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FARMSTOCK

WEST AFRICAN FARMERS' AND CO-OPERATIVES' MONTHLY

Managing Editor **ABIQDUN OJUGBELE**

AUGUST '75

30k

Cover Pix

NIGERIANS STUDY RURAL DEVELOPMENT AT ENGLISH UNIVERSITY

Dr Emmanuel N. Agwu-na second from left) a Principal Livestock Development Officer from Nigeria's Federal Minister of Agriculture and National Research, and Mr. Ikechukwu Ikpelue (third from left) an agricultural officer from the Mid-west State Government, are seen here with a group of overseas government officials being shown round the Home Farm of Harewood House - the famous Stately Home of Queen Elizabeth's cousin, the Earl of Harewood.

They are among specialists from seventeen countries currently attending a three months course in planning and economic appraisal of rural projects at the University of Bradford, in northern England.

The course is designed to give a sound working knowledge of the methods and approaches to the planning and development of agriculture, forestry and rural projects.

Although the course concentrates on the wider issues and problems of rural planning and development the students will also consider related topics including economics, work skills and management.

Courtesy of B.I.S London.

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LETTERS

WE WANT A GREEN REVOLUTION

Nigeria's Agricultural Development has been lying dormant for years without any apparent radical changes necessary to cope with feeding her population properly.

Our former leaders were blind to the reality of formulating a progressive nation wide agricultural plan. Most of our farmers are no better than the days of their predecessors. Hoes and cutlass remain the most popular farming implement in most parts of the country.

There is no marked improvement in our cultivating system while the farmers are as ill-educated and ill-informed as ever. Government assistance where necessary had been woefully neglected. Stretches of land lay waste for lack of planning while food production continues to decline in output.

It is with this gloomy picture of our agricultural system that I call on the Federal Government to effect a radical programme for farmers. A more revolutionary approach should be embarked upon with all the resources at our disposal. Already we have fallen into No. 4 position in cocoa production while our leading position in palm kernel is shockingly threatened.

There is also a general decline in food crops like gari, palm oil, groundnuts, oil beans etc. We must with her vast resources both natural and human should be able to blaze a trail of agricultural revolution in Africa.

Lagos Yemi Olatunji

HIGHLAND TOMATOES

An agricultural expert once said that Jos in the Benue-Plateau State can be one of the world largest producer of tomatoes. This assumption was based on the favourable weather condition of the area.

In view of this it will be of great benefit to us if we can utilise this favourable weather condition and expedite tomato growing in the area. This will also save us a lot of money spent on the importation of tinned tomatoes. At least what stops us from having our own highland tomatoes when God has bestowed on us the fertile land.

Jos. Umaru Abubakar

Money doesn't make a fool out of a man nearly as often as a fool makes money out of a fool

X X X

When a woman asks to see something more expensive she's shopping; when she asks to see something cheaper, she's buying

SET UP VILLAGE CO-OPERATIVE BANK

Will you kindly permit me a few lines in your magazine to express my opinion on ways and means of improving village farming? I suggest that village Co-operative

Bank should be set up in remote parts of the Country to help poor farmers. The Bank will lend money to purchase seedlings, fertilizer and necessary equipment. These will produce a better harvest to help the farmers pay back the debt.

Ota Oluyemi Aganran

LET'S HAVE MECHANISED GARI PLANTS

The prices of gari have gone up now so much that even the poor has been forced to pay more since it is the only food item within his reach. This increased cost is a result of lower production. Farmers are now producing below what is required for consumption. As the record shows, the output to be on downward trend, we may soon reach a stage when gari has to be imported to supplement home demand.

I therefore appeal to the Federal and State Governments to set up mechanised gari plants as this will enable farmers to concentrate on growing cassava to feed the plants with raw material.

Ibadan Tunji Omoba

ENCOURAGE DIARY

Among the most neglected aspect of our agriculture in Nigeria is diary. This stems from the fact that only government and very few Companies can undertake the venture which requires large financial outlay. Already there are some government diary farms, but their productivity is far below the requirement of the nation.

We should strive to establish diary farms that would be able to supply us with abundant milk, butter, cheese, bacon etc.

I hope the government would include these essential products in her five years development plan.

Lagos. Micheal Orizu

SCHOOL FARMS

I give accolade to the editorial SCHOOL FARMS in the June edition of FARM STOCK. As we are now witnessing that the drift from rural to urban areas is increasing at a tremendous rate the enthusiasm of becoming a farmer is declining in our youth.

This is a matter of which is the result of lack of encouragement and the future that await would be farmers.

In as much as the cause of this drift lies in the search for security in steady living, the exact will continue unless security and steady life is available in the farm.

Farming too can be made attractive if there are schools for FARMING where intending farmers can undergo the basic technique of farming. However, the products of the school should be aided by the government through loans to purchase necessary implements. Fertilizer and seedlings too should be provided at subsidised rates.

All in all the success of the scheme will depend on the incentive offered by the government.

Rauchi. Usman Baba

INCREASE IN COCCA PRICE

The producer price of Cocoa has been raised from fifteen to sixteen cedis with immediate effect. Announcing this at a rally at Koforidua in the Eastern Region to mark the International Cocoa Day, the Head of State and Chairman of NRC., Col. I.K. Acheampong said the increase is in recognition of the efforts of farmers.

The Ghana Government in a short period of three years has raised cocoa price four times from eight to sixteen cedis. The increase, according to the Chairman, is to encourage farmers not only to improve production, but their living standards.

GHANA SOON TO EXPORT RICE

Ghana might export rice to neighbouring countries by the end of the next agricultural season, Commander J.K. Amedume, Ashanti Regional Commissioner told the Right Reverend David Brown, Anglican Bishop of Guildford and his wife in Kumasi. Bishop Brown who was on a two-day visit to Kumasi as part of his visit to Anglican Diocese in West Africa paid a courtesy call on him at the residency. Commander Amedume said three years ago, Ghana imported about 95 per cent of her rice consumption "but since the launching of the "Operation Feed Yourself" programme, every rice consumed in the country is produced locally" while several scholars had taken to serious farming. Bishop Brown had earlier praised the government's agricultural policy and suggested that in order to attract more school leavers to the agricultural field, sixth formers must be introduced to all branches of agriculture so that by the end of their course, they could choose the field of study in which they were interested.

TRADE FAIR

THE THIRD GHANA INTERNATIONAL TRADE FAIR WILL BE HELD IN ACCRA FROM FEBRUARY 1 - 15, 1976.

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(Issued by the Information Section of the GHANA HIGH COMMISSION, Lagos)

cooperatives and grains

This season is one of plenty. Harvesting will go on for some time until around November, scarcity of one item or another will be creeping in.

The average farmer is now selling his products at give away prices. He cannot do otherwise because he needs money. What then can save us from the bogey of plenty today none tomorrow?

Storage entails huge costs usually beyond solo effort, therefore team work is the answer. No other team readily comes to mind beside the co-operative bodies in whose bank tills fortunes are stored away in cash only to be lent on interest in drips to borrowers who will need money mostly for consumption.

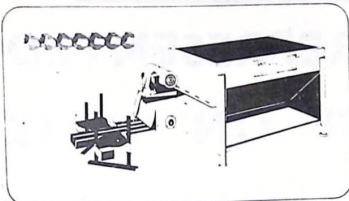
Although relief is relief, one form is however better than another. The co-operatives can relieve the farmers of much headache by buying up their grain stores at reasonable prices now to be sold to the public steadily afterwards.

The two effects to be created are steady prices and the avoidance of waste usually experienced at harvest time. Another important result to follow if the co-operatives come in timely will be the removal of the unhelpful role of middlemen. They usually make things difficult for both the farmer and the buyer.

The poultry business readily comes to mind. Unless there is plentiful grain, the business suffers, eggs and chickens will be scarce and the benefit derivable from these items of food will be out of the reach of many.

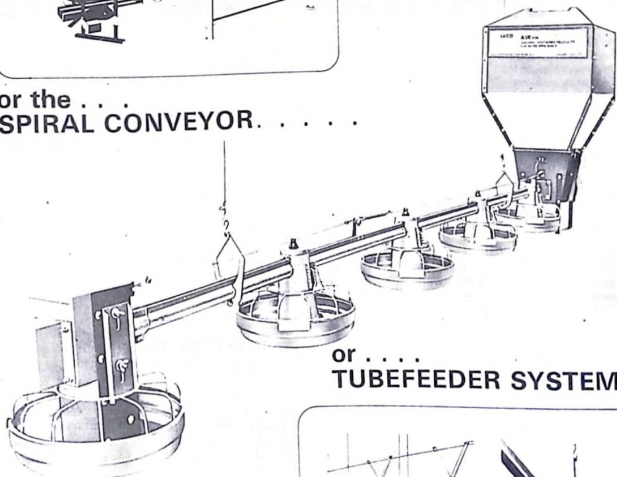
The co-operatives must come in quickly now.

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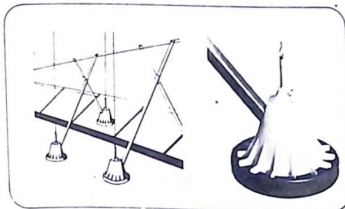
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NIGERIA REPRESENTED AT SEMINAR ON MAIZE

Ways of improving the yields of maize were discussed at London University's Wye College in Ashford, Kent, recently when experts from all over the world - including Nigeria - attended a one day seminar on the subject organised by the College's Maize Unit. Representing Nigeria were Professor D. McDonald from the University of Ibadan and Mr. Iremreni, a post graduate who is studying at Wye.

Dr. Alastair Allen, from the Kitale research station, presented a paper on climatic factors in the development and yield of maize crops in Kenya and the expansion in production that is taking place there. Dr. Allen is currently back in Britain to write a report on production for the Kenya Government.

Other topics that were discussed were physiological factors of production and requirements for future research work into ways of

improving crops.

A member of the Wye College's Maize Unit said that in recent years Britain had begun cultivating maize for animal consumption and industrial use. "Much of the work we are carrying out at Wye is relevant to developing countries. At the moment we are concerned with experiments with French and Northern European seed, but the technology we are using in improving yields is applicable to all maize growing areas".

World production of grain maize is of the order of 300 million tons a year and is second only to wheat. The grain is used extensively for human and animal feed and provides a major source of starch for industrial use.

Britain imports 3 million tons annually. Some 20 acres of maize silage is being grown at Wye College together with an extensive area of trials plots and 100 acres for grain maize. Over 75% more than 1974

BOOST TO FARMING IN BP

The Bokkos Farm Project in the Benue Plateau State has been inaugurated by the Kano State Military Governor.

Stressing the aim of the project the State Governor hopes to increase food production in the state.

The project will also provide venue for the training of local personnel management and reduce unemployment.

The Governor disclosed that similar projects would be established in Gboko Division of the State.

FERTILIZER FACTORY NEAR COMPLETION

The Federal Government owned super-phosphate fertilizer plant at Kaduna is due to commence operation soon.

When production starts, the complex will produce super-phosphate fertilizer daily.

A blending plant would also be established to produce concentrated N-P-K fertilizer.

The factory will provide employment opportunity for about 300 Nigerians.

ADA TO SPEND N72m FOR DEVELOPMENT

The East Central State Agriculture Development Authority, plans to spend N72.18 million during the Current National Development Plan.

While addressing a news conference at the Enugu Press Club, the ADA President Mr. Achukwa disclosed that N6m had been invested in the authority applied investigations during three years of its experimental phase.

The President also revealed his authority's investment of N1.8 million in its Ogbe cashew and poultry complex project in Udi Division.

There are also moves to aid private farmers, to this end the authority was going into partnership with a private piggy farm - The RECONO Properties Company Limited.

Wye College's Maize Research Unit, which is supported by the Home Grown Cereals Authority, is engaged on studies in the agronomy, mechanisation and economics of production.

LAND ACQUIRED FOR AGRIC SCHOOL

The South Eastern State Government has acquired a large parcel of land for the permanent site of the School of agriculture at Adu.

Construction of blocks to enable the School to move to its permanent site during 1976/77 academic session will begin soon.

This was made known by a reliable source of the Ministry of Natural Resources during the graduation ceremony of the second batch of students which took place at Obubra.

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- GARDENING

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Managing Editor
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COOPERATIVES

OGBAKU COOPERATIVE MOVES ON

The year 1967 marked a turning point in the history of co-operative Society at Ogbaru Division. Preceding this period, there was no organised co-operative Society in the area. The formation of Abo-Atani farmers' multipurpose co-operative society radically altered the farming picture of the area.

Situated along Atani-Ozubulu road, it has most of its members from experienced rice farmers who had lived and cultivated rice for some years in Ibaja in Northern Nigeria prior to the Nigeria crisis.

CRISIS

As a result of the crisis they were forced back home during which they underwent series of upheavals. However, during the civil-war they cultivated paddy rice supplied to them by the then Ministry of Agriculture and Natural Resources.

They were able to mill the rice at a private mill in Ihiala when the war came to an end.

Subsequently, their effort to procure a mill of their own through the Rehabilitation Commission failed. This drove them into partnership with a private businessmen in Onitsha who had a million machine.

The association was shortlived and the society had to rely on its own initiative which has enable it to grow and expand.

The Society which was registered 1971 with current member-ship strength of 71 people comprising seasoned farmers owed its success to the President Mr. Udogwu Okenwa of Okija, treasurer Fred Ewizie and Geogrey Ifeacho secretary.

The Abo-Atani farmers' multipurpose society's is managed on the shareholding basis.

Each share capital is worth N200.00 and members are to hold at least five shares and pay entrance fee of 20k.

The objectives of the society is to improve the standard of its people, attainment to modern methods of farming and extension of fishing activities.

Society members also benefit from loans made available to them to obtain seedlings and agricultural equipment which enables them to undertake profitable cultivation of yams, cassava, maize and rice.

During the harvest period, traders from many parts of the state and some parts of Northern State and Rivers State are attracted to the area.

The spirit of this self-help scheme of Ogbaru natives had attracted a loan of about N1,500.00 from the East Central State Reha-

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CO-OP UNIONS IMPORED TO STRIVE HARD

On the occasion of the 53rd International Co-operative Day in Ibadan recently, the President of the Co-operative Federation of Nigeria, Pastor E.T. Latunde implored the co-operative and union staff to strive harder.

In his address to the union, Pastor Latunde entreated the union to assist affiliated unions to enable them know the benefits of becoming co-operators.

He also urged the Federal Government to give more and financial assistance to Nigerian farmers.

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bilitation Commission in 1973. The loan helped to increase the production of yams, rice, cassava and maize.

To this end it has acquired 521 acres of land for planting rice; 450 for cassava; 400 for maize; and 10 acres for yams.

The success of Abo-Atani co-operative society spurred the formation of Udoka multi-purpose co-operative society which was formed in 1971 with a membership of 18 persons who were mainly farmers and fishermen.

The society was run in line with those of the former society with similar objective to improve living standard and better farming conditions.

FURTHER GROWTH

The Orabuike credit and thrift co-operative society formed in January has also joined the group of co-operative societies in Obaru Division.

The society with a membership roll of 37 people appears to be the first of its kind in the Division. Comprising cross section of all trades, profession and businesses.

With the formation of this Co-operative Society the people of Ogbaru Division will become more self-reliant. Furthermore, it would be building a legacy for the future generation who would have better opportunity to infuse modern agricultural method into an already established system.

In the meantime the people should concentrate their energy on consolidating the already laid foundation. This will necessitate closing ranks and absorbing the mush-room co-operatives to form one large viable co-operative capable of providing the needs of the people.

Rasaq Alli - Balogun.



All hands on the deck, the above picture seems to indicate, leaving no one behind in feeding the ever growing population of our Country. The leader of Otu Olu Obodo women organisation Oru Division Mrs. Rose Koles is seen with a stick at Otu Olu Obodo farm.

COOPERATIVE EDUCATION TO BE ESTABLISHED

The Federal Government is proposing the establishment of a Co-operative Education and Enterprises Development Centre for Research and Training throughout the Federation.

This fact was made known by the Federal Registrar of Co-operative Societies, Mr. J.O. Taiwo while addressing the opening session of a three-months course of co-operative and business management.

The decision to establish the Centre hinged on the role which co-operatives are expected to play during the third National Development Period.

In his address the Director of the Nigerian Institute for Oil Palm Research (NIFOR) Mr. E. Ogor, said that because of the massive programme of the Institute United Nation Development Programme had been called upon to assist NIFOR with men and equipment.

NIFOR he said had already circulated research results to farmers through workshops seminars and publications.

There are also moves to aid private farmers, to this end the authority was going into partnership with a private piggery farmer. The RECONO Properties Company Limited.

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FOOD PRODUCTION: WOMEN IN THE FRONTLINE

In the East Central State, women have formed various economic groups for co-operative farming with a view to increasing food production. Among such groups is the Ozuh - Omuma Wing of the Otu Olu Obodo Women Organisation in Otu Division.

The group has planted cassava in an eighty hectare piece of land recently acquired. The Organisation's leader Mrs. Rose Koles wants young girls to be included in their programme purposely to check their drift to the cities and

much more important to make them helpful to their mothers at home.

Otu Olu Obodo Women Organisation is also in Udi, Okigwe, Mbaise and several other places.

NEWS

KWARA LAND SCHEME LAUDED

The Kwara State "Farmers' Land Settlement Scheme" has been praised by the Kwara Group Farmers, a farmers association in Ilorin.

The Scheme said the chairman of the group Mr. Bayo Ajayi who has just returned from the Royal Agricultural Show compared favourably with those he saw in England.

Under the scheme, the State Ministry of Agriculture plough, ridge, plant and fertilize farmlands before handing them over to owners.

RURAL FARMERS WILL BE PROTECTED

In pursuance of its mechanised farming programme, the Midwest Government would not displace rural population in the state.

It is the desire of the Government to increase the agricultural productivity of the state and by the mechanisation of farms more food would be available.

Farmers will be re-allocated at suitable sites if their farms

are taken over by the government.

The government also has urged local farmers to form themselves into co-operative and medium scale farmers, so that they would be given loan.

An agreement has been signed between the Midwest Government and the Nigerian Agricultural Bank, Kaduna, which would make available N3.5 million while Midwest would provide N3.5 million in making a total of N7.00 million loan available to farmers.

WATER POWER COMPANY LAUNCHED

The North Central State Water Board in conjunction with Messrs. Wakuti Gmbh of Switzerland has inaugurated a Water and Power Development Company (WAPDEC). In the joint venture Messrs. Wakuti hold 49 percent share while the North Central State Board hold the majority share of 51 percent.

Outlining the objective of the new Company, the State Commi-

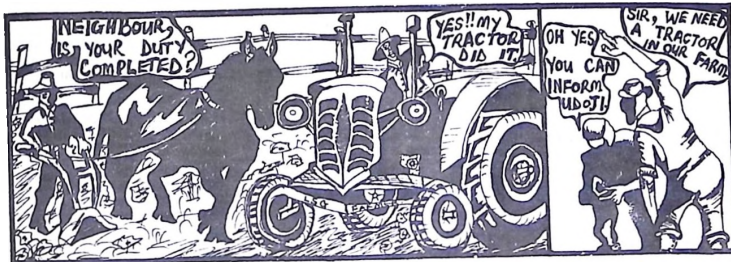
ssioner for Finance who is also the Chairman of the State Water Board, expressed the government intention of utilising the expertise of the Swiss technical knowhow to form a virile indigenous Company.

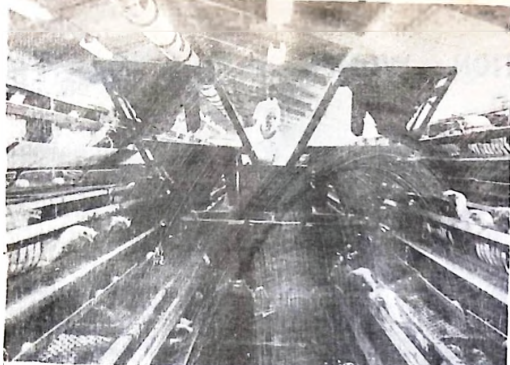
Messrs. Wakuti plans to develop the water sources of the state. The implementation of this project would counter any hardship that may result in case of future drought.

FACULTY OF AGRICULTURE EXPANDS

The Department of Animal Science of the Faculty of Agriculture in the University of Nigeria Nsukka, East Central State have placed order for equipment worth N300,000.00 to enlarge its Cattle Centre. The equipment which are expected towards the close of the year will help in increasing the production of milk to serve the University and environs besides buildings to house goats, pigs and poultry are also under way.

As the Country is constantly facing meat shortage, this step is one in the right direction.





There is a steady increase in the production and procurement of poultry, due to the high level of automation and mechanization in this sphere of Soviet Agriculture.

Photo shows feed distribution in a poultry farm department

USSR

INDUSTRIALISATION OF LIVESTOCK BREEDING IN THE USSR

By Gleb Spiridonov, APN Political Correspondent

As one of the most important tasks in working out a general line for boosting agriculture ten years ago a plenum of the CPSU Central Committee mapped a programme for the further development of livestock breeding. At that time, livestock breeding was one of the most backward sectors. Fixed procurement plans for livestock products and higher purchase prices by 20 to 70 per cent, were established while retail prices remained the same. The government rendered material aid to the state and collective farms by pouring additional money into livestock raising.

In keeping with the directives of the 24th CPSU Congress, widescale measures to transfer livestock breeding on an industrial basis are being carried out in the current ninth five-year plan period. The construction of large cattle-breeding complexes and poultry factories that would produce pork, beef and milk, eggs and fowl have started on the outskirts of large cities. The successful implementation of the party's agricultural policy has promoted a radical turn in the development of collective and state cattle

breeding. As a result in the last decade the output of meat in the USSR has increased 1.7 times, milk 1.5 times, eggs more than twice. This has improved the supply of city population with the most valuable food products.

However, the present state of livestock breeding is still incapable of fully satisfying the increased

farming in other lands

demands on its produce. In order to add to the quantity of foodstuffs, consumed by its citizens, the USSR buys a certain amount of meat, meat products and eggs from the fraternal socialist countries Bulgaria, Hungary, Mongolia and Poland. These purchases make up less than 1 per cent of the total output of livestock products in the country. The meat that is purchased from time to time in the West does not make much difference in supplying the population of the country.

One of the most important ways of dealing with the problem, and that is exactly what Soviet agriculture is doing now is the specialisation and further concentration of livestock breeding and its transformation along modern industrial lines. The Ministry of Engineering for Livestock and Fodder Production of the USSR has been set up in order to better cope with the all round mechanization of livestock breeding.

Today scores of machine-uriting

plants are working for this line of agriculture. The large cattle-breeding farms and complexes created in recent years in a number of regions show the high efficiency of specialisation and complex mechanisation. They have attained a tremendous increase in the output of meat surplus, a reduction of labour expenditure, economy of fodder and a decrease of prime cost.

The higher material and technical potential has made it possible to effectively combine the economic production resources of the industrial farms, inter-collective farm enterprises and collective farm enterprises. Associations are being set up in the republics and regions of the country. There are more than 50 of them to date and the major ones are cattle-breeding complexes, pig farms, factories producing meat, fodder, and poultry factories.

The intensification of livestock breeding in the USSR is conducted on a planned basis in the interests of the farmers and the working people. It is aimed at improving working conditions, raising the material welfare and cultural and technical level of the workers and at the same time called upon to provide the production of low cost high quality livestock products in quantities that would satisfy the demand of the 250 million population of the Soviet Union.

UK

AN ANSWER TO WORLD FOOD PROBLEMS

Technology developed by BP Petroleum (BP) for producing protein on a commercial scale from oil is being used to make a significant contribution to world food problems.

The latest advance in the international adoption of BP protein technology is the plan to establish an integrated plant in Saudi Arabia to produce 100,000 tons a year of protein as a joint venture with Saudi's state petroleum and mineral organisation.

If, as expected, the BP study group complete their work in the next few months the plant could be in production by 1978, making Saudi Arabia the second major oil state to opt for

AGRIC NOTES

Raspberry Trial Pays Off

Raspberries have been grown successfully for the past 12 years at the Horticultural Centre, Loughgall, Northern Ireland, even though the land has never been cultivated since the canes were planted.

Instead, weeds have been controlled by the use of herbicides.

Herbicide sprays facilitated plantation management - particularly during wet soil conditions - without any reduction in crop yield.

Indeed, during the eleventh and twelfth years of the experiment, the herbicide-treated raspberries significantly out-yielded those in which cultivations were used to keep down weeds.

Some canes were given a mulch of farmyard manure and, although this did not increase crop yield, it did prevent soil erosion and water run-off on sloping sites.

Whole Wheat For Birds

Pullets can be reared cheaply and successfully from 12 weeks of age on a diet consisting solely of whole wheat, although preferably with a vitamin-trace element supplement, according to an experiment at the Agricultural Research Institute of Northern Ireland at Hillsborough Co., Down.

Fed from 12 weeks of age onwards, the whole wheat diet cut feed costs, not only because it was cheaper than a conventional rearing ration of 14.8 per cent crude protein, but also because feed consumption was slightly reduced.

And, apart from about four days' retardation in sexual maturity, the treatment had little effect upon adult performance.

However, when replacement pullets were put on to the whole wheat diet at only nine weeks of age, there was a high mortality rate because of cannibalism which was only partly reduced by the addition of the supplement.

Poultry Waste - Another Green Light

A wide range of livestock rations could usefully incorporate dried poultry manure according to trials which have been carried out at the Poultry Research Centre, Edinburgh.

These indicate that five per cent can be fed in replacement pullet rations - and up to 20 per cent in

These indicate that five per cent can be fed in broiler starter feeds, ten per cent in broiler finisher, and 14 per cent in replacement pullet rations - and up to 20 per cent in layers' ration, according to the report.

Chief nutritionist at the centre, Dr. William Bolton, told a conference in Norfolk that dairy rations could take 10 per cent of dried poultry manure and beef rations as much as 20 per cent.

However, Fr. Bolton added, while he had no reservations about the safety of dried battery manure from layers, he was not so certain about beef litter manure from the broiler house.

Wood splinters in the material were the main reason, with the carry-over of broiler feed drugs and toxic chemicals which were sometimes used to treat the wood shavings used for litter.

But its feed value, though of a lower energy level, was similar to barley, and the cost of drying manure

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**THE CIRCULATION MANAGER
FARMSTOCK
P. O. Box 79 EB.
NIGERIA**

Continued from p. 13

could be cut by pre-drying in deep-pit houses on wooden slats before passing through the drier.

Its potential in Britain,

Dr. Bolton concluded, could be estimated at an annual production rate for the country as a whole of one million tons.

Bringing on The Bull

Bulls should be bought two to three months before they are required to give time for them to be got into a fit conditions by the start of the mating season, according to Dr. B.G. Lowman, of the East of Scotland Agricultural College.

He has told farmers that special management is important for young bulls used for the first time, for they have often been reared well to achieve high 400-day

weights, are still very fat when sold and hence can be lazy workers and infertile.

Dr. Lowman says young bulls should never be turned in with large numbers of cows straight away, for they can easily become over-enthusiastic and over-work themselves.

Instead, they should be introduced gradually to the cows, spending only three or four hours with them at first and not allowed full access until at least one or two weeks later.

Cold Colostrum

The feeding of stale, cold colostrum to calves provides a cheap system of calf rearing, according to Mr. Keith Swannack of Bridgets Experimental Husbandry Farm, near Winchester in Hampshire.

Following unsuccessful attempts to freeze store colostrum, Mr. Swannack simply collected a can of colostrum, let it go sour, and discovered that the animals had no objections to it at all.

This means that that a Friesian cow give 10 to 14 gallons colostrum during the four days, her calf drink only up to

Therefore feeding ten surplus gallons at ten pints a day will keep calf for a further 20 days and if fed only to help calves, the excess can take them right up to weaning.

No ill effects have been observed with colostrum to 100 days old, according to the report, with grain rates on the calves more on it as good as those of whole milk or milk substitutes.

FISHING

ADVICE TO OVERSEAS FISHING INDUSTRIES

A team of consultants who have formed an advisory group plan to expand their overseas activities in the coming year.

The London-based organisation - Fisheries Development Ltd (a member of the Arbutnot Latham Group) advises on a

wide range of development aspects from feasibility and fish stock assessment. Fish farming of all species including fresh water varieties through to harbour and port development. Product processing and marketing are also important aspects of the organisation's services.

The speciality services available from the company's staff and associated consultants include marine and civil engineering, fishing gear technology, vessel design, echosounding techniques, and fish handling both at sea and on land.

As a non-government organisation the company is able to make unbiased recommendations and the procurement of equipment on a 'best buy for the job' basis.

The company believes its services will be in increasing demand as the international clamour gathers momentum for the setting up of 200-mile fishing limits around national shorelines. Many countries will be hoping to establish their own fishing industries to fortify their own national food supplies as well as for possible exports.

Apart from Europe the company has carried out projects in Thailand, Brazil, Portugal, Jordan and Panama during the past year.

Fisheries Development Ltd., 37 Queen's Street London EC4R 1BY.



FISHING TO FIGHT FAMINE

Here at the Shearwater Fish Farm - on a half-acre site amid the rolling hills of the English Lake District - British expertise is helping to produce half a million fish a year in a scheme which may go some way to alleviating the current world food problem.

At the Farm rainbow trout are reared in a controlled environment using a low dissolved oxygen concentration pumped into the rearing tanks. The use of oxygen minimises the amount of water required to produce such vast numbers yet allows for greater stocking densities. Controlled environment farming does not aim to produce the trout quicker than in a natural environment but the mortality rate of the young is cut from 80-90 per cent in nature to only 10-15 per cent in controlled conditions.

After the trout eggs hatch they are transferred to 60 inch (152 mm) fry tanks where they get their first taste of oxygenated water. As they grow they are again transferred to large covered tanks outside the hat-

chery where they are left to mature until ready for selling as food or as further breeding stock.

In this picture a research worker prepares to catch a specimen in one of the 25 feet (7.6 m) diameter tanks which hold up to 3 tons of fish - around 26,000 in number - in 6,000 gallons (27,265 litres) of constantly changing swirling water where they swim against the artificial 'tide' as in their natural environment.

At the Farm rainbow trout are reared in a controlled environment using a low dissolved oxygen concentration pumped into the rearing tanks. The use of oxygen minimises the amount of water required to produce vast numbers yet allows greater stocking densities.

'Eyed-Ova' - trout eggs with eyes of the embryo fish visible - are imported from many parts of the world and nurtured in shallow dishes arranged in racks around the hatchery. On hatching the fish are transferred

Continue overleaf

ethiopia:

A decree on land reform was made public recently in Ethiopia. All land was proclaimed to be the property of the whole people. All land other than 10 hectares can remain for private cultivation on rural land announced by the Provisional Military Administrative Committee put an end to the age-old feudal system, and did away with the foundation for the exploitation of millions of tillers of the soil-private property in land. The radical, democratic nature of the reform showed that the new Ethiopian authorities have seriously tackled the job of breaking down the old system.

WORLD FOOD PROBLEMS

protein technology - the first technology outside the U.S. to receive the Kirkpatrick Chemical Engineering award for advances in commercial applications of biochemical engineering.

Venezuela is constructing a plant to produce 100,000 tons of protein a year, while a similar plant run jointly with Italy is expected to come "on stream" this year (1975). BP has itself been operating two development plants - one producing 4,000 tons of protein a year at Grangemouth, Scotland, and another for 20,000 tons at Lavera, France.

Regulations Satisfied

The BP product of high protein yeast from hydrocarbons to complement animal foodstuffs has already satisfied the strict regulations governing the safety and nutritional value of the agricultural departments of all Western European countries.

BP say: "On present estimates, proteins from traditional agricultural methods will become increasingly in short supply possible by some 20 million tons by the year 2,000. We believe that our technology in producing a high protein yeast from hydrocarbons on a commercial scale offers a major new animal feed source, which will help to relieve the pressure on the traditional food crop sources of protein and allow the crops to be used to feed people rather than animals".

The Russian newspaper "PRAVDA" carried under this heading a dispatch by journalist Valentin Korovikov from Addis Ababa, capital of Ethiopia. The Novosti Press Agency offers a slightly abridged version of this article below:

To get an idea of the full importance and revolutionary character of this reform, it must be borne in mind that for ages man's social status in Ethiopia was based on ownership of land, and was determined by the size of the possessions. If one has land, he has power. The might of the Emperor and the nobility was based on the possession of huge estates. Until recently Ethiopia remained a typically feudal and serfdom country with a poverty stricken and landless peasantry without any rights and a haughty, fattened top clique wallowing in luxury.

Exploitation

Two main forms of the peasants' use of the land took shape historically

in Ethiopia. In the northern half of the country, inhabited mostly by Amharas and Tigreans, the communal ownership of land remained. The ploughman had a right to a plot of communal land on the basis of consanguinity or permanent residence. However, with the growth in the population these plots were split until it became smaller and could no longer feed the owner of the plot and his family. Moreover, quite a large portion of the communal land was sliced over to the feudal masters - officials and churchmen, who resorted to various means to increase the land at the expense of the peasants. Forty-nine percent of peasant farms in Begemder province have less than half a hectare of land, and another 10 percent from a half to 2 hectares. Seventy eight percent of the ploughmen in Tigre province have less than a hectare. And these are in areas where entire farm depends on cereals crops, i.e., the gross annual produce of the land owner amounts to several metric centimetres of grain, a small portion of which is taken off by the collectors.

In the southern region of the country the Sidamo, Shoar, Arussi and other provinces most of the peasants have no land at all. In renting it, they had to pay huge duties. One of the articles of the old Civic Code permitted landowners to take from the lease-holder as much as 75 percent of the crops! Crown, the nobility, and high officials and in recent years also businessmen, grabbed millions of hectares of land. No one showed any concern for the fate of the peasants living on these lands from time immemorial. They automatically became lease holders of their own fields.

FISHING TO FIGHT FAMINE

to fry tanks where they get their first taste of oxygenated water.

As they grow they are transferred to large covered outside the hatchery. Controlled conditions are maintained in these 25 feet (7.6 m) diameter tanks which have a capacity of 6,000 (27,275 litres) of constantly changing swirling water. In these tanks live up to 3 tons of fish - around 26,000 of them - swimming against the artificial "tide" closely resembling their natural environment.

This picture shows the racks of 60 inch (152 mm) controlled fry feeding tanks where the trout receive their first taste of oxygen injected water.

BOC SHEARWATER EQUIPMENT, Unit 7, Industrial Estate, Station Road, Southwater, Horsham, Sussex, England.

land for the farmers

became farm labourers on newly created plantations.

Quite naturally, Ethiopia was in a state of complete stagnation due to such abuses. According to data from the UN Economic Commission for Africa, farm production in the country in 1971-1973 decreased annually by two percent. The suffering of the Ethiopian people became unbearable.

MOMENTOUS CHANGE

That is why the agrarian reform proclaimed last March 4, is designated to play a decisive role in undermining the old system. Its main principles are: The nationalisation of land, no compensation shall be paid for land compensation shall be paid for land property, only people tilling the soil by their own labour can have plots for personal use, and the hiring of farm labour is not allowed.

The decree annuls the old debts and the lease holder's obligations towards the farmer landowners. Until the full redistribution of the lands all the lease holders and farm workers have the right of possession of the plots they had cultivated. The former landowner, if he lives in a rural area, shall receive the same plot as the rest of the peasants.

Special attention was given to the creation of peasant associations and their role. These bodies have to assume at district, area and province levels, with the assistance of repre-

sentatives of the administration, the main job in the implementation of the land reform. The main base of this network is the association of peasants or group of farmsteads with a land area of not less than 800 hectares. It is practically the first time in its long history that the Ethiopian peasantry (which makes up nine-tenths of the country's population) has been given the chance to participate in solving their vital national problems.

As far as large commodity farms are concerned, they will be made state property and will form the basis for the modernization of agriculture, and are to supply grain, beans, cotton, coffee, oil, seeds, cane sugar, meat, milk and other products for domestic needs for export.

The land reform has been received enthusiastically. Mass demonstrations in Addis Ababa, meetings, processions and folks celebrations swept the country. It is therefore understandable that the land reforms should cause dissatisfaction, and open resistance among the feudal interests and their successors. Quite a lot of smuggled arms are hidden in the estates and houses of the former ruling clique of Ethiopia. Some of the landowners still hope to remain in their estates playing

on the apathy and ignorance of the peasants. Reports have already appeared of the backlash of reactionaries. The feudal interests have no intentions of given up their lands without a fight. The new rulers and all the democratic forces of the country face a difficult job in uprooting the feudal system and replacing it with a new truly Ethiopian system.

Bearing in mind that, never in history have radical changes entailing the break down of old, moribund foundations proceeded easily and smoothly. Stumbling blocks still lie ahead for the people of Ethiopia. At the successful implementation of the land reform will be one of the decisive stages on the difficult road of progress for the country of 28 million people.



Specialists of the North Research Institute of Hydro-Engineering and Land-Improvement in Leningrad are testing instruments for new irrigation systems.

the elements of AGRI CULTURE (I)

by Our Farming Correspondent

The first step toward getting agriculture moving is to achieve a clear and full understanding of 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.

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 their leaves. They take in moisture and chemical

substances from the soil through their roots. Out of these, using the energy of sunlight, they make seeds, fruits, fibers and oils that man 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 material into still other products use to man; meat, hide, 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, temperature, 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

Agriculture must vary frequently within short periods of the near future to be able to meet the needs of a world that is growing, existing soils are under various past climatic conditions in climates and soils call for differences in local en-

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.

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 in the degree to which this control has 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.

from place to place. We are not likely in dry climates substantially. Even if we a bit of long evolution. The differences in different crops, adapted.

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 in increasing his 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.

AGRICULTURAL APPARATUS



An original device for determining the time for watering farm crops was created at Hydraulic Engineering and Land Reclamation Institute in Turkmenia (republic in Central Asia.) This is outwardly a small vessel with a scale showing the moisture content. It has a loose "mushroom" whose head serves as a vaporizer while its "roots" are immersed in the vessel. The device evaporates moisture synchronically with the soil and, having been "tuned" ahead of time for a definite farm crop, gives a timely warning about the need for watering the soil again.

The signalling device is one of the links of future automatic systems that will find application on the republic's farms. Such systems are being developed by Turkmenian scientists now.

The instruments included in the system will report on the need for watering the crops to

the control room or will give the signal to switch on the water directly at the pumping station. But they can also operate independently of any system. In this case the waterers have to watch the instruments and switch on the water themselves.

Now the automatic signalling devices are undergoing production tests on the republic's farms and have already gained favour with practitioners. Their introduction will greatly lighten the work of the waterers, and will create the possibility for the effective management of irrigated farming in the conditions of Turkmenia's hot climate.

In this picture, the author of the invention Vladimir Gafurov, scientific worker at the Hydraulic Engineering and Land Reclamation Institute in Turkmenia, sets up the automatic signalling device for watering an alfalfa field.



FARM TRAINING FOR NIGERIAN

The intricacies of the electric milking machine now hold no secrets for Mr. Umaru Abubakar Zango, a Nigerian technician on a one-year course in Britain studying arable farm management and farm machinery.

Mr. Zango, 32 and senior assistant technician in the agronomy department of the Institute of Agricultural Research, Samaru, Zaria, Nigeria, is currently studying at the Lindsey College of Agriculture, Lincolnshire, in Eastern England. He is also looking at some of the most technically advanced farms in Britain, involving the growing of potatoes, onions and the processing of sugar beet and potatoes.

The Lindsey College has its own herd of Friesian cattle, a breed used in Nigeria, and Mr. Zango is gaining practical experience in feeding and milking.

Certain characteristics of the biological production process of agriculture and 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 climate, 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 has 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.

Implications for Agricultural Development

Several important implications for agricultural development follow directly from the nature of the 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 the 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.

In contrast to the concentrated nature of cities and factory work, agriculture needs space to take advantage of soil and sunlight.

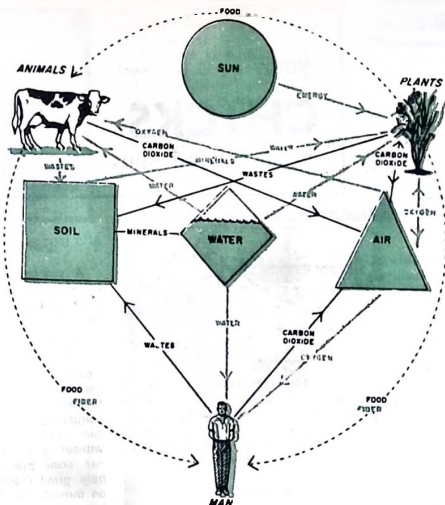
Agriculture must vary markedly from place to place, frequently within

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 a result of long evolution under various past climatic conditions. The differences in climates and soils are too great for different crops, except for differences in local environments.

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 States; the Ural Region of Russia; the rice regions of Thailand, India, and the Philippines in Burma; the rubber regions of Malaysia, the coffee regions of Brazil, Colombia and East 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 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 local resources.

Thus a small farm in Japan may combine rice with vegetables, bamboo and fish culture. A farm in North India may combine intensive irrigated crops near a well with extensive dry-land farming only a few hundred yards away. A farm in the Cauca Valley



Colombia 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.

"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-operators of much smaller farms. Such uniformity of natural conditions is the exception rather than the rule.

Another important implication is that hints as to how the agriculture 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

regions elsewhere in the world. But the importance of minor variations in soils and climates even in regions 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 that permit each operation to be performed at any time and all the time. Agricultural production, on the other hand, is

subject to weather and to other factors such as the incidence of insect pests or diseases that vary from time to time and from place to place.

Some operations, like ploughing can be done only when weather and soil conditions are right. Other operations, such as pest control, must be carried out quickly if a crop is threatened with destruction. Thus many agricultural operations cannot be rigidly scheduled in advance or from a distance. Schedules must be left flexible for on-the-spot decisions by each farmer, based on local conditions at the time.

POULTRY

The first few weeks of chick's life are her most important. Most poultrymen devote a lot of care to their chicks during this time. However, despite good care, poultrymen can run into trouble during this period.

Look at some of these experiences. Let them help you prevent trouble and increase your egg profits.

PREVENT LITTER EATING

One harried poultryman reported his chicks dying one after another. Examination showed the chicks' gizzards packed with shavings. His chicks lived in battery for a few days after hatching. When the poultryman put them on the floor, the chicks ate litter and died.

your

CHICKS

want a good start



If litter is "bite-sized", cover it with paper for a few days. This allows the chicks to learn to eat from feeders. After you remove the paper in a few days, they recognize feed and won't confuse it with litter.

ADD GRIT SPRINGLY

A poultryman brought some chicks to a laboratory. Some were weak, some had died. Grit packed the gizzards.

Sprinkling a small amount of grit on top of the mash helps avoid this trouble. Don't use a lot of grit until the chicks learn where to find feed. If you restrict feed on your flock continue periodic grit feeding. Chicks can digest mash or crumbles well without grit. But if they happen to eat some pieces of litter, grit may help grind those pieces so they pass on through the intestine. Begin feeding hen-size grit when the chicks reach seven or eight weeks of age.



For day-old

TATUM BROILERS

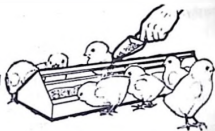
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Don't Feed
Too Much
Grit



PLENTY OF FRESH AIR

One poultryman closed his brooder house up tight one cold night. During the night, the gas stove died. So did some of his chicks. There just wasn't enough oxygen to keep the chicks and the burner going. By morning gas filled the house and was ready to explode.

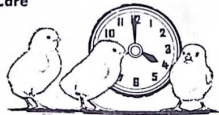
Chicks and stoves must have oxygen. Allow air to move through your brooder house at all times. You may reduce ventilation in cold weather, but don't cut it off. Chicks need some ventilation all the time. As long as your chicks can find a warm place



under the hover and their water does not freeze, they can stand cold rooms for brooding.

Chicks would rather have fresh, cool air than warm, stale air. Poor ventilation during brooding causes many losses. Keep air moving. Watch chicks and feathers grow rapidly in cool, well-ventilated brooding rooms with comfortable warm hover areas available. Ventilation also helps keep litter dry, reducing chances for coccidiosis and mold growth.

Give Birds Regular Care



REGULAR CARE

Poor ventilation, not enough feeders and waterers, overcrowding, disease, and other poor management factors may lead to stress in a flock of birds. A little stress may harden a flock to ward off future attacks, but too much stress can permanently damage the birds.

Good, regular care discourages the build up of stress factors. Regular care can help birds develop good habits so they get along well with each other, without picking, and with people, so they are not frightened when someone looks at them. The attendant should move around normally right from the

start. If he moves too cautiously around the chicks, he will always have to be cautious.

It is good for birds to learn to eat together at the feed trough. Usually this makes picking less of a problem. Birds need enough feeder space so all can eat at once. Feed birds two or three times a day. If birds are a little hungry when fed, they all eat quickly.

Continue overleaf

Teach Birds To Eat Together



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level in the feeders several pounds of feed is raised.

feed falls into the litter, bacteria and molds contaminate it and multiply. Worm eggs and coccidia mix with the feed and chicks get sick when they eat it. Low level feed, correct feeder size and height help prevent this and saves feed as well.

One puzzled poultryman wondered why his chicks stayed so far away from the hover. His thermometer said 93 degrees - and the chicks were three



Brood Chicks Far From Hens

days old. They acted okay in the morning when the thermometer said 75 degrees. But that was too cold, he thought, and turned up the thermostat.

A later thermometer check showed the instrument off 18 degrees. When the thermometer registered 93, the temperature actually hovered around 75. No wonder the chicks stayed away from the hover.

The brooder had worked in reverse, too. Check your thermometers for accuracy before you trust them. At any rate, watch the birds more closely than the thermometer. They'll let you know whether they're comfortable or not.

A meticulous poultryman stopped up all the cracks in his brooder house to prevent drafts. He missed one - the crack under the door. He noticed the chicks close to the door looked a little less than frisky - and they looked

Keep Wild Birds Out



He discovered a draft blowing about a third of the way across the room. The oil brooder stove created a movement of air up the chimney, and the replacement air came in the only place it could - under the door.

The poultryman put a step-over board across the doorway and card board chick guard around the hover. He stopped the draft without ruining ventilation and solved his problem.

CLEAN UP REGULARLY TO CHECK DISEASE

Many a poultryman has learned, to his dismay that good sanitation pays. Clean out and disinfect your brooder house. Remaining disease germs may affect the new chicks severely. Keep the birds out of contact with old manure. Put them on clean ground if you range your birds. Keep them away from places where older birds have been recently. This helps keep disease germs and parasites out of the young folk. These organisms cause some damage and lower performance in the laying house later.



FOR BEST RESULTS OBSERVE THESE TEN MANAGEMENT SUGGESTIONS

- 1 Each chick needs at least 7 ins. (20m) to 10 ins. (25m) square inches of brooding space under the hover. If you brood chicks under individual brooder stoves or units, allow a maximum of 300 chicks per 6-foot (2m) hover or 750 per 8-foot (2.5m) hover.
- 2 Give chicks reared in confinement at least 1/2 (15cm) square foot of brooder room floor space per bird through six weeks of age.
- 3 Chicks day old through 6 to 10 weeks of age should have 2 inches (50mm) of feeder trough space or equivalent per bird. Count both sides of the feeder

trough. For example a trough one foot long provides two feet or 24 inches of trough space.

- 4 Chicks day-old through 2 weeks of age require 20 linear inches of water space or 2 one-gallon fountains per 100 birds. From 2 weeks to 10 weeks of age, provide 1/2 inch. of trough space or equivalent per bird.
- 5 In cold weather, use a solid chick guard around the hover to keep chicks from straying and to stop floor drafts. Wire guards work fine in warm weather.
- 6 Start with chick guard 2 or 3 feet (1m) from edge of hover. Gradually expand it. Remove it at the end of 1 week.
- 7 Provide roosts for the replacement chicks by 4 weeks of age, especially if roosts are to be used for hens. Allow 4 ins. roosting space per chick from 4 to 10 weeks of age.
- 8 Spread at least 2 inches of suitable litter on the brooding house floor. Cane pulp, shavings, sawdust, crushed corn cobs, chopped straw, peanut hulls, peat moss and other materials may be used when free from dust. Change litter from each new brood of chicks.
- 9 Use all-night lights the first couple of days, equivalent to 15 watts per 200 square feet of floor space (about 14 foot square). This helps prevent pile-ups.

PLEASE REMEMBER:

Use enough feeders for all your chicks to eat at one time. As your

Use enough feeders for all your chicks to eat at one time. As your chicks get older, use more and larger feeders. Feeding several times daily helps develop good habits of eating together.

Two waterers per 100 chicks with clean, cool water, help keep chicks healthy. Add more waterers as your chicks grow older. If necessary use disinfectants in the water to kill bacteria. Some disinfectants make cleaning waterers easier. But don't substitute disinfectants for regular cleaning.

Keep your chicks healthy while they grow - and they'll pay you bigger dividends when they go into the laying house.

FARMS ARE NOT WHAT THEY

USED TO BE

by

Ruth Elliott



Schoolchildren on a days visit to a farm listen to the farmer explaining the techniques of dairy farming.

Watching people at work though a time nonoured pastime often causes a major disturbance to the people being watched. This is particularly true of farms and farming. Not many farmers can cope with visitors in their farmyard, among expensive and often potentially dangerous machinery, or eager beavers trampling down young plants in fields and vegetable gardens as they exclaim joyfully over colourful poppies or cornflowers on a nest in the hedgerows.

It is partly because many townspeople still have a romantic picture book view of life on the farm in the 1970s that the Countryside Commission in Britain is now

investigating the possibility of setting up permanent Farm Centres which can be freely visited by schoolchildren and other members of the public.

Primarily outings to such Farm Centres are intended to be educational but they could also become an acknowledged leisure activity the equivalent of spending a day on a farm.

A Bout Of Nostalgia

Farming in Britain today is not so much a slow moving rustic activity as a major industry. Few people would think of taking their families round a factory or laboratory, but many people get a bout of nostalgia when they think

of spending a day down on the farm.

Hilary Tinley at the Association of Agriculture has been involved for some years in the setting up of the popular Open Days on farms which are already introducing townspeople in all parts of Britain to the realities of life on a modern farm.

A farmer's daughter, and a trained dairy farmer herself she has now lived in London long enough to understand why townspeople often know so little about the countryside.

Fair Open Days were launched after a previous study by the Countryside Commission, which investigated not only the potential demand for such facilities but the best way of meeting it. There is always a danger that "each man destroys the thing he loves" to the point where crowds of enthusiastic visitors can turn a farm into a showpiece where the provision of facilities for sightseers overshadows the real purpose of the place.

Continued overleaf

Working Farm

Over 120 farms now have official Open Days and more are on the way. In the main these Open Days are organised at weekends so that parents and children can go together. Farm outing are also very popular with scouts and guides.

The emphasis is always on demonstrating a real working farm, including aspects which townspeople may not often consider - tractors and combine harvesters,

machinery used for milking and corn drying, battery hens and commercial bacon production.

Visits like these are a long way from the children's image of the toy farm they played with in the nursery, or even the real farm on which their parents may have grown up a generation ago.

Following on Farm Open Days came Farm Trails. These are prearranged walks round farms and farmland and are more flexible than the Open Days since they do not need guides. The foot-

paths are equipped with leaflets or noticeboards designed to nudge walkers into noticing what might otherwise escape the untutored eye: a field or spring barley on one side, a herd of Herefords grazing peacefully on the other.

It is a good way to learn about the countryside and to see for yourself that farming is not just a matter of putting seeds into the ground and waiting for things to grow. Fertilisers and insect sprays are as much part of modern farming as balance sheets and imported feedingstuffs.

Now the movement has more contact with schools and farming communities is growing rapidly. Local authorities in the county of Derbyshire, northern England, and in the Greater London area are already running Open Days on their farms as Farm Centres to which schoolchildren can go with their teachers to learn about modern farming at first hand.

Where The Milk Comes From

Seeing for yourself is very contemporary teaching method; a visit to a Farm Centre can be more enlightening than a whole book about farming. Town children are sometimes astonished to discover that milk comes from cows and not from the dairy, or that apples grow on trees and potatoes grow on trees and potatoes in the ground.

Of course it is not ideal to run a farm as a sort of museum piece. I admitted a charter surveyor in the Greater London Council's Value Department who is responsible for one of the Farm Centres. "The main problem is to keep the farms as typical as possible."

To this end he always visualises overhead walkways for visitors maybe viewing galleries overlooking the herring bone milking parlour a special pre-tour briefing for the teachers in charge. Some purpose built features like special buildings for displays, or even demonstrations of manual milking, may also be recommended.

The main problem facing the planners is to ensure that instruction and relaxation arrangements at Farm Centres do not spoil the essential character of the farm.

THE YOUNG MASTERS OF THE FIELDS & FARMS

by APN Correspondent, Moscow.

Today young people in the countryside can do a lot of things which older people have never done in their life. They now know how to work out a ration for cattle with the right portion of proteins and tracer elements, they can test new varieties of plants.

There are close to three million children in the Soviet Union who are members of youth production teams.

In the past peasants had individual plots and cattle. This was regarded as a great help in their life, so the parents taught children on their own initiative how to cultivate land and take care of domestic animals. At the present time individual economies are playing a very insignificant and diminishing role. The more farsighted school teachers together with collective farm management and rural Komsomol organisations have decided to set up children's teams. They have allotted plots of land to these teams, and appointed instructors. They have provided them with necessary machines and equipment,

seeds, etc. The drive brought fruit within the first few years, and plenty

YOUNG PRODUCERS

At the present time there are dozens of thousand of children's production teams all over the Soviet Union, and they sow cereals, grow vegetables, and take care of the young cattle. These teams practically train skilled personnel for agricultural production. Many of the children's team have proved very helpful to research institute, and actually fulfil the duties of experimental

stations. Research continues several years. The children test new varieties, analyse the effects of different weather conditions, frost, rain, snow.

The children learn to manage agricultural production economically. They study machines, agrochemistry and animal physiology.

Work in the teams does not limit the children's choice of future profession. The teachers, it is true, are trying to orientate them to working in their native places, the more so that the Soviet village today can offer practically any kind of occupation.

In order to help students preparing for examinations in Agriculture, we publish below this year's syllabus for the West African School Certificate at both Ordinary and Advance Levels.

WEST AFRICAN SCHOOL CERTIFICATE & G.C.E SYLLABUS

AGRICULTURAL SCIENCE (ORDINARY LEVEL)

Candidates can be accepted for this subject only in accordance with regulations G.1(2), 1(3) and 5(3).

The Science syllabuses have been prepared on the assumption that the course will be based on practical work, and considerable weight is given, in the marking schemes, to the practical examinations. In order to ensure that passes in Science subjects are not awarded to students whose knowledge is obtained from books alone, no school may enter candidates in any Science subject unless it has been specifically recognized for that subject by the appropriate Ministry of Education. The Council reserves the right to inspect such schools. The Council does not attempt to prescribe a course of experimental work or even the number of periods to be spent in carrying out experiments since it does not wish to interfere with the freedom of schools in these matters. Candidates who have left school not more than a year before the date of the examination may be permitted by the Head of the school, at his discretion, to enter as school candidates.

4(3)

Schools seeking recognition for a specific Science subject (or subjects) must apply to the appropriate Ministry of Education for such recognition by 30 June, two years before the examination for which recognition is sought.

AND 5(3)

Private candidates can be accepted for Agricultural Science, Biology, Chemistry, General Science, General Science (Additional) and Physics only

if (i) they have spent three years at a school recognized for these subjects, and (ii) they produce, when they enter, a certificate from the Head of their former school establishing this fact and stating that the Head is prepared to offer laboratory facilities during the examination.

Candidates offering Agricultural Science will be required to offer, in addition, General Science or Biology and Chemistry.

When Agricultural Science is taken together with General Science or Biology and Chemistry at the same examination, a pass may be awarded in Agricultural Science irrespective of the candidate's performance in General Science or Biology and Chemistry.

There will be three papers all of which must be taken:

PAPER 1 will be a 1½ hour practical paper.

PAPER 2 will be a 1 hour theory (objective) paper.

PAPER 3 will be a 2 hour written paper consisting of four sections.

There will be three questions in section A two in each of the remaining three sections B, C & D.

Practical work should form the basis of preparing for this subject. Candidates will be required to submit their PRACTICAL FIELD NOTEBOOKS for which marks will be awarded.

DETAILED SYLLABUS

Candidates will be expected to answer questions on the topics set out in the column headed 'Syllabus'. The rates are intended to indicate the scope of the questions which will be set but are not to be considered as an exhaustive list of limitations and illustrations.

It is desirable that schools presenting candidates for Agricultural Science should keep a School Farm, but where this is not possible, a well planned garden with small plots of farm crops of regular observation during growth is essential. At least two species of livestock, preferably one monogastic e.g. pigs, poultry, and one ruminant e.g., sheep, goat, cattle or a herbivore e.g. rabbit, guinea-pigs must be kept. The Practical Field Note Books of the candidates should contain records of individual projects, farm activities and observations carried out on the school farm or garden.

It is also recommended that the study of Agricultural Science in the School Campus be supplemented by visits to well organized farms and/or Agricultural Research Stations.

SECTION A: INTRODUCTION TO AGRICULTURE

SYLLABUS

1. The meaning and importance of Agriculture.

This should involve a discussion of the importance of Agriculture to man generally and its role in the economy of the relevant West African country, emphasizing that agriculture is a business.

2. General principles of land use.

This should be discussed in relation to the use of land for Agriculture, Forestry and wild life conservation purposes, bearing in mind the physical, economic and social factors, commercialisation, communication and marketing.

3. Agricultural Systems land tenure systems, shifting cultivation, crop rotation, continuous cropping, monocropping, mixed-cropping, pastoral and mixed farming.

4. Development of Agriculture: role of science and technology in development of Agriculture, including tools and source of farm power, Problems of development of local Agriculture.

Role of Government-Agricultural policies, regulations and programmes, Agricultural education, research and extension, credit facilities

subsidies, quarantine, vaccines and farm settlement schemes.

5. Simple farm tools and Agricultural machinery: their uses and maintenance.

Engineering details should be avoided.

6. An elementary study of climate with particular reference to its effects on Agriculture. The main types and ecological distribution of crops (cereals, legumes, roots, vegetables, edible fruits, beverages, spices, drugs, oils, gums, latex, fibre); and animals (cattle, sheep, poultry, rabbits) found in West African countries.

7. Use of Agricultural and Forest products and their by-products.

The discussion should include the use of agricultural and forest products for the provision of

- (1) Food: fresh and processed;
- (2) Clothing: hides and skins, fibre, rubber etc.
- (3) Shelter: Timber, gums, resins, etc.
- (4) Health: Drugs:

- (5) Fuel and Power: oil, minerals; and
- (6) Others.

SECTION B: SOIL SCIENCE

1. Soil formation and properties: rocks-main types, rock weathering and factors of soil formation. Composition and properties of the soil; sand, silt, clay, organic matter, soil acidity. Soil texture and structure, and their importance. Water-retaining properties of humus and clay.

Different soil types should be handled and the separation of a soil into sand, silt and clay fractions demonstrated. Water-holding capacity and drainage of a sandy soil, clay and soil with a high percentage of organic matter should be simply demonstrated by these soils in funnels.

2. Soil and water conservation depletion of soil resources by leaching, cropping, burning and oxidation of organic matter, erosion - its importance, causes, prevention and control - irrigation and drainage.

3. Soil fertility plant nutrients; major sources of nitrogen, phosphorus and potassium. Maintenance of soil fertility, crop rotations, including cover crops and green manure; the living population of the soil and

its role in the carbon cycle (especially Earth-worm and Termite) and nitrogen cycle (especially nitrogen fixing bacteria); the use of commercial fertilizers and lime, the principles and practice of cultivation and their effects on soils.

SECTION C: CROP SCIENCE

1. A review (with emphasis on their Agricultural implications) of plant parts, their functions, growth, development and reproduction.

2. Annual and perennial crop plants: external morphology, life-history, propagation, growth, cultivation, harvesting, storage, marketing and uses of local crop plants. Minimum of two

crops from each of groups 1 to 6, should be selected from the list in the Appendix table below.

Where there are two or more types in each group not more than one member of each type should be studied.

3. Pastures and forage crops: recognition and study of main grasses and legume species commonly used in pastures. Natural pastures and their distribution. Important forage grasses and legumes and their uses.

Detailed botanical studies are not required. Students will be expected to recognize on the basis of gross morphological appearance, at most for species of grasses and at least one species of legume used in pastures.

4. Crop improvement: aims, methods, introduction, selection and cross-breeding.

Chromosomes and Metel's 'Laws' need not be treated in detail. A brief study of sexual and asexual methods of crop improvement. A comparison of a local variety and an improved variety of a crop plant can be made for demonstration.

5. Weeds: their importance in Agriculture. Recognition of common annual and perennial weeds of local importance. Methods of dispersal and control of weeds.

Herbicides can be mentioned but not details of chemical structure and mode of physiological action should be dealt with.

6. Disease: a simple general account of diseases caused by fungi, bacteria, nematodes and viruses and nutrient deficiencies affecting crops. The nature of the damage, methods of transmission and common methods of control.

Microscopic recognition of the causal organisms may be demonstrated where feasible.

PRACTICAL AGRICULTURAL SCIENCE

One hour and a half will be allowed for the practical test which can be taken in an ordinary classroom. The principal aim will be to test skill in observation and recognition. The practical note book covering the work of the entire syllabus, field work farm diary and project work will be examined and assessed.

NOTE It is assumed that candidates will have gained adequate experience of every practical aspect of the entire syllabus.

1. Soil samples, rocks, and fertilizers.

Soil samples to be examined for texture by feel only, acidity by simple tests. Common rock types of igneous, metamorphic and sedimentary origin. Soil profile description. Recognition of common types of fertilizers and manures.

2. Growth, habitat and form of plants and animals studied as listed in Appendix Table (Groups 1 to 6) and sub-section 5 of Section D of the syllabus.

Recognition of parts and whole of the crop plants and farm animal studied.

3. Main pests and diseases of crops.

Recognition of main pests, their damage to crops, e.g. cotton stainer stem borers of cereals, weevils of grains and yam beetle. Recognition of main diseases of crops and their causal agents where feasible with characteristic symptoms, e.g. smut of cereals, maize rust, swollen shoot of cocoa, mosaic of cassava, ravelle and leaf-spot of groundnut, blast of rice and brown-rot of pineapple, nematodes of crops, parasitic seed bearing plants such as dodder and mistletoe, and nutrient deficiency symptoms.

4. Seeds, fruits, food storage organs and other parts of the main plants and local weeds.

Recognition of the structure of seeds and fruits of the main crop plants and of weeds in relation to the mode of their dispersal.

cross-breeding (including the use of artificial insemination).

Chromosomes and Mendel's 'Laws' need not be treated in detail. Comparison of a local breed and an improved breed in animal can be made for demonstration purposes.

7. Diseases: a general account of important diseases in farm animals. Control: preventive and remedial measures.

Local examples should be emphasized.

8. Pests and parasites: insects and ticks and carriers of disease in farm animals. Life-history of one endoparasite of farm animals, e.g. ticks or lice. The principles and methods of control of pests and parasites of farm animals.

Details of structure are not required.

APPENDIX TABLE

APPENDIX TABLE

List of annual and perennial crops (See SECTION C. 1.2 of Syllabus).

Group 1: Cereals: maize, millet, rice, guinea corn, wheat, tamba, acha.

Group 2: Legumes: beans, cow peas, groundnuts, soya beans, bambaragroundnuts, yams beans, pigeon pea.

Group 3: Roots, tubers and vegetables: cassava, yams, cocoyams, potatoes, onion, charlots, pumpkins, tomatoes, carrots, okro, spinach, vegetable jute, lettuce, cabbage, cauliflower.

Group 4: Edible fruits and nuts: avocado pear; bananas, citrus fruits, guavas, mango, jackfruit, pawpaw, pineapple, cashew, water-melon.

Group 5: Beverages, spices and drugs: cocoa, coffee, colanut, peppers, benni-seed, ginger, sugar-cane.

Group 6: Oils, latex and fibres: coconut, cotton, oil palm, shea butter, sun-flower, sesame, rubber, sisal, kapok, jute, hemp.

7. Pests: a general account of pests of crop plants and stored products, their types and importance, principles and methods of pest control.

Study should include a general account of pests including rodents, birds and insects. An account should also be given of the life-cycle of a biting insect, e.g. grasshopper, a boring insect, e.g. a weevil, a sucking insect, e.g. an aphid.

SECTION D: ANIMAL SCIENCE

1. A review (with emphasis on the Agriculture implications) of the organs and tissue of animals and their functions.

A discussion of various species of domestic animals, their uses, and the common breeds (exotic and local) of each of the species.

2. Farm Animals: purposes of their production. Types and economic value of domestic animals locally produced.

3. Elementary study of Animal Nutrition: Functions of carbohydrates, fats, proteins, minerals and vitamins. Feeding stuffs—sources of main nutrients, balanced rations, maintenance and production rations, main nutrition in farm animals.

Details of formulation of diets and bio-chemical details of these major nutrients are not required.

4. Reproduction in farm animals; heat period (oestrus), a general outline of the development, nourishment, respiration and birth of the young. Mammary glands, milk, lactation, egg formation; weaning of young.

Details of cell division and of the anatomy of the early embryo and the formation of the foetal membranes are not required.

5. Study of one animal from each of the following groups; study including the main aspects of general management, feeding and breeding.

- cattle, sheep and goats;
- pigs, rats, and dogs;
- rabbits, guinea-pigs, horses donkeys;
- chicken, ducks, turkey, guinea-fowl.

6. Animal improvement: aims, methods: introduction, selection and

5. Tools

Recognition of common hand tools, e.g. cutlasses, hoes, forks, mattocks, trowels, rakes, building knives, shears, secateurs, chain measurer, sprayer etc. and their uses and maintenance.

6. Animal feed-stuffs.

Recognition and comments on the use of main animal feed-stuffs, e.g. palm kernel meal, blood meal, bone meal, maize, guinea corn, groundnut cake, fish meal and common forage crops, e.g. guinea grass, elephant grass, giant star grass, andropogon, calopogonium, pueraria, centrosema and stylosanthis.

7. Main pests and parasites of farm animals.

Recognition of main ectoparasites and endoparasites of animals, e.g. ticks, lice, tapeworms and roundworms, recognition of ill-health symptoms.

AGRICULTURAL SCIENCE

(ADVANCE LEVEL)

The syllabus that follows has been designed to portray Agricultural Science as an applied science with emphasis not only on the depth of but also in the acquisition of skills that are associated with the theory. It is therefore essential that candidates should make field trips to farms in different ecological areas and game reserves within the country, and

in different ecological areas and game reserves within the country, and should be exposed to the major products of the forest types in their country.

The syllabus has been designed to meet the needs of private candidates as well as those of school candidates. Candidates who wish to do a University course in Agricultural Science are advised to offer along with this subject at Advanced Level some other science subjects as may be necessary for entry requirements of the Universities.

It is desirable that candidates should have reached Ordinary Level standard in at least one of the following subjects

Agricultural Science, Biology, Chemistry, Physics, General Science and Additional General Science.

The examination shall consist of three papers all of which should be taken.

PAPER 1

2 - hour theory paper divided into three sections.

Section I: General Agriculture (5 questions).

Section II: Agricultural Economics (3 questions).

Candidates shall be required to answer four questions including at least two from Section I and at least one from Section II.

PAPER 2

3 - hour theory paper divided into three sections.

Section I: Soil Science (4 questions).

Section II: Crop Science (4 questions).

Section III: Animal Science (4 questions).

Candidates shall be required to answer two questions from each section.

PAPER 3 (Practicals)

A Farm Project to be assessed in the second term of the year of examination; and carrying 1/3 of the maximum marks for the practicals.

PLUS a 3-hour practical paper.

Note: (1) The content of the syllabus for the Practical's could be examined in the theory papers and vice-versa.

(2) Paper 2 alone may be offered as a Subsidiary Paper for H.S.C.

(3) Farm Project

The Farm Project would be assessed by an examinee of the Council. The Project Work would be expected in the 1st term of the 2nd year or when the Project is at its peak. Schools will therefore be required to inform the Council of the Project Work being carried out by the students at the end of their first year.

DETAILED SYLLABUS

A. General Agriculture

1. Introduction

(a) Meaning and importance of Agriculture.

(b) Factors that determine the pattern of agriculture-ecological and sociological basis ecological distribution of crops, animals and forests.

(c) Agricultural systems of cultivation nomadic shifting cultivation mixed cropping, crop rotation and mixed farming.

(d) The contributions of Agriculture to the national economy.

2. Development of Agriculture

(a) Problems of subsistence agriculture-land tenure education, health services, communication soil erosion, transportation, attitudes, tools, government agricultural policies.

(b) General World Survey of the development of Agriculture with special reference to West Africa.

(c) Role of Science Technology in the development of Agriculture

(d) Administration of agricultural production the role of government

agricultural policy, research, extension education and services,

education and services, financial assistance to farmers, veterinary services and quarantine services.

3. Land Tenure System and the Principles of Land use for Agriculture, Forestry and Wild Life Conservation.

Factors affecting land use-topography, economic and social factors, population, situation of land for commercialisation, farm settlement schemes; development, management and conservation of forests and soils.

4. Fisheries

Distant sea, coastal and

Distant sea, coastal and inland water fishing, fish ponds curing, handling and distribution of fish. Marine products other than fish.

Note: Fish species to be mentioned Fishing equipment to be discussed.

5. Agricultural Engineering and Surveying

(a) Problems and prospects of mechanization of agriculture in West Africa.

(b) Tools, implements and machineries-uses, care and maintenance.

(c) Sources of power on the farm-wind, water, electricity, heat engines and animals.

Brief discussion on the working of the internal combustion engine.

(d) Farm surveying farm buildings and constructions (simply treated).

(e) Mechanization peasant agriculture.

B. Soil Science

1. Genesis and Classification of Soil

(a) Rocks and minerals-their characteristics and simple classification.

(b) Weathering Processes

(i) Expansion and abrasion agents, water, wind and temperature.

(ii) Chemical Processes

Hydrolysis, hydration, oxidation, solution and reduction.

(iii) Biological Processes Effects of organisms.

(c) Soil Formation

(i) Factors of soil formation-climate and vegetation, relief and drainage, parent material, living organisms, time.

(ii) Soil profile-soil horizon, soil profile defined. Genetic horizons of ideal profile specific to the area. Importance to Agriculture.

(d) (i) Principles of soil classification.

(ii) Kinds of soils in the local area and their existing classification.

2. Composition of the Soil

(a) (i) Physical composition of the soil: soil components, soil structure, soil texture, soil air, soil water and soil temperature.

(ii) Mineral composition of the soil: Quartz, feldspars, micas, clay minerals, montmorillonite etc.), colloids and colloidal systems, colloids defined, properties state of colloidal system sol, gel.

(iii) Organic components of soil-organic material, substance and matter; humus.

B. Effect of Soil composition on properties of the soil.

3. Soil Fertility

(a) Plant Nutrient Elements

(i) Classification Macro-N,P,K,Ca, Mg,S Micro-B,Cu,Zn,Mn, Co,Fe,Mn.

(ii) Factors leading to loss of these nutrients: Leaching, erosion, crop removal, etc.

(iii) Replenishment of lost nutrients Soil organisms: Micro-Marco, effect of soil organisms on the soil. Nitrogen cycle; rock carbon cycle; and weathering, fertilizers.

(iv) Soil management as an attempt to strike a balance between loss and gains in soil nutrients.

4. Soil Conservation

(a) Types of irrigation and drainage.

(b) Soil erosion: Types, effects and control.

(c) Methods of soil conservation: terracing, contour farming, strip cropping, cover crops, mulching, etc.

- (d) Water pollution and recovery (where it applied).

of diseases associated with the crops studied.

and colloidal systems, colligative defined, properties state of colloidal system sol. gel.

C. CROP SCIENCE

Candidates should be familiar with agricultural and botanical methods of classification of crops

methods of classification of crops as well as the identification, morphology and reproduction of important crop plants.

1. INTRODUCTION

Origin and geographical distribution of some important tropical crops including forage crops. Nomenclature and classification of crop

ture and classification of crop plants. Examples should be drawn from the major classes of locally cultivated crops.

2. FACTORS AFFECTING CROP PRODUCTION

Ecological physiology of crop plants: the primary effects of light, radiation, temperature, water and inorganic elements on crop growth, development and yield.

3. PRINCIPLES OF CROP PRODUCTION

Land preparation.

Methods of propagation: seed selection and testing, vegetative propagation. Nursery practices: time of planting and planting distances.

4. PRINCIPLES OF PLANT BREEDING AND CROP IMPROVEMENT

- Aims of crop improvement;
- Basic genetic principles of crop improvement;
- Methods of crop improvement:

Introduction and mass selection, hybridisation; multiplication; vegetative propagation.

5. PRINCIPLES OF PLANT PROTECTION

- Diseases of crop plants: Causal agents, symptoms, methods of transmission and eradication

(b) CROP PESTS

- Classification of field and storage pests; extent of damages: e.g. insect pests, nematodes, rodents, birds and human beings.

- Principles of pest control: mechanical, biological, cultural and chemical.

(c) WEEDS AND THEIR CONTROL

- Identification of common weeds and modes of dispersal; study of selected weeds with particular reference to locality.

- Control: mechanical biological, cultural and chemical methods.

6. STUDY OF SELECTED CROPS

Origin, geographical distribution; climatic and soil requirements: cultural practices, harvesting, processing marketing and storage of West African arable crops, cash crops and vegetative crops.

- (i) Principles of soil classification.

- Kinds of soils in the local area and their existing classification.

2. Composition of the Soil

- (i) Physical composition of the soil: soil components, soil structure, soil texture, soil air, soil water and soil temperature.

- Mineral composition of the soil; Quartz, feldspars, micas, clay minerals, montmorillonite etc.), colloids

- Organic components of soil-organic material, substance and matter humus.

- Effect of Soil composition on properties of the soil.

3. Soil Fertility

(a) Plant Nutrient Elements

- Classification Macro-N, P, K, Ca, Mg, S Micro-B, Cu, Zn, Mo, Co, Fe, Mn.

- Factors leading to loss of these nutrients: Leaching, erosion, crop removal, etc.

- Replenishment of lost nutrients: Soil organisms Micro-Marco, effect of soil organisms on the soil, Nitrogen cycle; and carbon cycle; rock weathering, fertilizers.

- Soil management as an attempt to strike a balance between loss and gains in soil nutrients.

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- Types of irrigation and drainage.

- Soil erosion Types, effects and control.

- Methods of soil conservation: terracing, contour farming, strip cropping, cover crops, mulching, etc.

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Land preparation.

Methods of propagation: seed selection and testing, vegetative propagation. Nursery practices: time of planting and planting distances.

4. PRINCIPLES OF PLANT BREEDING AND CROP IMPROVEMENT

- Aims of crop improvement.
- Basic genetic principles of crop improvement.
- Methods of crop improvement:
Introduction and mass selection, hybridisation; multiplication, vegetative propagation.

5. PRINCIPLES OF PLANT PROTECTION

- Diseases of crop plants: Causal agents, symptoms, methods of transmission and eradication of diseases associated with the crops studied.

(b) CROP PESTS

- Classification of field and storage pests, extent of damages e.g. insect pests, nematodes, rodents, birds and human beings.

- Principles of pests control: mechanical, biological, cultural and chemical.

(c) WEEDS AND THEIR CONTROL

- Identification of common weeds and modes of dispersal, study of selected weeds with particular reference to locality.
- Control: mechanical, biological, cultural and chemical methods.

6. STUDY OF SELECTED CROPS

Origin, geographical distribution; climatic and soil requirements; cultural practices, harvesting, processing marketing and storage of West African arable crops, cash crops and vegetative crops.

The study should include at least one cereal from group 1, one legume from group 2, and four plants chosen from at least three of groups 3,4,5 and 6 below:-

GROUP 1

CEREALS

- Maize-Zea mays
Millets-Pennisetum typhoides, Setaria italica, Eleusine corocana
Rice-Cryza sativa
Guinea Corn-Sorghum bicolor (S. vulgare)
Wheat-Triticum vulgare
Tamba
Acha

GROUP II

- Beans-Phaseolus spp

Cow peas-Vigna unguiculata

Groundnut-Arachis hypogaea

Soya Beans-Glycine soja

dambara groundnut-Voandzaia geocarpa (V.Subterranea)

Yam bean-Sphenostylis steno-carpa

Pigeon pea-Cajanus cajan

GROUP III

Cassava-Manihot esculenta

Yams-Dioscorea Spp

Cocoyams-Araceae (Colocasia or Xanthosoma)

Tomatoes (European \circ Solanum tuberosum (Hausa P.),-Plectranthus esculentus

Sweet Potatoes-Ipomoea batatas

Onions-Allium cepa

Shallot-Allium ascalonicum

Pumpkins-Cucurbita maxima

Tomatoes-Lycopersicum esculentum

Pumpkins-Cucurbita maxima

Tomatoes-Lycopersicum esculentum

Carrots-Daucus carota

Cabbage-Brassica oleracea

Cauliflower-Brassica oleracea, var. botrytis.

Graden egg-Solanum melogena

GROUP IV

Avocado pear-Persa gratissima

Bananas-Musa Spp

Citrus-Citrus Spp.

Guava-Psidium guajava

Mango-Mangifera indica

Pawpaw-Carica Papaya

Pine-apple-Ananas sativus

Cashew-Anacardium occidentale

Water melon-Colocynthis citullus

GROUP V

Cocoa-Theobroma cacao

Coffee-Coffea Spp.

Colanut-Cola Spp.

Benniseed-Same as Sesame

Ginger-Zingiber officinale

Sugar cane-Saccharum officinarum

Peppers-Piper nigrum*

G R O U P V I

Coconut-Cocos nucifera

Oil Palm -Elaeis guineense

Cotton-Gossypium Spp

Shea-butter-Butyrospermum park ii

Sunflower-Helianthus annuus

Sesame-Sesamum orientale

Rubber-Hevea brasiliensis

Sisal hemp-Agave Spp.

Ka,ok-Ceiba pentandra

Kenaf.

Urena lobata.

7. PASTURES AND FORAGE

Pasture agronomy, grasses, legumes, their distribution, improvement, quality and assessment, establishment and conservation.

D. ANIMAL SCIENCE

1. Introduction

Role of livestock and livestock products in West African countries.

2. FARM ANIMALS

Types and classification of locally available breeds of cattle, sheep, goats, swine, poultry.

3. ANATOMY AND PHYSIOLOGY

(a) Brief gross anatomy of named domestic animals: cattle, goats, horses, pigs, sheep, rabbits, poultry and fish.

(b) Physiology of digestion, reproduction, lactation, milk letdown, egg formation and laying, circulation, and endocrine systems.

(c) Environmental physiology: The direct and indirect effects of climate (tropical) on farm animals with due regard to their effects on grazing habits, growth, reproduction, milk production, egg production, gross yield and quality of food supply.

4. ANIMAL NUTRITION

(a) The main nutrients—carbohydrates, proteins, fats, minerals, vitamins, water—their chemical composition and their role in animal nutrition. Malnutrition in farm animals.

(b) Feeds and feeding-methods of preparation of foodstuffs for farm animals—cooking, cutting, grinding, pelleting etc.

Note: Emphasis should be laid upon the reason for feeding these forms of feeds to the different types of animals.

(c) Principles of ration formulation—balanced maintenance, production, starter rations.

Note: Mathematical and technical details of ration formulation will not be required.

5. ANIMAL HEALTH

(a) DISEASE

Causes and prevention; pest and parasite control; insects and ticks as carriers of diseases in farm animals. Life history of one endoparasite of farm animal (e.g. liverfluke, roundworm, tape worm, trypanosomes); and one ectoparasite (e.g. ticks and lice).

(b) Diseases as the limiting factor in the development of animal husbandry in West Africa. Detailed study of the more common diseases of local farm animals, preventive and control measures, in respect at least one of each type of

- (i) Virus-fowl pox, foot and mouth diseases, rinderpest.
- (ii) Bacteria-Anthrax, tuberculosis, contagious abortion.
- (iii) Fungi-Scabbies, ringworm.
- (iv) Protozoa-trypanosomiasis, coccidiosis.
- (v) Metabolic-milk fever, ketosis, rickets, bloat etc.
- (vi) Mycoplasmas-pleuro-pneumonia.

6. MANAGEMENT OF FARM ANIMALS

Detailed study of management aspects of the following farm animals from birth to maturity:
Monogastric e.g. pigs, poultry
Ruminant e.g. sheep, goat, cattle.
Herbivore e.g. rabbits, guinea-pigs.

A field study of at least one animal from each class is essential.

7. BREEDING AND IMPROVEMENT OF FARM ANIMALS

- (a) Aims.
- (b) Principles of genetics in respect of animal breeding.
- (c) Methods: Selection, inbreeding, crossbreeding and effects. Artificial insemination. Castration.

E. AGRICULTURAL ECONOMICS

1. Factors of production—land, labor, capital, entrepreneurship.
2. Law of diminishing returns.
3. Principles of demand and supply.
4. Marketing of agricultural products.

(i) Operations—Processing and storage, packaging, transportation and distribution.

(ii) The role of the producer, middlemen and the consumer: Individuals, co-operative, corporations, firms, Marketing Boards.

(iii) International Trade with respect to agricultural produce.

5. Agricultural Financing—sources and nature of farm credit and financing.

6. Farm Record

Farm diary, input records, production records, farm inventory, farm log-book.

7. Simple Accounting

Preparation of entries of sales and purchases, profit and loss accounts.

PRACTICAL EXAMINATION

During the course the candidate is expected to have carried out and participated in practical work on livestock management, farm and vegetable gardening practices. Candidates should also be exposed to the major products of the forage type in their locality.

CLASSIFIED ADVERT

POULTRY

For the Construction of Wooden Battery Cages or Fixing of Metal Batteries, consult experienced Carpenter M. Jimoh, 10 Adeniyi St., (Behind Obafemi's Palace,) Ibeju, Lagos.