter Kung, a National of Taiwan, was sent to conduct preliminary experiments and to study possibilities of future development. The Expert after a number of experiments which lasted for more than three years was able to draw some valuable conclusions which the East Pakistan Government are planning to embody in their programme for the development of the Irrigation Project. A few of his findings may be mentioned.

With irrigation it was possible to change the pattern of cropping and produce more from the land. Contrary to the usual practice, it was found that most crops including rice could be produced with about half the amount of water that farmers are using now. Economic and efficient use of water helped to increase yields of crops. A very simple agronomic experiment on the dates of transplanting rice indicated that after August 24th of any year was unsuitable for transplanting and significantly brought down the yields. This experiment justified the adoption of early planting of rice to increase yield. These and a number of other important conclusions of Mr. Kung, enabled him to draw up a scheme of rotational cropping for the

project area. The Gangtok Project will bring under irrigation 1·20 million acres and so, when the East Pakistan Government implements the full scheme, this area will become one of high production and contribute to the world total.

* Thailand: The relatively fertile soil, the favourable climate and on the average, a sufficient rainfall combined with a low population have made Thailand one of the few Asian countries producing surplus rice. As a consequence, it is one of the few countries, where rice is both the main food crop and a cash crop. It produces about seven to eight million tons every year out of which 1½ to two millions are available for export after feeding the population of 23 millions only. On this export of rice, the national economy of Thailand has been built.

Another feature has put its stamp on Thai agriculture. It is overwhelmingly rainfall agriculture. Even the rice land is nearly 90 per cent dependent on rain. As a consequence the yields are often affected by the whims of nature and the possibilities of double cropping are limited. Gradually, the irrigated area is being extended. The Chaianat and Yarnhee projects now just completed, make possible the irrigation of large areas in the Central Plain of Thailand. The tanks in the North-east region will also contribute to the extension of irrigated areas, and to the accumulation of knowledge on many crops which will develop with the Mekong Project, which is in the offing.

The principal purpose of these several irrigation projects in Thailand is to assure a greater supply of water to the existing farms, which are chiefly rice producing and to bring new areas under irrigation. The projects are of fundamental importance to the country because they are already changing the agricultural pattern of the country. Irrigation, in addition to its great benefits to rice production, will allow diversified, multiple cropping and mixed farming. This change over will have to be supported by actual experiments in the field with different crops, the results of which will be the basis, for recommendations and for further extension work among farmers.

An experimental farm was opened in 1955 at Samhook, a spot typical of the Project area. A small irrigation project nearby, enabled experiments to be laid out to study irrigation agronomy side by side with rainfall agronomy in the neighbourhood.

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The field experiments were laid out to study primarily the yield, season, the duration and water requirement of different crops. Agronomic practices were also investigated. Whenever and wherever possible, the utilisation of raw materials for cottage and large scale industries were also kept in view by keeping in touch with processing methods and for the suitable estimation of quality like lint length in cotton, sucrose in sugarcane, fibre strength in jute, milling losses in rice, etc. It is obviously impossible to mention all the details of the work which has been embodied in F. A. O. Report N. 1318 sent to the Thai Government. A few results which have a bearing on agricultural production may be mentioned.

Experiments indicated that there is a tendency for the farmers to overirrigate their crops especially rice, if there are irrigation projects nearby to supply water. This is due to an impression that water supply will cover all mistakes of commission and omission in agricultural operations and make up for any loss in yield. Particularly strong is this impression with regard to rice, which according to them requires large quantities of water, during its growth. In Thailand there are no irrigation charges, and one can imagine how wasteful the farmers will be of water. Previous data collected by the Rice Department showed that rice farmers were using anything from 20,000 to 26,000 cubic metres per hectare (about 80 to 100 inches). The Samchok experiments indicated that this was not only not necessary, but higher yields could be obtained with less water, say 12,000 to 14,000 cubic metres (40 to 50 inches). The stages of the crop, draining it now and then to improve aeration to the roots and even withholding water in certain stages were found to be important factors.

Puang Ngern is a short duration and non-photoperiodic variety which was found suitable to be raised as a second crop. Four other varieties were all grown during the main season, June to November—December. The average acre yields of these varieties was 3,200 pounds while farmers often get 1,000 to 1,200 and rarely up to 2,000 lb.

It is possible to grow rice with about 50 inches of water and get a high yield. This is a point which has to be considered by all countries where as much as 75 inches and even 100 inches are used. It is incumbent to examine the position and to find out the stage of the crop, where the wastage occurs.

As a result of the experiments and the results obtained from them, the Government of Thailand was advised to change over from rice monoculture and initiate a policy of Diversified Cropping under the Irrigation Projects. Greater use could be made of Land and Water and as a result

new crops like Sugarcane, Cotton, Jute, Groundnut, Soyabean and others are now being grown under irrigation and the areas under these are being gradually increased. These have not replaced rice but are rotating with rice, so that the food problem in the country is not affected. If any, the cultivation of rice has received greater impetus with the use of irrigation and the yields are also steadily increasing with the adoption of improved agronomic practices.

Till very recently sugarcane had been raised in Thailand only under rainfall on limited areas. The varieties were chiefly of Chinese origin, and were mostly used for chewing, though here and there small factories were manufacturing brown sugar or jaggery. The Samchook experiments showed that sugarcane could be raised in rotation with rice under irrigation. The studies included trials with varieties, fertilizers, improving drainage and different months of planting.

Of the 34 varieties under trial Co. 419 and Co. 527 from India, NCO 310 from Natal and F. 108 from Taiwan were quite good and gave over 40 tons an acre in the very first trials. The successful results obtained with sugarcane induced the Government and non-official organisations, to follow up the Samchook-work and put in motion a machinery to rapidly bring about extension of sugarcane among farmers of the area. A factory was started in 1958 to manufacture white sugar, the first one to manufacture centrifugal white sugar in the country from cane grown under irrigation. The factory was located at Suphanburi, near Samchook, the experimental station, the staff of which were available to advise the farmers of the neighbourhood. During 1960—'61, the factory crushed 600 tons of cane daily for four months in the year. There are indications that ultimately the factory will work for six months with a daily crushing of 2000 tons.

The factory is unique in many ways. Agriculture and industry are linked in a vicious circle. The industry cannot start unless there is sufficient raw material of the desired quality available. Conversely, there will be no inducement for production of raw material, if industry does not create demand. The vicious circle has to be broken and generally it is the rule that agriculture precedes industry. The promoters of the factory have made History by locating an industry first, which has served to stimulate agricultural production. As in all new ventures there were some setbacks initially, but when in the course of years it comes to successful and profitable working, it will be a tribute to Thai initiative and vision which have taken the steps to make the country self-sufficient in sugar.

There was an interesting experiment conducted during 1956—'57 following a practice prevalent in Taiwan. Sugarcane was planted in the month of March in furrows one meter apart; after two months when the crop had established itself, the ridges between the furrows were broken up and dug to produce good tilth and the soil was laid along the rows of cane. The original ridges or interspaces now became deep furrows and thereafter served as irrigation and drainage channels. In the month of June, when the sugarcane was about one meter height, water was let into the new furrows and rice planted there. This arrangement permitted a good water supply to the rice crop which was in the channel and kept the sugarcane ridges moist. There was no need to irrigate the sugarcane till the end of October and middle of November.

Kachin: The Kachin state in North Burma has an area of 33,000 sq. miles; the terrain is mountainous with ranges running in a North-south direction with fertile valleys in between. It is only these valley-plains (about 1.5 per cent of the total area) that are devoted to agricultural crops, chiefly rice. Agriculture is only with rainfall and monoculture is the rule.

“Taungya” or shifting cultivation is the characteristic feature of Kachin agriculture. Quite often, hill-slopes are cleared and put down to sugarcane. For four or five years no attention is paid to soil or crop, except to harvest and send, the poor quality cane to two factories, one at Nanti and another at Bhamo which for several years have been making no progress at all. The fields are then abandoned and the farmers move to another hill slope, clear another jungle and grow sugarcane there. The traditional Kachin way of growing rice in many remote areas is only by the “Taungya” cultivation. As a result, it is rare to see the original forest growth, most of the forests and jungles in the rural areas being secondary and tertiary growths.

The problem here was to wean the local population from this shifting cultivation and settle them to permanent agriculture. There is an inherent unwillingness to make this change, as it is easier to move from place to place in search of virgin soil than to settle down in one place and adopt improved agricultural practices. Fortunately, Army Resettlement Schemes are doing excellent work in this metamorphosis. Colonies of soldiers are taking to permanent agriculture with a discipline born of their military training. Sugarcane, rice and groundnut are now grown in rotation in valley areas. On mountain slopes, citrus, litchi and pine apple plantations are coming up along with coffee and some apples. On sugarcane particularly, valuable experimental work has been done, involving varieties, fertiliser application and where available, with irrigation. Co. 419 is the most successful variety

and ammonium phosphate at 200 pounds per acre the optimum dose of fertiliser applied in two doses, one at planting and another at the time of ridging up the crop in the third month. Formerly, five or six ratoons were being raised, but now it has become a rule in all the Army Settlements that not more than one ratoon should be allowed. As a result of all these, the yield of sugarcane which was formerly only eight to ten tons per acre, is now 25 to 28 tons. This is a very good yield, considering that it is grown only with rainfall. Today the Army Resettlement Unit at Mytkyina has become the chief source of supply to the Hamti Sugar Factory, 28 miles off and as a result, this factory which had been incurring losses has turned the corner and is well on the way to increased production.

As in Thailand, the experiments indicated that phosphoric acid was a limiting factor on Kachin soils. To obtain increased yields, more application of nitrogen alone was found to be not enough.

Among the crops slowly finding their way and increasing in areas due to the propaganda of the Agricultural Department and the example of the soldiers, may be mentioned groundnut, oranges and pine apples, the last-named making rapid progress and new areas being opened up every year. There is already a surplus production in certain localised areas. This State has poorly developed communications and this factor is acting as a handicap to the transport of agricultural products. In 1963, there were proposals to start a modern factory for canning the pine apples produced.

So far, a few instances of how F. A. O. assistance is helping agricultural production in many under-developed countries have been mentioned. There are many more countries which are slowly changing their old methods and contributing their share to world production, all because of the technical assistance and advice given by the F. A. O. of the United Nations.

These instances will illustrate how, many countries have become alive to the present world situation and the need for proper planning in agricultural development. In addition to these, there are some, who on their own, are carrying out schemes of development which may be called examples of human endeavour. Prominent among these countries are Israel and the Netherlands.

Israel: The small country of Israel created after the last Great War is a striking example of what technology and hard work can accomplish by way of agricultural development in a short space of a few years. At the beginning, the Jewish population planned only to develop industries primarily, obtaining their food from the local and surrounding Arab farmers. Soon, they wisely changed their policy, giving agriculture primary importance.

and launched on a scheme designed to cover first as much as possible, the food requirements of the people, Jews or Arabs. Later they intend to combine this task with the gradual introduction of crops to supply raw materials for industries. Orchards occupy 25 per cent of the area. But the remaining area is under mixed cropping with less risk. Dry-farming, which was the prevalent practice in Arab-days has been completely transformed into farming with irrigation and as a consequence higher yields are obtained.

Most of the available land area is in the South, but the water sources are in the mountains of the North, on the borders of Lebanon. From here, water is taken by conduits to different parts of this small country, which for efficient handling has been divided into five regions. In addition to the major irrigation scheme, there are minor ones for small areas, supported by lakes and underground water. The utilisation of underground water and the use of pumps for irrigation are unique features in this country. Another noteworthy point is the economic use of water and Israel people have confounded experts from other countries with the high yields they obtain with minimum required irrigation. Research obtains top priority in the country's expenditure and not only for their own country, but also for others as well; Israeli research workers have been contributing valuable material to the world treasure-house of agricultural information. Besides soil testing, the application of fertilisers and the use of improved seeds, which are familiar to all, special investigations on the optimum use of water are being conducted. This consists of measurement of water consumed, statistical analysis of data collected, map of irrigated area in detail, studies on water duties and methods of irrigation and promotion of the utilisation of sewage water for irrigation. Barley, wheat and maize are the chief cereal grains with maize giving over 2500 pounds per acre. Citrus, grapes and bananas are among the fruits produced and recently cotton, sesamum and tobacco have been introduced. Potatoes and onions give enough to more than meet the needs of the population. Special efforts are being made to reclaim a desert area in the South and bring it under cultivation. In fact the Israelis have obtained a reputation among experts in what may be called desert agriculture.

Netherlands: Capital may be created and Labour may be advantageously altered to enhance production. But if someone were to make a suggestion that one attempt to create more land than exists, it would be met with derisive laughter. It would be taken as an insane idea and the product of a weak and diseased brain. And yet this seemingly insane and impossible idea has been put into execution by the Dutchmen to whom goes the credit of a great human achievement, that of creating land out of the sea. God made the world, but Dutchmen made Holland, so goes the saying.

The intrepid Dutchmen have been at the idea of wresting land from the sea, for the last four centuries. From A. D. 1600 onwards, between two and three thousand acres of land have been added to the country yearly. In course of time its surface area would have been increased by more than 8,00,000 acres or about 10 per cent as a result of "Impoldering".

This consists of a number of stages, one following the other with regularity and precision of detail. First, an area of the sea is impounded by the construction of dykes, to build which vast quantities of boulder rock and clay found strewn well over the country are collected and brought in to form the core. Then sand and water reads in the same large quantities are laid on to create the surface for future constructions and for road-making. The enclosure so formed is then drained by pumping out the water into the sea, sluices here and there in the dykes also help to regulate and control the flow of water from inside to outside and *vice versa*. Later and as a last stage, land reclamation measures are put into operation including further draining, deep ploughing, filling of depressions and the incorporation of organic matter by growing crops for the first years and then ploughing them under. Then within the enclosed area, other smaller dykes appear in directions to suit the lay and level of the land, thus dividing the land into convenient sized "polders", which are the agricultural units. When the whole job has been completed, a marvellous miracle has been wrought. Where once the sea spread with a forbidding appearance, there is productive land created now, neatly laid out into independent blocks for cultivation and with channels, drains, dykes and sluices. The dykes have also served to provide surface for roadways to be constructed and with settlers coming in, new villages and townships are springing up everywhere. For the first few years again, the State does all the reclamation and the cropping, until they are sure that the soil has been brought to condition and to a productive level. Then allotments are made to applicants of whom there are a very large number who wish to settle on the newly created land.

Today, the work is being carried out with the help of huge machinery of all kinds, cranes, bulldozers, dredgers, buckscrapers, pumps, tractors and so on. Even with all this technical equipment, provided by modern scientific advancement, the volume and magnitude of the work turned out leaves the visitor gasping with wonder. Imagine what it should have been in the middle ages, when without any machines and equipment, the early pioneers set themselves to the task—a real Herculean labour indeed—all for the sake of the country they were born and lived in and for the sake of its future generations. That was human labour in its most noble form, as applied to increasing production. There was no complaint about lack of land or dearth of capital. Intense labour obtained both and revolutionised all concepts regarding the limits of human possibility.

The reclamation of the zuyder zee in Holland is the most remarkable example to demonstrate how man can conquer seemingly impossible obstacles existing in nature. The whole project is daring in conception, brilliant in planning and perfect in execution, down to the smallest detail. Everything connected with the work was the subject of careful preliminary and scientific research. It was felt that some rivers of the area flowing into the zuyder zee would create problems in the future for draining their flood waters especially during seasons of storm and heavy rainfall. Engineers and land experts opined that an inland lake would serve to meet this future possibility. Elaborate and accurate calculation were made to ascertain how large any remaining lake should be. The result of these calculations was the Yssel Lake nearly 2,00,000 acres in extent. This lake today functions in two ways, to drain and to irrigate. If the land is overburdened with water, it is pumped into the lake. If it has too little water, the lake is there to supply it. In other words, the lake and the adjoining area have been 'turned in' to each other. Another point worth noting is that the water of the lake which was formerly brackish is gradually turning fresh and suitable for irrigating crops.

It is impossible to describe the area and the marvellous changes that have been brought about, which can be grasped only by a visit to the place. The main feature is the big enclosure dyke, with a road on it, providing easy transport. It is about 20 miles long and acts as a mighty barricade against the advance of the sea; and in land once at the bottom of the sea and strewn with sea shells, grow crops like wheat, barley, oats, maize, potato, beet, and flax. Dutch linen as we all know is famous all over the world.

The labours of the Dutchmen have not ceased with merely wresting land from the sea. A high degree of the application of science to production is a characteristic of Dutch agriculture. Instance and incessant research is going on to unravel Nature's secrets with a view to using the knowledge for increasing production. Soil studies, fertiliser application, irrigation and drainage problems, plant-breeding for high yielding varieties are all significant features of modern Dutch agriculture. Mechanisation also plays a major role in this advancement. The Dutchmen have acquired a reputation all over the world for hard work as soil experts and as land-reclamation engineers, particularly for draining marshes and bringing them under production.

The amazing achievement of the Hollanders should be an inspiring example to all countries where, 'in order to escape work, people go on emphasising unfavourable existing conditions as insurmountable obstacles to progress.
