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AGRICULTURAL SCENE

This page provides a blend of recent developments in Agriculture within the last month.

Bold Steps Towards Improvement

All over the country a salutory change of mind towards Agriculture is noticeable. A number of factors have contributed towards this change of outlook, principal among them is the increasing cost of various items of food and ingredients of animal feed. Since the 'gods' too have to eat, we are all equally pinched; hence the general concern.

The haphazard handling of Agriculture hitherto has caused the present hopeless state of affairs.

Happily however, State Governments have been earmarking huge sums of money to prosecute Agriculture vigorously. This month, the Lagos State Government has voted about 3 million naira for Agriculture. If the Lagos State, being the smallest in area, can vote 3 million naira it is anybody's guess therefore to say that right all over the country the aggregate total vote on Agriculture is 40 million naira - more than the whole country's total budget a few years ago: a huge fortune indeed. Wise spending is what everybody is asking for.

How is the staggering amount to be spent? There are experts in the various State Agricultural Departments. These gentlemen aided by Agricultural economists should work out a frugal disbursement of the votes. In effect, they may have to modify certain aspects of the vote to conform with present need attuned to stabilizing things in future.

A sad note of warning pealed out towards the tail end of the month from the North Eastern State. Swarms of locust invaded the State. The pests must have touched the fringes of the adjoining states devouring the already drought-affected crops.

The full affect of the invasion will be felt from October onwards reflected in poor harvest, stunted crops and unripe fruits since the leaves helping evaporation and consequent ripening of fruits have been chewed by the locusts.

Briefly, the agricultural scene is one beset with hurdles which fortunately have attracted the attention of the Federal Military Government.

The Federal Military Government is aiding the North Eastern State Government in checking the inroads of the locust. The poor farmer can be sure that though the war is between armies, the Federal team will not only overpower the invading locust armies but will also checkmate a repetition.

Let us hope that corrective measures will be taken against locusts and drought while the votes are scrupulously expended.

ANIMAL HEALTH AND PREVENTIVE MEDICINE

by A. F. BALDRY

Veterinarian of the Agricultural development and Advisory Service, National Agricultural Centre Stoneleigh, English midlands

An important development at Britain's National Agriculture Centre (NAC) at Stoneleigh in the English midlands in the past year has been the establishment of a multi-disciplinary team of the governmental Agricultural Development and Advisory Service (ADAS).

The ADAS team, comprising specialists in animal husbandry, agronomy, farm building mechanisation and drainage and land use and conservation, has two major tasks: to help the NAC achieve high standards in its demonstration and exhibition work and to use and develop the opportunities offered for advisory activities and the passing on of information to the agriculture industry.

The NAC - headquarters of the Royal Agricultural Society of England (RASE) and the permanent site of the Royal Show - provides a comprehensive information service for both British and overseas farmers and has permanent livestock demonstration units with a staff of instructors as well as technical units.

There are also conference facilities support groups including commercial organisations and the centre also provides the opportunity for exchanges of ideas between farmers, advisers, educationalist, research workers and those with commercial interests.

Time Lag

The NAC attempts to update the original object of the RASE which is to unite practice with science. There has always been a time lag between successful research and the adoption of its results. As in most countries, there is a need for quick and the wide dissemination of ideas and techniques which have been proved in practice and the aim of which is to increase the total productivity of the agricultural industry.

The setting of the ADAS team in 1972 was a big step forward and, the Royal Show aside, its main activities are concerned with demonstrations, conferences and a continuous information service. To obtain such ends the specialist must gain considerable experience out-

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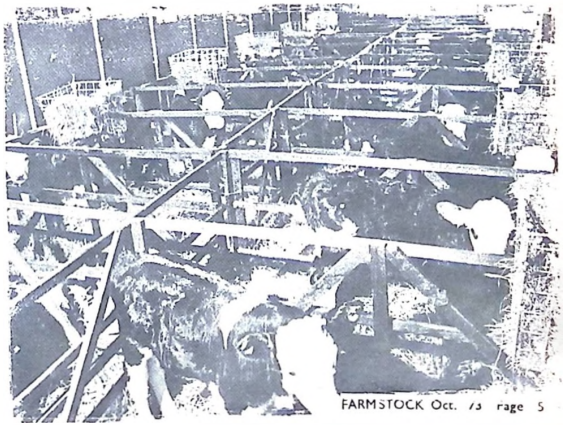


OUR POULTRY CORRESPONDENT ADVISES ON

HOW TO CHOOSE DAY-OLD CHICKS

Modern poultry keeping is a skilled business which needs expert management to make good profits. Good managements starts with buying the right type of day-old chicks, ones capable of growing into profitable layers.

Such chicks should be scientifically bred and hatched in a hygienic hatchery. The hatchery which produces them should be one which takes an interest in the farmer's success with their stock and will help him with advice and delivery.

WELL-BRED CHICKS

Breeding better chickens is a difficult and complicated business. Some of the ways in which Poultry scientists do this are explained later in this series.

Here, we are concerned with only the objects and results of their efforts. Layers are bred to produce the maximum PROFIT PER BIRD, profitability being the result of a combination of several factors :

1. Adaptability of the bird to farm conditions
2. Low feed consumption
3. High egg production
4. Large egg size
5. Good liveability
6. Good carcase weight at the end of lay

Hatchery Hygiene

The farmer who buys day-old chicks requires healthy birds. The hatchery and the breeder have to spend much time and effort in producing healthy and disease-resistant birds.

Each individual bird is tested before its eggs are taken for hatching. Every egg laid is collected promptly from the poultry house, dipped in sanitant and stored in a specially cooled room until it is required for setting in the incubators.

Only clean well-shaped eggs, free from cracks, are used for hatching. The last three days of incubation are in separate hatching machines, kept in a different room from the setters so that a complete disinfection after hatching can be carried out without affecting the following week's eggs.

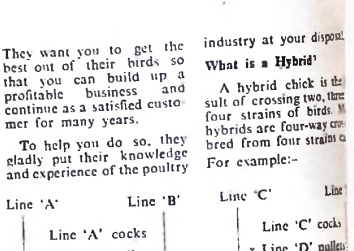
Service and Advice

Most hatcheries maintain an after sales Service. suppliers never lose interest in the chicks they have produced. They want you to get the best out of their birds so that you can build up a profitable business and continue as a satisfied customer for many years.

To help you do so, they gladly put their knowledge and experience of the poultry industry at your disposal.

What is a Hybrid?

A hybrid chick is the result of crossing two, three four strains of birds. M hybrids are four-way cro bred from four strains o For example:-



Signature of Advertiser Address

There are two reasons for this complicated breeding plan. Firstly, it combines the good qualities of the several strains all into one bird. Secondly, it makes use of "hybrid vigour" to produce an outstanding commercial chick.

"Hybrid vigour" is the name given to the improvement in performance of a hybrid chick over that of its parents. It is responsible for an improvement of up to 50 eggs per bird over the parent strains. Selecting the best birds for use as grandparents for commercial birds is a complicated task.

Two main methods are used. Firstly, the strains used at present are constantly being improved by selection within the strain. Secondly, hatcheries are constantly searching for new strains or crosses which could prove even more profitable for poultry farmers than those they sell at the moment.

These two programmes for improvement include recording the performance of over 200,000 experimental layers each year, kept under a wide variety of conditions, and derived from over 150 separate pedigree strains. Such breeding research involves an annual expenditure of over ₦400,000 per year.

The benefits of this huge research programme are being made available to Nigerian poultry farmers by the various hatcheries in the country today New parent stock are imported to their farms three times a year to make sure that the very latest improvements have been incorporated in the day-olds hatched at intervals.

Good Housing

The purpose of housing poultry are:

(a) To keep the birds under the owner's control

(b) To protect them from other animals and from theft

(c) To provide conditions in which disease is kept to the minimum.

(d) To provide the poultry with their needs for food, water and nests in a convenient arrangement for the owner

(e) To provide as good temperature, ventilation and humidity as is economic.

(f) To control light

The first two points need little comment. Half-inch wire netting should be used to keep wild birds or rats out of the poultry house. Concrete floors and roofs which cannot harbour vermin are advisable.

DISEASE CONTROL

(a) All housing and equipment should be simple and smooth-surfaced, easy to clean and disinfected between batches of birds. For example concrete asbestos and well-made wooden houses are satisfactory but thatch or earth floors can harbour disease. An "all in all-out" policy should be adopted for

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ANIMAL HEALTH

side the NAC and they regularly visit farms and establishments and attend conferences.

The veterinary officer has a particularly interesting job, with work falling into five main categories. Within the NAC there is direct involvement with disease monitoring and with the production of demonstration material on veterinary matters, to project the livestock units with regard to veterinary topics and preventive medicine. He also supports other specialists in their own extension work where there are veterinary implications.

Outside the confines of NAC veterinarian keeps up to date by visiting farms, veterinary schools and Agricultural Research Council establishments to obtain view on veterinary problems, both at research and farm levels. One of most important aspects of the NAC veterinary officer's task is to concern the livestock units in projection of the principles of good animal health and preventive medicine.

For the success of these ideas close liaison is established with the managers of the units and local and company veterinary surgeons and the work of using the NAC demonstration units to project veterinary preventive medicine has developed particularly during the past six months.

Mastitis Control

At the Dairy Unit mastitis control is of great importance and a mastitis committee has been formed, comprising a dairy husbandry adviser, experts on mastitis research, the practising veterinary surgeon and the unit manager. The control programme closely follows the recommendations by the National Institute for Research in Dairying and includes regular monitoring for pathogens, cell counts and biochemical analysis of the milk.

Results are demonstrated for the benefit of visiting farmers and the basic design of the control scheme consists of dairy hygiene, teat dipping and the use of dry cow therapy.

Metabolic profiles, which consist of a comprehensive blood analysis, are recognised tools for the dairy industry. In the past year two metabolic profiles on the NAC dairy herd have been analysed and the resulting data and comments are available, together with a discussion of the situations in which such profiles could be used. There was a demonstration of these principles at the 1973 Royal Show.

The Profitability of a dairy herd depends on a good calving index or open interval, that is, calved cows should become pregnant again in a relatively short period after they calve to ensure the continuous flow of milk. An analysis of breeding data has been made in which action can be made to improve the calving index. The uses of this system together with farm records were demonstrated at the Royal Show.

Continuous Exhibit

Plans are in hand to use the normal health procedures carried out at the Pig Unit for the demonstration of the Royal Show. This will become a continuous exhibit for the future with data on specific topics used to promote the concept of animal health, taking into account economic factors and performance figures.

The 1973 exhibit included data on erysipelas vaccination, care of the sow and litter at the time of farrowing and care of the young piglet, with special regard to weaning. A number of visual aids on castration, teeth clipping, tail docking and other procedures of modern pig husbandry were included. The security of pig farms to disease entry formed a further exhibit.

Virus pneumonia causes a considerable loss of revenue to Britain's pig industry and there are plans to assess the level of this disease in the two systems of management operating at the NAC Pig

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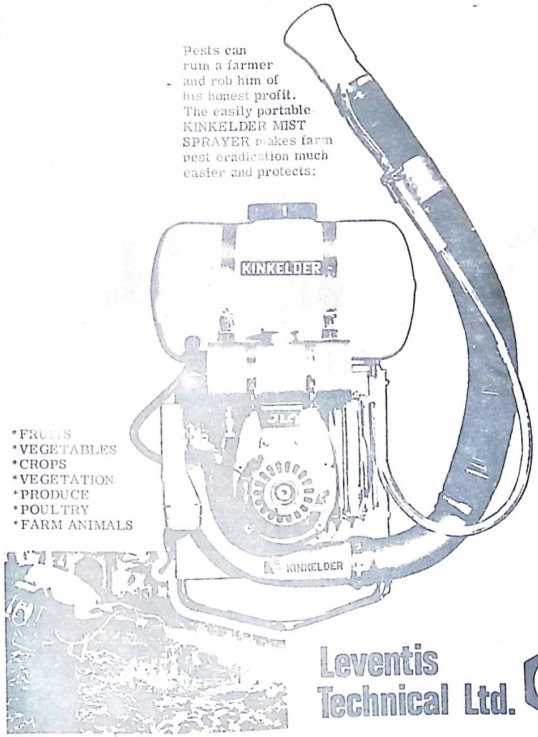
Mr. A. F. Baldry blood sampling a ewe at the National Agricultural Centre's Sheep Unit

AMAZING KINKELDER SPRAYER

Pests can ruin a farmer and rob him of his honest profit. The easily portable KINKELDER MIST SPRAYER makes farm pest eradication much easier and protects:



*FRUITS
*VEGETABLES
*CROPS
*VEGETATION
*PRODUCE
*POULTRY
*FARM ANIMALS

Leventis Technical Ltd.

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DAY-OLD CHICKS

each house, and young chickens should be reared at least 100 yards away from adult birds. The best housing system is to keep birds in wire-floored cages. If this is not possible, make sure that the ground and litter are both clean and dry. Concrete floors are better than earth floors.

Space Requirements

Poultry kept on deep litter require the following living and feeding space for every 100 birds:

Age in weeks	Feeding space	Drinkers	Square feet on litter
0 — 2	8 ft.	One 9 gallon drinker	20
2 — 4	16 ft.		40
4 — 8	25 ft.		60
8 — 12	33 ft.		90
12 — 16	41 ft.	Two small round fountains or one 4ft. long trough	120
16 — 20	50 ft.		150
20 weeks onwards	50 ft.		300

Nest boxes should be provided at the rate of one 12 inch square nest box for every five birds in lay.

Feeding space refers to one sided troughs. A 6ft. long trough, which birds can reach from both sides, therefore counts as 12 ft. of feeding space. Troughs should be big enough to hold 2 days' supply of food when filled to the half-way mark.

Drinkers should either be connected to piped water supply or else should be filled to the brim with fresh water. This will prevent water shortages which stop egg production very quickly.

Perches for birds on litter should be made of 2" x 2" wood and provided at the rate of 8 inches per adult bird. An alternative to perches is to use a weldmesh-covered droppings pit covering one third of the pen area for layers or half the pen area for growers. 2" x 1" weld mesh is fixed to removable wooden frames and placed 15 inches above the floor for growers or 24 inches above the floor for layers.

By using this droppings pit, the litter is kept cleaner and the risk of disease is reduced.

When poultry are kept in cages, the stocking rate should be three adult birds in a cage 16 inches wide and 18 inches back to front. Birds reared in cages should be allowed half a square foot each up to 10 weeks and four inches of feeding space per bird.

No more than 50 birds should be reared together in one cage. When birds are brooded in rearing cages, the wire floor should be covered with hardboard or paper for the first week until the birds are able to walk on the wire. Sawdust litter should be scattered on top of the paper.

LIGHT AND TEMPERATURE CONTROL

Naturally-ventilated and naturally-lit poultry housing is very much cheaper than that depending on electric power. Production per bird is generally lower, but the return on capital invested should be higher because of the lower cost of the building.

There is no minimum size of unit and houses can be extended cheaply as the poultry flock grows. Poultry do not need bright lights to lay eggs. Indeed, too bright a light will cause feather pecking and cannibalism. They should therefore be protected from direct sunlight.

Birds give off heat and breathe out foul air. The ventilation system should remove both of these. Hot air rises so an opening at the top of the building is necessary to let it escape while cooler air comes in through the sides.

Airflow round the birds themselves must be unobstructed, except in the case of young chicks which have to be protected from draughts. The stair-step arrangement of cages gives the best air circulation. Naturally-ventilated poultry houses must be not more than 30 ft wide.

Day-old chicks need warm dry and draughts-proof accommodation. Draughts can be prevented by using hardboard circular surrounds 2 ft. high, for the first week.

PLEASE! Have you any IDEAS to help other Poultry owners in SA, then write to: FARMSTOCK P.O. Box 79 * A payment is made for used articles - Editor

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ANIMAL HEALTH

If the birds are reared on the floor, these surrounds are useful for keeping the chicks near the brooder. A circle, 5ft. in diameter is sufficient for 100 chicks. The minimum brooder temperature necessary is :

Egg production is most efficient in temperatures between 50 and 70 degrees F. However, birds can produce well at higher temperatures, provided the ventilation is satisfactory.

Age in weeks	0 — 1	1 — 2	2 — 3	3 — 4
Brooder temperature, degrees F.	95	88	81	74

From four weeks to point-of-lay, pullets are not too badly affected by either temperature or humidity. Maximum growth occurs at 60F., but the reduction in growth at higher temperatures is not important for pullets, provided the ventilation is adequate. Birds should be protected from the direct heat of the sun by a roof, extending well beyond the eaves of the building.

the birds are acclimatised to them and the humidity is not also high.

In hot, dry climates, such as in the Kano area, water spraying during the hottest part of the day is useful in cooling the poultry house, but this should not be done in the humid areas of southern Nigeria.

Unit. Data with economic loss estimates will be instructive and may be related to the system, to the buildings and to environmental conditions such as temperature relative humidity and ventilation.

Aspects of preventive medicine at the NAC Sheep Unit have progressed well. Metabolic disease monitoring has been carried out as a mini-profile with a view to mounting a demonstration on hypo-calcaemia, hypo-magnesemia and pregnancy toxaemia - three important diseases in Britain. A project has commenced to demonstrate parasite control in the grazing animal together with monitored data from pasture sampling for the presence of parasitic larvae.

The NAC Sheep Unit includes a flock of rare sheep such as the Norfolk Horn, Cotswold, Woodland White Face (Penistone) and Manx Loghtan, which have been blood sampled for haemotological studies by the Cambridge School of Veterinary Medicine.

Bird Deaths Survey

A large project being carried out at the NAC Poultry Unit is a complete survey of the causes of death of birds dying in egg laying batteries. This will be concluded at the end of the laying period in January 1974 and the data collected on the type of cage, position of cage within the house hybrid of bird.

An interim report will be available in 1973 but a final assessment will not be available until the Royal Show in 1974.

One of the main projects in the calf beef Unit is the testing of the blood of all calves for the level of antibodies obtained via the colostraum. Such samples are routinely tested for Brucella abortus and this opportunity has been taken in cooperation with a Veterinary Investigation Centre to test the serum.

Calves are carefully monitored for disease and performance and the material gathered will demonstrate the need and benefit of adequate colostraum feeding of the young calf. At present a large number of calves has been processed in this manner and the data collected will form a large exhibit to be mounted at the 1973 Royal Show.

Future activities at the Beef Unit will include the control of liver fluke, the monitoring of pastures for parasitic larvae and the correlation of such data with the use of antelmintic preparations for internal worms. A recent developement has been the introduction of a system of metabolic profile assessment within the various beef systems at the unit and to relate this information to the production levels of the cattle.

Disease monitoring and control is a continuous process at the National Agricultural Centre and each successive Royal Show will exhibit additional material to help visiting farmers gain control of those diseases that cause them such great financial loss

The war against DROUGHT

Water transfo the Land

by **ARTHUR BRIGADA** *A London journalist*

Many machines fall down on their claimed capabilities when they have to operate in very hot climates. But this does not happen with the SSP Ranger series of irrigation systems - already in successful operation in Libya.

The metal expansion problems which tropical areas create have already been allowed for by the British manufacturers in the design and field tests of these systems.

Ranger irrigators can give a finely controlled flow of water or liquid agricultural nutrients over an area of up to 100 ha from their feed position. Being fully mechanical they need a minimum of supervision and maintenance – once set up, they are in effect completely automatic.

Efficient

One important factor is their efficient use of water – an important advantage where supplies are restricted. Also, with an even and regular distribution of nutrients, higher crop yields of good quality are ensured.

There are many places, particularly in Africa, where soils are too shallow to retain water very well, which can mean they are entirely unproductive. However, so long as there is a well, borehole, river or canal within reasonable distance the Ranger irrigators can transform useless land into crop-bearing fields,

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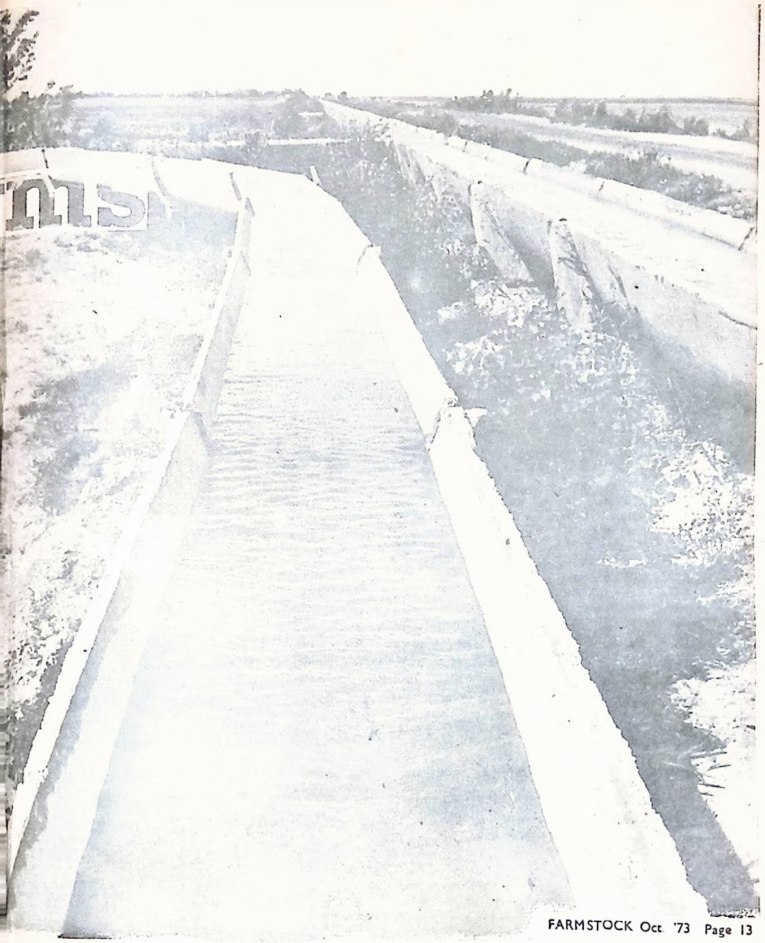
●Hungry Steppe Now Fertile

One of the canals in the Hungry steppe of Uzbek. This canal carries water to the cotton fields.



S S P Agricultural Services Ranger 7 Irrigator

The Ranger 7 sprinkler in action—at full blast

Lack of electric mains power is no disadvantage – the machines will function equally successfully from a portable generator.

Best Use

Even when a minimum of water has been left in a lagoon after rains, the Ranger can spread this where it can have its most valuable effect, instead of being wasted by evaporation or absorption.

A great problem with irrigation systems in tropical countries is often the lack of constant supplies of water but the Ranger machines can help by making the best use of what water is available.

The pipelines of these machines, fitted with sprinklers along their entire length, rotate continuously at a pre-determined speed needing only a minimum of attention. It is supported by a series of wheel structures which keep the pipeline well clear of growing crops and farm machinery and allow it to operate over rough or undulating ground.

Enquiries to: SPP Agricultural Services Oxford Road Reading RG3 1JD Berkshire

(Please mention FARMSTOCK as source of information)

Picture on the right shows an irrigation canal. This canal serves a dual purpose since it provides hydroelectric power at Farkhad, on its way to transforming the hungry steppe into fertile farmland →

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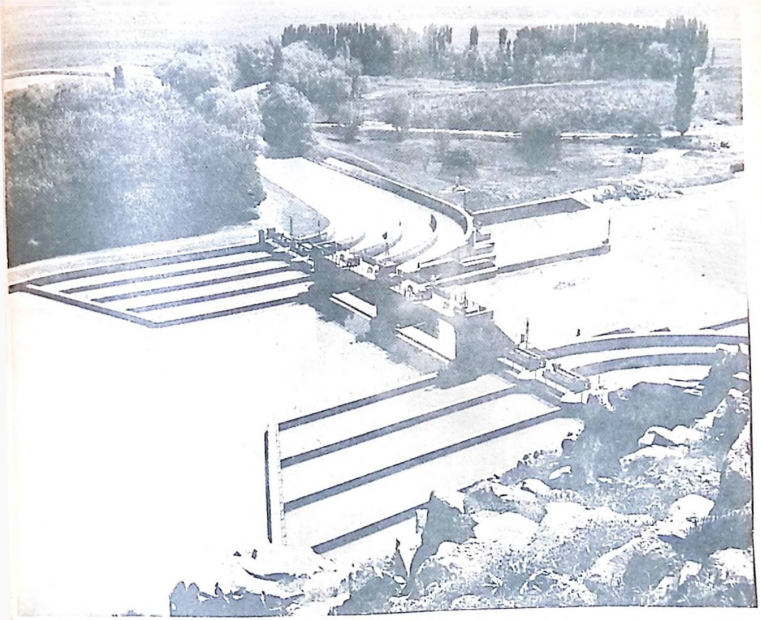

Above The Chumysh Dam supplying water to the fields of Kirghizia & neighbouring Kazakhstan

Left Soviet peasants cultivate the deserts of central Asia which have been silent for thousands of centuries. Photo shows a bird's eye view of a section of the Kara Kum Canal the longest fresh water Canal in the world. It will be 1,300 km. long when construction work is completed

What is

by Our Agricultural Writer

(In these series of articles, our Agricultural Writer begins some systematic analyses of farming and farming processes in order to satisfy a popular demand by young educated farmers and students preparing for various examinations).

In order to practice Agriculture well, it is necessary to understand what Agriculture is.

Agriculture is a special kind of production based on the growth processes of plants and animals. Farmers manage and stimulate plant and animal growth on farms. The production activities on each farm are a business in which costs and returns are important.

We begin, then, with a review of the elements of agriculture which briefly are:-

The Production Process
The Farmer
The Farm
The Farm Business.

The Production Process

Plants are the primary factories of agriculture. They take in carbon dioxide from the air through the leaves. They take in mo

Agriculture?

ture and chemical substances from the soil through their roots. Out of these, using the energy of sunlight, they make seeds, fruits, fibres and oils that men can use.

Livestock are important secondary factories of Agriculture. Depending on plants for their food, they can eat many parts of plants that man does not, such as the stems and leaves of grasses. They transform plant materials into still other products of use to man: meat, hides, wool, eggs and milk.

The growth of plants and animals goes on in nature without any participation by man. Thousands of kinds of plants have evolved over time in different parts of the world in response to differences in sunlight, temparature, amount of available moisture, and the nature of the soil.

Each kind of plant has its own special requirements. It grows best with a certain growing season, certain temperatures at different stages of its growth, a certain amount of moisture, and certain soil characteristics.

The plants that grow in a particular region determine what kinds of animals, birds and insects live there, since some of these feed on the particular kinds of plants found in the region, while others feed on each other.

As a result, different combinations of plants and animals are found in different parts of the world. Sometimes, particularly where the land is hilly or mountainous, these combinations are different within very short distances because of pronounced differences in temperature, direct sunlight, moisture and soil conditions.

Control

Agriculture arises when man begins to take control of this growth of plants and animals, rearranging it to his own benefit. The difference between primitive and scientific agricultures lies

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Heavy duty machines like this one above in a Byelorussian drained land is needed for our agricultural progress Apart from the government or a cooperative body very few individual farmers can afford this type of equipment

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What is Agriculture?

in the degree to which this control advanced.

In the most primitive agriculture, man accepts the soil, the rainfall, and the local strains of crop plants. He fosters the growth of these plants by eliminating to some degree the competition of other plants for the available sunlight and moisture. He tries, by primitive methods, to protect his crops from wild animals, birds and insects. He domesticates certain animals, taking care of them and using their products.

In a scientific agriculture man applies his ingenuity to increasing this control over all the factors that affect plant and animal growth. He introduces irrigation and drainage. He adds plant nutrients to the soil.

He breeds modified plants that are more resistant to disease, that can utilize large amounts of fertilizers, that are resistant to drought, that can mature more quickly and that yield more of the particular products he wants.

He develops scientifically prepared feeds for his livestock and scientific methods to protect them from disease.

Certain characteristics of the biological production process of agriculture are beyond our control. We cannot change its dependence on the energy of sunshine or its variation with the seasons of the year. We cannot eliminate the great diversity of the many combinations of climates, topography, and soil that favour the growth of different types of plants and animals.

And yet, although man did not invent and does not fully understand the process of plant and animal growth, he has learned a great deal about them and

had discovered many ways to control them for his own benefit. We are discovering new ways all the time through scientific research. This increasing knowledge provides the technical basis for the changes that add up to agricultural development.

AGRICULTURAL DEVELOPMENT - What it means.

Several implications for agricultural development follow directly from the nature of biological production processes of agriculture.

Agriculture must remain widely dispersed. Because the energy for plant growth comes from sunlight agriculture cannot be concentrated in urban factories that can have their energy brought to them in the form of fuels or electrical energy. Agriculture will always require large areas of the earth's surface on which sunlight falls

This means, first of all, that a widespread transportation network is necessary for scientific agriculture, to take improved seeds, fertilizers, pesticides, and other modern production supplies and equipment to the various parts of the wide expanse of fields exposed to sunlight, and to bring agricultural products to markets.

Another consequence is that farmers cannot be moved out of their family and village setting into a more controlled "production environment". In non-agricultural industry, workers can be assembled in urban factories away from their places where they live. In agriculture the changes necessary to increase productivity must be carried on in the midst of traditional family and village influences.

Agriculture must vest markedly from place to place, frequently within short distances. We are not likely in the near future to be able to modify climates substantially, except in greenhouse agriculture. Even if we could, existing soils are the result of long evolution under various past climatic conditions.

The differences in climates and soil call for different crops, adapted to differences in local environment.

Suitability

In a few exceptional regions of the earth, conditions for plant growth are reasonably uniform over large areas of valuable agricultural land. The Nile Delta; the Corn Belt of the United State; the Ukraine Region of Russia; the rice Regions of Thailand, Indonesia and Philippines and Burma; the rubber regions of Malaysia, the coffee regions of Brazil, Colombia and East and West Africa, the grasslands of Australia, Uruguay, and the steppes of Asia-are examples of such regions. Within any one of these, the uniformity is usually far from complete. Minor differences in soil and topography make different crops and soil treatments most productive.

Other regions are much more varied. Within short distances-frequently within a hundred steps - differences in soils and in hilly country differences in direct sunlight and temperatures call for different crops in order to make the best use of the resources.

Thus a small farm in Ekiti area may combine rice with vegetables, bamboo and fish culture A farm in the North Central State of Nigeria may combine intensive irrigated cropping near a well with extensive dry land farming only a hundred yards away.

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What is Agriculture?

A farm in the Ida Valley of Enugu area may have one kind of crop on well-drained fields and another kind on a nearby field that is marshy.

These differences have important implications for agricultural development. Perhaps the most important is that they call for such close adaptation of crops and methods to varying local conditions that only the individual farmer can have the specialized knowledge of his farm necessary to make intelligent decisions about its use.

This helps explain why so many programmes that take much of the decision-making away from cultivators of individual farms and place it with national "plans" or with managers of large "collectives" fall far short of expectations.

It is only where natural conditions are very uniform that large farms or plantations, with one manager directing the work of many "labourers" can match the efficiency of good individual farmer-operator of much smaller farms. Such uniformity of natural conditions is the exception rather than the rule.

Comparison

Another important implication is that hints as to how the agiculture of a region can be improved can frequently be found by looking at the agriculture of other farms in the same region or at those in similar region elsewhere in the world.

But importance of minor variations in soils and climates even in region that seem similar means that crops or methods imported from other regions, or even from elsewhere in the same region, require careful testing to make sure they would prove satisfactory if adopted locally.

The timing of farming operations must be fitted to weather conditions and to attacks by pests and diseases.

Factory production processes are carried on under controlled conditions t[illegible] permit each operation to [illegible] performed at any time a[illegible] all the time. Agricult[illegible] production, on the ot[illegible] hand, is subject to weat[illegible] and to other factors such [illegible] the incidence of insect pe[illegible] or disease that vary fr[illegible] time to time and from pl[illegible] to place.

Some operations, [illegible] ploughing can be done o[illegible] when weather and soil co[illegible]ditions are right. Other o[illegible]rations such as pest cont[illegible] must be carried out qu[illegible] if a crop is threatened w[illegible] destruction.

Thus, many agricultur[illegible] operations cannot be ri[illegible] scheduled in advance or fr[illegible] a distance. Schedules m[illegible] be left flexible for on-th[illegible] spot decisions by each farm[illegible] based on local conditions [illegible] the time.