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SUMMARY REPORT
REPORT NO. 4

DRYLAND AGRICULTURAL DEVELOPMENT-PAKISTAN BARANI PROJECT
Contract AID/NE-C-1217

GERALD R. MCKAY
COMMUNICATIONS CONSULTANT

September 1 to September 30, 1976
and
October 2, 1978 to January 25, 1979

June 1979

I. INTRODUCTION AND BACKGROUND

The objective of the Barani Project, which was initiated in February, 1976, was to advise and support the Government of Pakistan (GOP) Barani Project staff in their efforts to plan and implement programs that will improve the efficient production, harvesting, storing, and marketing of grain, forage, and fodder crops, and improve the supply of inputs and services in non-irrigated areas of Pakistan.

An important part of the project was the production of printed and other educational materials to support and reinforce ongoing Barani programs in the barani areas of Punjab and Northwest Frontier (NWFP) provinces of Pakistan.

As Communications Consultant, Gerald McKay made two trips to Pakistan in the interest of information support for this project -- the first trip was in September, 1976; and the second, October, 1978 through January 1979. On the first trip some general recommendations were made regarding the areas of emphasis for producing teaching materials and suggested steps to follow to get materials

produced. At that time, work was completed on a 16 mm. film on wheat demonstrations, and a set of 2 x 2 inch slides was prepared on soil testing with accompanying tape recordings in English and Urdu. These audio-visual materials were used extensively in the teaching activities during 1977 and 1978.

The 1978-79 assignment to produce extension teaching materials was a short-term intensive effort to make available materials specifically aimed at reaching the objectives of this project in the barani areas.

Professional relationships were established by Mr. McKay with other members of the Barani and USAID staffs, as well as a number of Pakistanis who worked with the project. People were cooperative and helpful, and the materials produced were the result of a team effort with a large number of people participating.

During the past three years, Barani Project staff members accumulated considerable experience and information related to the production and marketing of farm crops in the barani areas of the Punjab and Northwest Frontier provinces. Some of the information on groundnuts and sunflowers was published in bulletins for farmers to use, but a large reservoir of useful information on wheat, maize, and other crops had not been made available to farmers.

Over the years, Departments of Agriculture in the two provinces have published some materials on a periodical or an irregular basis. This schedule did not include single sheet educational materials for farmer use specifically in the barani areas. There has been a lack of materials such as slide sets, posters, and radio and television materials for farmers in these areas.

II. PLANS FOR PRODUCTION OF MATERIALS

Because of time limitations on Mr. McKay's visit, efforts were concentrated on producing a series of 23 information sheets with posters, slide sets, and radio scripts to accompany the fact sheets. Subjects covered included wheat, groundnuts, maize, and rodent and bird control. These are written in Urdu at a level that could be read and understood by literate farmers and the field assistants (FAs) in the Agricultural Extension Service.

The materials produced were put in a package or unit format, with each package containing a single page fact sheet, a poster, a set of slides, and a radio script. The units are intended to be used as part of an organized teaching plan to be carried out by agricultural extension staff members who work directly with farmers. They are not intended to be distributed on a random basis (see Appendix A).

This plan is modeled after the Benor system of extension teaching, which has been used in India with some degree of success. Under this system, the extension workers use what is referred to as the "T-V" (Training and visitation) system of teaching. Materials are presented to farmers in small consecutive units, and the presentations are made at regular intervals, usually fortnightly. This creates a built-in discipline factor.

The World Bank expressed interest in giving this plan a trial in some areas of Pakistan and has made a long-term loan of about \$12 million to implement it. The preparation of educational materials to support such a plan of teaching would be a logical step to take for barani areas as well as others (see Appendix B).

This plan, which uses the existing Agricultural Extension Service as a delivery system, places considerable emphasis on the extra assistant director of agriculture's (EADA) part in the pro-

gram. The EADAs would have responsibility for training all personnel under their supervision as well as setting up schedules for FAs to follow in their visitations. The EADAs would also serve as distributing centers for materials and equipment.

Before going into this system of teaching and material distribution on a full scale basis, however, it would be feasible to try it out on a pilot basis in a few selected rural development districts (markazes). The selection of the markazes for the pilot effort would have to be made by a member of the Barani Project or USAID staff, who would provide leadership to the work. This would involve training local extension staff and supplying them with materials.

III. ACTIVITIES DURING THE PERIOD

A. Personnel Who Worked with Gerald McKay

1. Dr. Clarence J. Miller, Team Leader
2. Lawrence G. Ulsaker, Barani Project Agronomist-Punjab Province
3. William D. Burgess, Jr., Barani Project Agronomist-NWFP
4. Everett Headrick, Head of Agricultural Programs, USAID
5. David Lundberg, USAID Monitor of Barani Project
6. Jim Gingerich, USAID Staff
7. Dr. Ed Rice, Mr. R. Sulyman, John Naegele, Dr. S. L. Plunkett, and others on the USAID agriculture and general staff
8. William Smythe and George Halazon, Vertebrate Pest Control Centre staff of FAO/United Nations
9. Mr. Zimmer-Vorhaus, Agricultural Advisor for the World Bank
10. Dr. Homer Hepworth, CIMMYT and Agricultural Research Council (ARC)
11. John Thomas, BBC Consultant with Alama-Iqbal Open University, Pakistan
12. Lal Mohammad Khan and Nisar Ahmad Barula, Barani Project directors of NWFP and Punjab

13. Gulzar Hussain and Abdal Barq, printers with Ferozsons, Ltd., Rawalpindi
14. S. A. Aziz, artist with International Communications Agency (ICA, formerly U.S. Information Service), Rawalpindi
15. Muhammad Sarwar, artist with Alama-Iqbal Open University
16. Mr. Majid and Mr. Hakeemi, photographers with ICA, Rawalpindi
17. Abdul Saleemi, ARC staff translator
18. Wajid Khan, Statistician on Barani staff, translator and proofreader
19. Bashir Ahmad, Assistant Agronomist on Barani staff, translator and proofreader
20. Brigadier Raja Mansoor Ahmad, Director of Agency for Barani Area Development (ABAD)
21. Ashraf Hussain, Assistant Publicity Director with Rawalpindi deputy director of agriculture's (DDA) office
22. Habib Malik, Office Manager, Barani Project
23. Muhammad Chatha, Maize Coordinator, ARC
24. Rashid Anwar, Maize Researcher with ARC, wrote materials on maize
25. Mr. Rafe, Educational Director, Pakistan Television
26. Mr. Risve, Radio Program Producer, Radio Pakistan
27. Several others on the staffs of the Punjab Agriculture Department and the USAID Embassy

Many of these people made major contributions to the production of educational materials used in the Project.

B. Materials Produced

Copies of all materials produced are in Appendix C.

1. Fact Sheets

	No. of Copies
Wheat - 10 titles	450,000
Groundnuts - 5 titles	100,000
Maize - 4 titles	80,000
Rodent and Bird Control - 4 titles	<u>100,000</u>
Total produced in Urdu	730,000
Same as above in English (anticipated)	<u>24,000</u>
Total copies	754,000

2. Posters

One thousand posters were printed from each of the fact sheets on wheat, groundnuts, maize, and rodent and bird control--23,000 total.

3. Radio Scripts

One radio script was produced from each of 23 fact sheets. These were bound into sets and one set was sent to each of three radio stations in the barani area.

4. Slide Sets

One set of 2 x 2 inch slides was produced from each of the fact sheets.

5. Production and Distribution of Materials

The wheat fact sheets were printed in quantities of 30,000 each for the Punjab Province, and 15,000 copies for NWFP. A different masthead was used for each province, and on the first fact sheet, a different back page was made for NWFP. All of the other fact sheets were printed in quantities of 10,000 for each province, except for the two on rodent and bird control, which were printed in quantities of 20,000 for the Punjab Province and 10,000 for NWFP.

Appendix D contains a progress record for each step in the development of all the fact sheets.

One thousand copies were made of each poster -- 500 for each province. This will be enough for a pilot project only. If the posters are successful, they can be reprinted. Each poster is a summary of the material on the corresponding fact sheet.

The slide sets are comprised of from six to eighteen 2 x 2 inch slides with the title of the fact sheet and a copy of the artwork on them. Each set also includes any slides that were made on location as the information for the fact sheet was being collected. Slides are numbered within each set to indicate the related fact sheet and the number in the set.

The radio scripts are written in a style that radio broadcasters generally use and are from five to eight minutes in length. These will be useful if they can be used by the three radio stations (Rawalpindi, Lahore, and Peshawar) at appropriate times in the crop seasons.

Mr. McKay contacted the Pakistan Television Corporation and Radio Pakistan to explore and determine opportunities of presenting educational materials on their respective programs. The reports of a visit to Mr. Rafe, Educational Director for Pakistan Television, and two visits to Mr. Risve, Producer for Radio Pakistan, are in Appendix E.

The largest item of unfinished work in information support of the Barani Project is the distribution and use of the materials. In a meeting with Brigadier Mansoor on January 14, he indicated to Mr. McKay that he was aware of the status of the production of materials and gave assurance that Mr. Ashraf would continue working with the printer until all the printing was finished. He also indicated that he would help set up a plan to get the materials to

the Extension staff who would be using them. Someone will have to continue working with the Brigadier to follow up on the distribution plan. The Barani Project director should be involved in any plan for distribution and use of the materials.

C. Recommendations

Many aspects of the Barani Project have made valuable contributions to the agriculture sector of the barani areas. If another similar program is implemented, the following provisions relating to information support should be included:

1. Work responsibilities, organizations to be involved, and the respective lines of accountability for agricultural communications should be clearly defined. These should be discussed with subject matter specialists.
2. An extension education program should be an integral part of any new barani extension or extension communications project, and one of the first people to be hired should be someone who is well qualified in the area. He should help set up the initial steps to be taken and contribute to the planning throughout the entire project. He should not be brought in as a part-time consultant. Qualifications for this individual should include some overseas experience, a bachelor of arts, or higher, degree in agricultural journalism, and five or more years experience in training methods and production of teaching materials (printed, audio visual, radio, and television).
3. When subject matter specialists are engaged to work on the project, their contract should specify that part of their work is the responsibility of contributing to the production of educational materials by working with the information person on the staff. This obviously will take some of the specialists' time, but it should be

considered as part of their responsibilities rather than an extra task. Information has to be an intrinsic part of an extension program.

4. The program should be set up for a minimum of five years. A better plan would be to make it open ended with no cut-off date, but with regular, periodic evaluations and reporting. A mandate to change directions when the need arose should be included.
5. The project plan should include provision for training local extension staff in teaching methods and the production of materials to be used in teaching. This should be included in the original plan, rather than being added later. The teaching of information methods could be combined, or at least coordinated with, teaching of agronomy and other subjects to extension workers.
6. Before educational materials are produced for the project, a plan for their use and distribution should be worked out thoroughly and agreed upon by concerned individuals in the project. This will insure that the materials will fill a need and will be well used.



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SUMMARY REPORT

REPORT NO. 4

DRYLAND AGRICULTURAL DEVELOPMENT - PAKISTAN BARANI PROJECT

Contract AID/NE-C-1217

GERALD R. MCKAY
COMMUNICATIONS CONSULTANT

September 1 to September 30, 1976
and
October 2, 1978 to January 25, 1979

June 1979

APPENDIX A

**A PLAN FOR DISTRIBUTING AND USING
TEACHING MATERIALS IN THE BARANI AGRICULTURAL
DEVELOPMENT PROJECT**

This report is one of seven summary reports prepared by Experience, Incorporated for Project AID/NE-C-1217, Pakistan Barani. The reports are listed as follows:

- No. 1. Miller, Clarence J., Summary Report of Team Coordinator. September 1, 1976 to May 3, 1979
- No. 2. Miller, Clarence J., Study of Socio-Economic Impact of Barani Project Demonstrations in Punjab and Northwest Frontier Provinces, Pakistan
- No. 3. Miller, Clarence J., Study of Economics of Wheat Production in Barani Areas of Punjab and Northwest Frontier Provinces, Pakistan
- No. 4. McKay, Gerald R., Summary Report of Communications Consultant. September 1 to September 30, 1976 and October 2, 1978 to January 25, 1979
- No. 5. Ulsaker, Lawrence G., Summary Report of Agronomist-Punjab Province. June 28, 1976 to April 3, 1979
- No. 6. Burgess, William D., Jr., Summary Report of Agronomist-Northwest Frontier Province. February 23, 1976 to April 18, 1979
- No. 7. Dilawar Ali Khan, et al, Study of Marketing of Farm Products and Farm Inputs in Barani Areas of Punjab and Northwest Frontier Provinces.

A PLAN FOR DISTRIBUTING AND USING
TEACHING MATERIALS IN THE BARANI AGRICULTURAL
DEVELOPMENT PROJECT

I. Purpose of the Teaching Materials

The teaching materials described in this plan were designed to support and reinforce ongoing Agricultural Extension Service programs which seek to improve the production, harvesting, storage, and marketing of grain, forage, and fodder crops in the barani areas of Punjab and Northwest Frontier provinces. Materials were intended to be used as tools which will help achieve recognized objectives. The materials do not constitute a program in themselves.

II. Materials That Were Produced

The format of these materials is a series of units, each of which consists of four items: a fact sheet (single sheet), a 20 x 30 inch poster, radio script, and set of 2 x 2 inch slides. All four items in a unit or package cover the same information. The fact sheet is used as the basis for the other three.

The following subjects are the basis on which fact sheets, posters, radio scripts, and slide sets were produced.

- Wheat No. 1. Plant Good Wheat Seed
- Wheat No. 2. Treat Seed With a Fungicide
- Wheat No. 3. Prepare a Good Seedbed
- Wheat No. 4. Planting Wheat Properly
- Wheat No. 5. Control the Weeds in Your Wheat
- Wheat No. 6. Controlling Diseases in Wheat
- Wheat No. 7. Using Fertilizers for Wheat
- Wheat No. 9. Test Your Seed for Germination
- Wheat No. 10. Harvest and Thresh Wheat Properly
- Wheat No. 11. Store Your Wheat Well

- Groundnuts No. 1. Choosing and Measuring Land for Groundnuts
- Groundnuts No. 2. Choosing and Treating Groundnut Seed
- Groundnuts No. 3. Preparing the Soil for Groundnuts
- Groundnuts No. 4. Fertilizing and Sowing Groundnuts
- Groundnuts No. 5. Cultivating, Harvesting and Storing Groundnuts

- Maize No. 1. Selecting Maize Seed
- Maize No. 2. Maize Cultivation
- Maize No. 3. Pest Management for Maize
- Maize No. 4. Fertilizing Maize

- Rodents and Birds No. 1. Kill Rodents that Damage Grain
- Rodents and Birds No. 2. Making Bait to Control Rodents
- Rodents and Birds No. 3. Don't Let Birds Eat Your Grain
- Rodents and Birds No. 4. Killing Birds That Eat Your Grain

Each fact sheet begins with a summary of the main points covered. The poster that accompanies the fact sheet shows these summarizations along with other general statements.

The radio script with each fact sheet is a recap of the information on the sheet written in a style that radio announcers probably would use. Scripts are five to eight minutes in length.

There are from six to eighteen 2 x 2 inch slides in each set giving the title of the fact sheet, the summary, and any artwork used to illustrate the sheet. The set also includes any other slides made during the period in which information was gathered.

Information for the fact sheets was written by experts in the respective subject matter fields and was checked by co-workers from the United States and Pakistan, and by local farmers before the fact sheets were printed.

III. How the Materials Were Intended to be Used

These package units were designed to fit into a system of extension teaching such as the Benor plan, which has been used successfully in India. This plan has two important basic aspects: presenting the material to farmers in small units, and making these presentations at regularly scheduled intervals, probably fortnightly. In other words, self discipline has been built into the system. Benor identifies this as the T-V (training and visitation) system.

For the system to work successfully, the field assistants (FAs) or other first level extension workers must be trained in its use and have knowledge of the subject matter they are presenting. This training could be planned and coordinated at the extra assistant director of agriculture (EADA) or similar level and should include the agricultural officers (AOs). Obviously, the program must also have the support of the deputy directors of agriculture (DDAs) and directors of agriculture in each province.

EADAs or others responsible for the program should set up a time schedule for their districts based on seasonal conditions (early or late, and amount of moisture), and schedule their training sessions accordingly.

IV. Fact Sheets and Posters

One fact sheet could be the basis for information presented at each of the visits the FA makes to a group of farmers in each of his assigned villages. The stage of seasonal development may be such that he will need to use two fact sheets. However, the amount of material presented should be kept to a minimum at each meeting.

The FA must know the subject matter on the fact sheet that he is presenting and be familiar with problems related to it. He should be supplied with enough copies of the fact sheets to give one to each farmer who can read.

After a session with farmers in each village, the FA should put up the poster that is coordinated with the fact sheet he has presented. This poster could be put up in a local shop where farmers buy supplies of fertilizer or other items, or might be put up in a local tea shop. This poster summarizes the material discussed at his farmer meeting and should be left up through the season to which it is applicable. The FA must be familiar with stages of crop growth and know when each fact sheet and poster is appropriate. The poster should be removed when the season is over and saved for future use.

V. Radio Scripts

The radio scripts, five to eight minutes in length, summarize information on each fact sheet. Someone at the DDA level will have to see that the radio stations which cover the barani area are given copies of radio scripts that are coordinated with the material on fact sheets which are being presented at regularly scheduled times. Only three radio stations are involved: Rawalpindi, Lahore, and Peshawar.

The program producers at the stations should be given a schedule of the times FAs will be presenting fact sheet material and requested to use the scripts on several occasions during the time it would be appropriate for farmers to listen. Stations may or may not cooperate with this timing schedule. They may cooperate to a limited extent but there is enough flexibility in scheduling so the scripts can actually be useful over a period of a few weeks.

The DDAs should inform EADAs of what the radio stations will be doing with the scripts so this information can be passed on to the FAs who will see that farmers can listen to the programs. FAs could record the radio programs off the air and play the recordings back for farmers at their next meeting. Radio programs will support the messages that have been put up on posters in the village.

VI. Slide Sets

The slide sets have from six to eighteen 2 x 2 inch slides, based on the subject matter of each fact sheet. Slides show the fact sheet title, summary of points on the particular sheet, and illustrations used on the fact sheet. Other slides made on location at the time information was being gathered for the fact sheet are also included.

Three duplicate copies of each slide set were made so the Punjab and NWFP offices, as well as USAID/Pakistan, can have full sets.

The slides are intended to be used in training sessions with AOs and FAs, not with farmers. However, in certain situations where farmers may be interested in more detail, it would certainly be appropriate to use the slides at farmer meetings.

When the slides are used for training by the EADAs, it will be their responsibility to have a 2 x 2 inch slide projector and projection screen available. A white wall or bed sheet could be used instead of a screen, if necessary. Some source of electric power and a room that can be darkened will be needed. Even a machinery shed or a building with three walls could be used. The meetings might be scheduled for evenings in some cases, so no darkening would be required.

It is assumed that the EADAs would combine training in the use of these materials with other training efforts in subject matter areas.

VII. Responsibility for Coordinating Use of Information Materials

EADAs, or others at that level, will be key people in the use of these teaching materials. EADAs should be well briefed by DDAs and have the complete support of the DDAs.

Unless there is an organized extension program with definite objectives, the materials will not be very effective. The EADAs must know what the objectives are and how the different fact sheet units will support various parts of it. A T-V schedule must be set up for the AOs and FAs to follow. Fact sheets and posters will have to be distributed to AOs at appropriate training meetings.

Some method of evaluating the fact sheet packages should be built into the plan used by AOs and FAs. This too, might best be done by the EADAs with the support and assistance of the DDAs.

Distribution of the materials and records of their use should be the responsibility of someone in each of the DDA's offices. This person should have experience in using information materials and should keep records of where the materials are sent and how they are used.

The materials should not be given out haphazardly by anyone who knows of their availability. Materials do not make up a program in themselves. They are one component of an overall agricultural extension effort and should be given to users in an orderly fashion by the Extension administration just as other components of the Extension program are administered.

Although any piece of the material on any of the subjects could be used independently by Extension staff members in certain situations, the full value of the materials will be realized only if a coordinated plan is followed and each element is used at the

appropriate time and place. This is a case where the whole is greater than the sum of its parts.

The fact sheets and posters for the Punjab and Northwest Frontier provinces were stored in the Barani offices of the respective provinces. Radio scripts were also sent to these offices.

Slide sets were sent to USAID/Pakistan to be forwarded to project directors of the two provinces.

APPENDIX B

REPORTS OF VISITS WITH PERSONNEL FROM
PAKISTAN RADIO AND TELEVISION STATIONS

I. REPORT OF VISIT WITH PERSONNEL FROM
RADIO PAKISTAN

On December 12, 1978, Gerald McKay and Clarence Miller visited the broadcasting station and studios of Radio Pakistan in Rawalpindi. The purpose was to obtain information on how to get the agricultural materials on the air and the procedures involved in getting this information to field assistants and farmers via radio.

Bashir Ahmad, Assistant Agronomist with the Barani Project in the Punjab, also attended the meeting. Sharif Shad, the producer who handles the broadcasting of all agricultural programs from the Rawalpindi station, welcomed the group and was very cooperative in giving information.

Shad is an employee of the radio station. Anwar Khan, his agricultural advisor, is on the staff of the Department of Agriculture. Together, they are responsible for all agricultural broadcasting from this station.

A number of relevant factors were brought out in the discussion, including the following:

The radio station will welcome all agriculturally related material.

There are nine radio stations in Pakistan, all operated by Pakistan Broadcasting Corporation. Three of these, which are located at Rawalpindi, Lahore, and Peshawar, have coverage of all of the barani area. The other six are located at Hyderabad, Multon, Quetta, Karachi, Bahawalpur, and Islamabad. Radio Pakistan-Islamabad handles only national broadcasts of government significance. In the barani area, Lahore has the most powerful station, with 100 kilowatts. Its signal goes out

more than 100 miles. Peshawar has 50 kilowatts of power and Rawalpindi has 10 kilowatts. Rawalpindi also broadcasts its programs on a short-wave station of 100 kilowatt power.

Radio Pakistan-Rawalpindi's regular signal frequency is 246.91 Khz. and on the short-wave band is 48.32 hz.

Any programs of agricultural interest to others in different areas are usually recorded on tape and sent to other stations for them to use if they wish. On special occasions when something of country-wide or province-wide interest is scheduled, the stations may be connected by wire and all will broadcast simultaneously.

There are no other radio stations in smaller areas that would handle agricultural material. In other words, if the three stations located at Rawalpindi, Lahore, and Peshawar are supplied with material, all of the FAs and farmers will be able to hear it on radio.

Therefore, it is the responsibility of someone at each of these three centers to provide agricultural material. Extension personnel from FAs up through EADAs would not be concerned with preparing radio programs as a rule. They would be responsible, however, for seeing that provision was made so farmers could listen to the programs and that farmers were informed on what programs would be on the air and when to listen.

Every three months, Mr. Shad and Mr. Khan call in specialists in the area who are concerned about the various aspects of agriculture; and together, they plan what the station will offer the next quarter. This program is sent to a committee of government officials for their approval. The program for the next quarter is then printed and, according to Mr. Shad, is sent to FAs and others who are interested.

Radio Pakistan-Rawalpindi has 30 minutes of agricultural broadcasting every day at 5:15 p.m. These programs are designed especially for farmers. The station also announces its program for the day at about 6 a.m. each day.

The producer who handles farm broadcasts at Radio Pakistan-Lahore is Riaz Mahmood. The individual who handles farm programs at Peshawar can be reached through the station director at Radio Pakistan-Peshawar. Lal Mohammad, Barani Project Director at Peshawar, would be the logical person to serve as liaison in Peshawar.

Information materials that the Barani office may send to the stations are filed for future use by the station. Materials should be marked as to the time of year when they would be most suitable. To be really effective, however, program material of this kind should be updated each time it is used so it can be localized according to conditions in the area.

An information director should be on the permanent Barani staff to keep in touch with the three radio stations because this is a continuous, year-round job. Radio offers a significant opportunity to do some effective communicating with the audience the Barani Project is trying to reach. The project has not begun to realize this potential. It will require a continuous organized effort.

II. REPORT OF VISIT WITH
AKHTAR IMAM RIZVI, RADIO PAKISTAN

On December 30, 1978, Gerald McKay visited with Akhtar Imam Rizvi, Senior Producer; and Anwar Khan, Chief Agricultural Advisor, Radio Pakistan, Rawalpindi. The discussion centered on the use of some of the Barani Project materials on Rawalpindi's radio programs. Mr. Rizvi had expressed interest and had invited Mr. McKay, along with Bashir Ahmad and Mr. Wajid, to visit his office.

Mr. Rizvi has been on the staff of Radio Pakistan-Rawalpindi for twelve years and has supervised the production of the agricultural broadcasts during that time. He is interested in a steady source of material like that produced by the Barani Project. This means that someone on the Barani Project staff should be assigned to sort out or write appropriate and timely material on a regular basis.

An occasional batch of material sent to him is appreciated but not as useful to the radio station as a regular flow of educational releases would be.

Mr. Rizvi said that Wheat Fact Sheets No. 1 and 2 were used by Mr. Bashir on December 28 in a 20-minute presentation he made on the evening radio program. He also indicated that Fact Sheet No. 5 on wheat would be used on January 11, 1979. They will also use a part of Wheat No. 4, "Preparing a Good Seedbed" on January 11, and February 1.

Currently, there are two agricultural programs on the Rawalpindi station each day. A 10-minute program is on the air at 8:45 a.m. and a 30-minute program is broadcast at 6:15 p.m.

The Pakistan Broadcasting Corporation has four mobile vans which can broadcast with a power output of 1 kilowatt from rural areas. The Rawalpindi station plans to have one of these vans to use in this area in the near future. From one rural location, this mobile unit can broadcast to a circular area 20 miles in diameter and reach the people in 60 to 80 villages. There are approximately 25,000 villages in the Punjab Province of Pakistan, with populations of 300 to 2,000 each.

Pakistan has approximately 80,000 villages. Mr. Rizvi said that more than 90 percent of the people in Pakistan have access to radio programs. He would like to get another mobile broadcasting van and suggested that USAID might be asked to provide one. Cost is about Rs. 100,000 per unit.

III. REPORT OF VISIT WITH RAFE-UZ-ZAMAN,
PAKISTAN TELEVISION CORPORATION

On December 28, 1978, Gerald McKay and Ashraf Hussain visited with Rafe-uz-Zaman in his office. Rafe was very cordial and answered many questions relative to the television broadcasting programs in Pakistan.

Rafe is director of educational television for the Pakistan Television Corporation. He is in the Educational Television Division, with offices in the Federal Television Complex on Constitution Avenue in Islamabad. The television transmitting station and studios are located at present near the Rawalpindi airport. Plans are to move these facilities to the Constitution Avenue address soon.

The purpose of the visit was to determine if there was any possibility of using television facilities to reach farmers in the barani areas of Pakistan with information about improved farming practices and the necessary procedures, if this was possible and feasible.

There are five television transmitting stations in Pakistan, all equipped with studios which can originate programs. They are located at Lahore, Rawalpindi, Peshawar, Quetta, and Karachi. There is only one broadcasting channel, all stations using the same wave length. They are interconnected by microwave so they all can broadcast a program simultaneously.

Plans are underway to make available a second channel at these stations. This channel will be used primarily for educational programs when it goes into operation. The program planning and management of all television stations is under the direct control of the government's Department of Public Information and Broadcasting.

Present broadcasting facilities reach about 78 percent of the population of Pakistan (not the same as geographical area). When

the microwave system now operating is completed, about 87 percent of the population will be within reach of television signals. Most of the population in areas reached by television signals is in urban and suburban centers. From 10 to 13 percent of the villages in Pakistan have electricity which, for the time being, rules out the possibility of about 90 percent of the people in rural villages having a television set.

There are approximately 500,000 television sets in the country, about 1 for every 150,000 people. Only 5 percent of these sets are capable of receiving color programs. Approximately one-fourth to one-third of the programming on the five stations is now broadcast in color. Because of the cost of color sets, the percentage of color sets in homes will probably not go up very fast. Most of the television sets are owned by the upper class and upper middle class.

A major project of Rafe-uz-Zaman and his staff has been the establishment of viewing centers around the country. The first pilot project was started in October, 1975 with 275 centers being set up in the listening areas by various community organizations. There are 550 such centers in operation now and plans are underway to expand the program to 5,000 centers.

The person who is in charge at each center is someone from an organization such as the Adult Education Association, the social welfare group, or a rural development organization. It is Rafe's responsibility to get a person like this for each center. Local teachers often fill this role.

Programs for these listening groups at the centers are produced at the national level and a booklet is printed for each series of programs. The booklets are sold to students who enroll for the course. Average attendance at the centers for the first two years was from 100 to 120, about equally divided between men and women. A comprehensive survey in September, 1978 indicates a satisfactory degree of success in these viewing centers. See page B-10 for a copy of the table of contents of one of these booklets.

The stations are on the air about six hours a day -- from 5 p.m. to 11 p.m. Occasionally, a program of special interest is broadcast from 3 p.m. to 5 p.m. Usually these are of interest to women.

All of the program material broadcast each day, with the exception of approximately 40 minutes, is of national scope and interest and is the same on all five stations. The 40 minutes is reserved for regional program material and would be at the same time for all stations.

Once a week there is a current affairs program, usually from 7 to 7:30 p.m., although the time is not fixed. This half-hour program has occasionally included agricultural subjects. When agricultural programs have been broadcast, the material has been supplied to the station by the Federal Agriculture and Food Ministry or Integrated Rural Development Program (IRDP).

The stations are equipped with mobile television production vans which can go out into the country and record on videotape or on 16 mm. film. For most programs, videotape is the medium used. The stations can process their own black and white 16 mm. film but not color film. The trend will probably be toward more videotape (three-quarter inch). The stations use two-inch tape, however, in the studios. They have equipment to transfer from one tape to the other (both ways).

There are no major sponsored programs to produce income for the cost of station operation, so a charge is assessed for each program carried by the station. The charge may not be collected in every case, depending on the situation. The basic charge for producing a half-hour program is Rs. 7,000, although this may vary. The charge for putting the program on the air is Rs. 5,000, for a total cost of Rs. 12,000 for a half-hour program. This is not out of line with similar charges made by educational television stations in the United States.

Looking Ahead

To get information to farmers, television broadcasting does not begin to offer the possibilities that radio does. At the present time, at least 90 percent of the population, including farmers, can be reached by radio because of the transistor radio sets.

To be effective, most agricultural programs on television would have to be on a regional basis; and at present, there are only about 40 minutes of regional programming a day. This is somewhere in the 6 - 7 p.m. time period. With the advent of a second television channel, it might be possible to get time for more regional broadcasts.

The cost would be very high for putting a half hour of agricultural information on the air via television on a regular basis -- Rs. 12,000 a week for a weekly spot. It also would require an agricultural information person on the staff of the sponsoring organization.

Private funding for 30-second spots that would be aired on some of the regional broadcast time might be a possibility. UNESCO has indicated interest in purchasing television sets for some of the community viewing centers. Perhaps this interest could be expanded to include the production of a number of 30-second short messages which the stations call "public service" broadcasts. These could be worked into the programs between longer broadcast units, if not in the regional programs.

For the present, a set of fact sheets should be sent to Rafe with the suggestions that if possible, he make them into 30-second spots for whatever use the station might make of them. There is a possibility this information might reach some of the farmers by using this approach.

PAKISTAN TELEVISION CORPORATION
EDUCATIONAL TELEVISION DIVISION
TELEVISION FOR ADULT FUNCTIONAL LITERACY

Final Report
on the
First Pilot Project and its Evaluation
(12 October 1975 to 30 April 1976)

Rafe-uz-Zaman
Director
Educational Television

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June 1977

APPENDIX C

EXAMPLES OF:

Fact Sheets

Posters

Radio Scripts

Slide Sets

COMPLETED
FACT SHEETS
IN URDU*

*This packet contains one fact sheet on each subject for either NWFP or Punjab province, with the exception of maize fact sheets, which were not available from Pakistan at the time of this printing.

گندم کا عمدہ بیج بونیں

کسانوں کے لئے عام معلومات پرچہ



N.W.F.P.

- ب۔ بیج تمام دوسری فصلات کے بیجوں سے پاک ہونا چاہیے۔ یعنی اُس میں بڑی بڑی - پنے یا سرسوں وغیرہ کا بیج نہ ہو۔
- ج۔ خالص بیج۔ گڑھا ہونا نہیں ہوتا۔ اور نہ ہی اُس میں بڑی بڑی بونوں کے بیجوں، جھوسے یا دوسری کسی بھی قسم کی ملاوٹ ہوتی ہے۔
- ۲۔ روئیدگی - اس کے اگنے کی شرح ۸۰ فیصد ہو۔ (ہر ۱۰۰ دانوں میں سے ۸۰ دانے ضرور اگنے کی صلاحیت رکھتے ہوں)
- ۱۔ اگنے کی قوت روئیدگی ۸۰ فیصد سے کم ہو تو اسی نسبت سے شرح تخم برعائیں۔
- ج۔ ۹۰ فیصد سے کم اگنے والے بیج کو کاشت نہ کریں۔
- ج۔ بیج کی شرح روئیدگی فیصد معلوم کرنے کے لئے ریگڈال کا طریقہ بہت اچھا ہے یا آپ نمودار سیاہی چوس میں بیج رکھ کر بھی شرح روئیدگی معلوم کر سکتے ہیں۔
- (مزید معلومات کے لئے پرچہ نمبر ۱۱ ملاحظہ فرمائیں) ہر دو طریقہ سے آپ کو ۹ دن بعد شرح روئیدگی معلوم ہو جائے گی۔



شرح روئیدگی معلوم کرنے کے لئے ریگڈال کا طریقہ

- ۳۔ وزن اور شکل۔ منتخب کردہ بیج کا وزن زیادہ اور دیکھنے میں گول چمکدار اور کیرے کوڑے سے پاک ہو۔ دانے ٹوٹے ہوئے اور پڑھڑھانے والے چاہئیں۔
- ۴۔ بیماریاں۔ منتخب شدہ بیج بیماریوں سے پاک ہو اور ایسے کمیتوں سے حاصل کیا گیا ہو جو بیماریوں سے پاک تھے۔ بجائی سے پہلے بیج کو دوائی لگائیں۔



صحیح مند گول بیج



ٹوٹے ہوئے چمڑے دانے



کیرے کوڑے اور ان سے نقصان زدہ دانے

گندم غبورا برائے پنجاب، صوبہ سرحد

خلاصہ

عمدہ بیج کیسے

- ۱۔ عمدہ بیج خالص ہوتا ہے یعنی صرف ایک ہی قسم کا بیج جو بڑی بڑی بونوں اور دوسری فصلوں کے بیجوں سے پاک ہوتا ہے۔
- ۲۔ اچھے بیج کی شرح روئیدگی ۸۰ فیصد یا اس سے بھی بہتر ہوتی ہے۔
- ۳۔ اچھا بیج مکمل دھونا اور ہر قسم کی بیماریوں اور کیرے کوڑوں کے نقصان سے صاف ہوتا ہے۔
- ۴۔ عمدہ بیج چمڑے اور ٹوٹے ہوئے دانوں سے پاک ہوتا ہے۔
- ۵۔ اچھے بیج میں سے کتنی قسم کی بونیں آتی۔
- ۶۔ اچھے بیج میں اگتے ہوئے دانے نہیں ہوتے۔
- ۷۔ یہ دیکھی قسم ہوتی ہے جس کی آپ کے علاقہ میں بجائی کی سفارش کی گئی ہو۔

الف۔ گندم کے بیج کا انتخاب کرتے وقت مندرجہ ذیل باتوں کا خیال رکھیں۔

- ۱۔ بیج کا خالص ہونا۔ یعنی صرف ایک ہی قسم کا بیج
- ۲۔ اگر مختلف اقسام کا ملا بیج ہے تو وہ اقسام ایک ہی وقت پر پکنے والی ہوں۔ کبھی بھی اگتی قسم کو چھٹی قسم میں نہ ملائیں۔

۲۔ آئندہ سال بجائی سے پہلے بیج کو دوبارہ صاف کریں اور دوائی لگائیں۔



گندم کے اچھے فصل حاصل کرنے کے لئے عمدہ کا بیج نہایت ضروری ہے

ب۔ اپنا بیج تیار کر۔ وقت!

- ۱۔ اپنے علاقہ کی مطابقت سے قسم (دورانی) گندم کا چناؤ کریں۔
- ۲۔ سفارش کردہ وقت پر بجائی کریں جیسا کہ گوشوارہ نمبر ۱ میں بتایا گیا ہے۔
- ۳۔ اپنے کھیت کا مشاہدہ کریں وہ کنگلی اور کانگاری سے پاک ہو۔
- ۴۔ کسی دوسری قسم یا فصل کو اس میں نہ ٹپنے دیں۔ دوسری فصل کی صورت میں درمیان میں مناسب فاصلہ رکھیں۔
- ۵۔ رستے لگانے کے فوراً بعد اُس رقبہ کا تعین کر لیں۔ جہاں سے آپ بیج حاصل کریں گے۔
- ۶۔ اس رقبہ میں سے دیگر فصلوں اور گندم کی دوسری اقسام کے پودوں کو نکال دیں۔
- ۷۔ اسے جڑی بوٹیوں، کیڑے مکوڑوں اور بیماریوں سے پاک کر دیں۔
- ۸۔ صرف صحت مند اور موٹے دانوں کا چناؤ کریں۔
- ۹۔ کٹائی، گہائی اور بیج کی سنبھال معذوں طریقہ پر کریں۔
- ۱۰۔ منتخب شدہ فصل کی گہائی سے پہلے تقریباً (مشین) کو صاف کریں۔
- ۱۱۔ بیج کو صاف بریلوں و صاف گودام میں رکھیں۔

گوشوارہ نمبر ۱

صوبہ سرحد کے بارانی علاقوں کیلئے سفارش کردہ اقسام گندم

قسم گندم	وقت کاشت	شرح تخم (کلوگرام فی ایکڑ)	قسم گندم	وقت کاشت	شرح تخم (کلوگرام فی ایکڑ)
لائی پور ۷۳	۲۰ اکتوبر سے ۳۰ نومبر	۳۸	سائل (صرف میدانی علاقوں کیلئے)	۱۵ نومبر سے ۳۰ نومبر	۳۸
پادان	یکم نومبر سے ۲۰ نومبر	۳۸	ارض	۲۰ نومبر سے ۱۵ دسمبر	۳۸
ڈبلیو ایل ۷۱	یکم نومبر سے ۲۰ نومبر	۳۸	ایس اے ۷۵	۲۰ نومبر سے ۱۵ دسمبر	۳۸
(پشاور ڈیپارٹمنٹ اسماعیل خان اور بنوں)	یکم نومبر سے ۲۰ نومبر	۳۸	سونالیکا	یکم دسمبر سے ۲۰ دسمبر	۳۵
ایچ ڈی ۲۰۰۹	یکم نومبر سے ۲۰ نومبر	۳۸	بلیوسلو	یکم دسمبر سے ۳۰ دسمبر	۳۵
(ڈیپارٹمنٹ اسماعیل خان اور بنوں)	یکم نومبر سے ۳۰ نومبر	۳۸			

جب آپ دوئی لکڑی فارخ ہوں تو دوئی طے بیج کر صاف بھریں یا ہڈی میں خال دیں۔ آسے لیل لگائیں جس پر دوئی کا نام اور دوئی طانے کی تاریخ درج کریں۔ پھر اسے حفاظت سے کسی خشک جگہ پر محفوظ کریں۔



۱۔ ایک پیمبر برائے ۲۰ سیر (دو ادونس بلے ۲۰ کلوگرام) گندم کے لئے استعمال کریں۔ یہ گندم سبب کی طرح بیج کی حفاظت کرتی ہے۔ اور تمام بیماریوں کی درک تمام کرتی ہے۔ یہ بیج کو کھٹنے سڑنے سے بچاتی ہے۔

آپ اس دوئی کو یا کوئی دوسری جو بھی آسانی سے دستیاب ہو، استعمال کر سکتے ہیں۔

بیج کو دوئی کیسے لگائیں؟

یہ ہے کہ دوئی کو بیج کے ساتھ ملا یا ملائے۔ اس طریقہ کے عملی مشاہدے کے لئے اپنے علاقہ میں تین محکمہ زراعت کے توجیسی کارکن سے رجوع فرمائیں۔

۱۔ سب سے پہلے یہ فیصلہ کریں کہ آپ نے کتنے بیج کو دوئی لگانی ہے۔ بعد ازاں آپ بیج اور دوئی کو طانے کے لئے کسی ڈبہ کی تلاش کریں۔ پھر اسے سے بیج (۲۰ کلوگرام بیج) کے لئے آپ صاف بوری یا مٹی کے تیل کا



خالیا بیجا استعمال کر سکتے ہیں۔

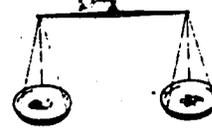
بیج کی تھوڑی مقدار کو دوئی لگانے کے لئے مٹی کے تیل کا خالی صاف بیجا بہترین ہے۔

دوسرا طریقہ یہ ہے کہ فرش پر تھوڑی سی جھلک کو اچھی طرح صاف کریں۔ اور لٹھا دیڑھیں دکھائے گئے طریقہ سے بیج کو دوئی لگائیں۔



یا پھر آپ بیج کو دوئی لگانے والی مشین سے بھی دوئی لگا سکتے ہیں بشرطیکہ یہ آپ کے گاؤں میں موجود ہو۔ اس سے آپ آسانی کم وقت میں بہتر طریقہ سے دوئی لگا سکیں گے۔ دوئی لگانے والی دو طرح کی مشینیں ملاحظہ فرمائیں۔

۱۔ جتنے بیج کو دوئی لگانی ہو۔ اسی حساب سے دوئی



کی مقدار معلوم کریں۔ اگر آپ کے پاس ترازو ہو تو اس سے گندم اور دوئی کا وزن کر لینے سے آپ دوئی کی صحیح مقدار استعمال کر سکیں گے۔

دوئی طانے سے پہلے اگر پیمبر نصف کلوگرام باریک مٹی (پاؤڈر کی طرح باریک) دوئی میں ملائی جائے تو دوئی آسانی بیج کو لگائی جاسکتی ہے۔

۲۔ برتن کو مٹی بیج اچھی طرح ملائیں، بیج کو دوئی کے ساتھ ملائیں یا ہینڈل کو گھمائیں تاکہ دوئی مکمل طور پر بیج کے ساتھ مل جائے۔ چند منٹ تک اسی طرح دوئی ملائے دیں۔ دیکھنا یہ ہے کہ دوئی کا سفوف بھرنے پر اچھی طرح لگ جائے۔

ایک چکر کھانے والے ڈھم جیسی دوئی لگانے کی مشین جو کہ گاؤں کے مکان (مستری) سے لوبے کے پڑانے پیسے (ڈبے) سے آسانی بنوائی جاسکتی ہے۔

یہ بڑے پیمانے پر دوئی لگانے کی مشین ہے۔ یہ بہت عمدہ طریقہ پر کام کرتی ہے۔ ممکن ہے آپ کے گاؤں میں بھی ایک ایسی ہو۔



بارانی زرعی ترقیاتی منصوبہ

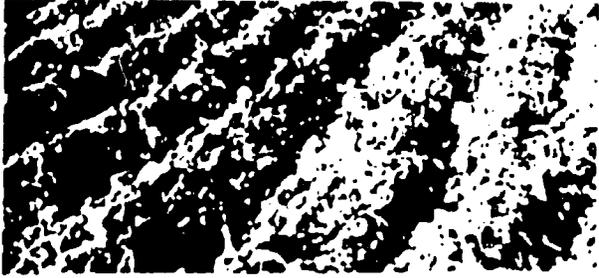
شمال مغربی سرحدی صوبہ

بہترین زمین تیار کیجیے

کسانوں کے لئے عام معلوماتی پرچہ



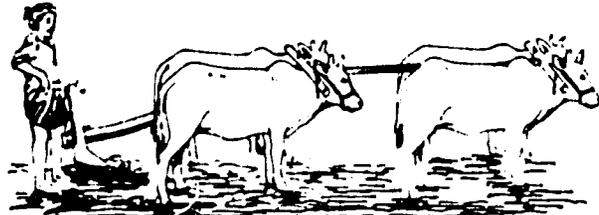
N.W.F.P.



اچھے تیار کیے بغیر کھیت

گندم کے لئے زمین میں اگیا (اگست کے آئیں) بل چلانے سے جڑی بوٹیاں تلف ہو جاتی ہیں۔ زمین نمی محفوظ ہونے میں اور پودوں کے استعمال کے لئے زمین ناٹ میٹ کے اخراج میں مدد ملتی ہے۔ وریاں یعنی پچھلے سال کی خالی زمینوں میں بھی اگیا بل چلانا مفید ہے۔

ایسے کھیتوں میں فوراً بل چلائیں جہاں سے غریب کی فصلوں مثلاً کئی جوار، باجرہ اور مونگ پسلی وغیرہ کی کٹائی کر لی گئی ہو۔ پچھلے سال کی وریاں (ساوین) زمین پر یا کسی فصل کے بعد چلا بل کافی گرا ہونا چاہیے جو تقریباً ۶ انچ ہو۔ اگر آپ کے پاس مدبڑے بل یا یاچارھوٹے یا ٹریکٹرز سے تو آپ یہ گرا بل جڑی آسانی سے چلا سکتے ہیں۔ دوسری صورت میں اگر آپ کے پاس صرف ایک بل ہے تب پھر آپ جتنا بھی گرا بل چلا سکتے ہیں چلائیں۔



بعد ازاں بجائی ٹمک برود ہفتوں کے بعد جگے بل چلاتے رہیں جو کہ تقریباً ۶ انچ ڈرا سٹیٹ میٹ گہرے میں تاکہ کرڈ ٹوٹ جائے۔ اور پر والی زمین ٹھہری ہو جانے اور بڑی بوٹیاں بھی تلف ہوتی رہیں۔

عام طور پر بارانی زمینیں کم نڈر ہوتی ہیں اس لئے آپ کو گندم کی بہتر فصل لینے کے لئے یقیناً ناٹروجن اور فاسفورس کھاد کی ضرورت ہوگی۔

کھاد ڈالنے کا صحیح وقت بجائی سے پہلے ہے جب کہ آخری بل چلایا جائے۔ اس طرح کھاد زمین کے ساتھ بل جائے گی اور فصل کی جڑوں کے لئے کارآمد ہوگی۔ اگر آپ کھاد چھتے سے دینا چاہتے ہیں تو صرف اتنی جگہیں کھاد کھجییں جس میں آپ اسی ایک دو میں بل بھی

خلاصہ گندم نمبر ۳

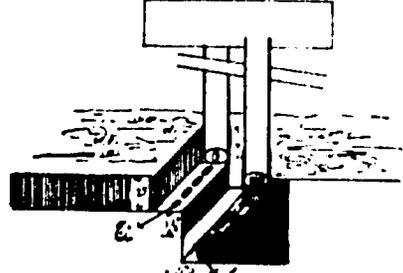
- ۱۔ گندم کی عمدہ فصل لینے کے لئے زمین کا بہترین تیار ہونا ضروری ہے۔
- ۲۔ جڑی بوٹیوں کے خاتمے اور زمین نمی کو محفوظ کرنے کے لئے اگیا (اگست کے آخر سے) بل چلانا شروع کریں۔
- ۳۔ پہلا بل تقریباً ۶ انچ (۱۵ سم) گہرا ہونا چاہیے
- ۴۔ بعد ازاں جڑی بوٹیوں کی تمنی کے لئے جگے جگے تقریباً ۶ انچ (۱۰ سم) گہرے بل چلائیں۔ کیونکہ جڑی بوٹیاں قیمتی زمینی نمی کو استعمال کرتی ہیں
- ۵۔ سفارش کردہ مقدار میں ناٹروجن اور فاسفورس والی کھاد استعمال کریں یا دونوں کھادیں الگ الگ لائیں۔
- ۶۔ آخری بل کے ساتھ ہی زیادہ تر کھاد کھیت میں کھجیوں اور بل چلائیں۔
- ۷۔ اگر کھاد کو بیج کے تھوڑا ایک طرف اور قدر سے گہرا ڈالا جائے تو بہتر نتائج حاصل ہوتے ہیں۔
- ۸۔ اگر کھیت میں نمی موجود ہو تو پودے کے بھاڑ بناتے وقت ناٹروجن کھاد استعمال کریں۔

بیج کے پھانڈ اور اسے دوائی لگانے کے بعد سب سے ضروری بات زمین کو وقت سے پہلے تیار کرنا ہے۔ زمین کی بہترین تیاری کے لئے بار بار بل چلاتے اور ہواگ پھرتے رہیں جتنے کہ زمین ہموار اور بھر پوری ہو جائے جیسے کہ نیچے شکل میں دکھایا گیا ہے۔ خیال رہے کہ زمین کی تیاری کے دوران مٹی اتنی باریک نہ ہو جائے جسے ہوا یا پانی آسانی سے لے جائے۔



ایک اچھا تیار شدہ کھیت

چلا سکتے ہیں۔ اگر آپ نائٹروجن حاصل کرنے کے لئے یوریا کا استعمال کرتے ہیں تو اسے ضائع ہونے (اڑنے سے) جانے کے لئے جتنی جلد ممکن ہو اسے زمین کے ساتھ ملا دیں۔ اگر کھاد قطاروں میں استعمال کی جاتی ہے تو بیج کے بائکل نزدیک ہر لیکن بسے چھوئے نہیں۔ کھاد اڑنے کا موسموں طریقے فرمز میں ملاحظہ فرمائیں۔



کھاد تقسیم یا پراگندگی پر اور اتنے ہی فاصلہ پر بیج کے ایک طرف ہو۔ اس طریقے سے کھاد استعمال کرنے کے لئے ایک ڈال کی ضرورت ہے جس میں بیج کے ساتھ کھاد بھی ڈالی جاسکتی ہے۔ شاید آپ کے گاؤں میں بھی ایسی ایک ڈال ہر جیسے ٹریکٹر یا بیٹوں سے چلایا جاتا ہے۔ نائٹروجنی کھاد، پودے کے پھیننے پیداوار بڑھانے اور لمبائی کی مقدار فی دانہ زیادہ کرتے ہیں مدد دیتی ہے۔

چونکہ زیادہ بارش والے (۵۰۰ ملی میٹر یا زائد والے) علاقوں میں کھاد اپنے پہلے جانے سے ضائع ہو جاتی ہے۔ لہذا ایسے علاقوں میں فاسفورس کی تمام کھادوں، نائٹروجن کا ۵۰ فی صد بجلی سے پہلے آخری لی کھاد استعمال کریں اور بقیہ کھاد پودے کے جڑ بناتے وقت دیں۔



کیلے پتوں پر کھاد کا چھتہ ہرگز نہ کریں کیونکہ نائٹروجن پتوں کو جلا دے گا۔ کھاد کا چھتہ اس وقت کریں جب پتوں پر سے نمی ختم ہو جائے۔ کم بارش والے علاقوں میں اگر آپ فصل کھاد کا چھتہ دینا چاہتے ہیں تو پہلے ٹریکٹر وسیع دیانت کے عمل سے کھیت کا معائنہ کریں یا مشورہ لے لیں۔ فاسفورس کھاد جڑوں کے بڑھنے میں مدد دیتی ہے اور پودے کو جلد مضبوط بناتی ہے۔ اس لئے فاسفورس کی کھاد کو بجائی سے پہلے استعمال کریں تاکہ پودے جڑیں پودے کے کام آسکیں۔ فاسفورس اور نائٹروجن والی کھادیں ملا کر بھی استعمال کی جاسکتی ہیں اور اگ لگ ہی بارانی علاقوں کے لئے سفارش کردہ کھادوں کی مقدار بمطابق ان کی اقسام گوشوارہ نمبر میں ملاحظہ فرمائیں۔

گوشوارہ نمبر ۱ بارانی علاقوں میں گندم کی بجائی کیلئے سفارش کردہ کھادوں کی مقدار

تعداد پوری فی ایکڑ	کھادوں کے مقدار اصل اجزاء فی ایکڑ کلوگراموں اور پونڈوں میں			مقدار بارش
	پوٹاش	فاسفورس	نائٹروجن	
ایک پوری ڈی اے پی اور نصف پوری یوریا یا دو پوری نائٹرو فاس یا پڑا پوری سنگل سپر فاسفیٹ اور پڑا پوری امونیم نائٹریٹ بمعہ ۲ پوری امونیم سلفیٹ کاشت کے وقت استعمال کریں۔	۰	۲۳ کلوگرام یا ۵۰ پونڈ	۲۳ کلوگرام یا ۵۰ پونڈ	جہاں بارش ۲۵۰ ملی میٹر تک ہو (کم بارش والا علاقہ)
ایک پوری ڈی اے پی اور ایک پوری یوریا یا دو پوری نائٹرو فاس اور نصف پوری یوریا یا پڑا پوری سنگل سپر فاسفیٹ اور پڑا پوری امونیم نائٹریٹ بمعہ پڑا پوری امونیم سلفیٹ کاشت کے وقت استعمال کریں۔	۰	۲۳ کلوگرام یا ۵۰ پونڈ	۳۳ کلوگرام یا ۷۵ پونڈ	جہاں بارش ۳۵۰ سے ۵۰۰ ملی میٹر کے درمیان ہو (یعنی اوسط دہے کی بارش)
پڑا پوری ڈی اے پی اور پڑا پوری یوریا یا پڑا پوری نائٹرو فاس اور نصف پوری یوریا یا ۳ پوری سنگل سپر فاسفیٹ اور پڑا پوری امونیم نائٹریٹ بمعہ پوری امونیم سلفیٹ کاشت کے وقت استعمال کریں۔	۰	۲۶ کلوگرام یا ۶۰ پونڈ	۴۱ کلوگرام یا ۹۰ پونڈ	جہاں بارش زیادہ ہوتی ہو (۵۰۰ ملی میٹر سالانہ یا اس سے زائد)

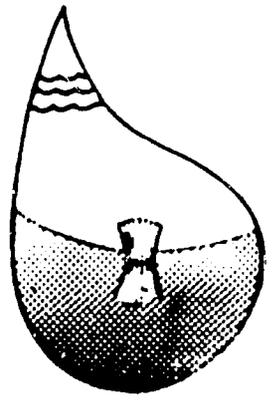
ایسی پائٹریزوں کے لئے جن میں دیسی کھاد کی وافر مقدار موجود ہو۔ مندرجہ بالا سفارشات میں تھوڑی تبدیلی ہو سکتی ہے۔ وہاں نائٹروجن کی مقدار میں کمی کریں۔ اور فاسفورس کی کھاد کو کیسے نظر انداز بھی کر سکتے ہیں۔

بارانی زرعی ترقیاتی منصوبہ

پنجاب

گندم صحیح طریقہ پر کاشت کریں

کسانوں کے لئے عام معلوماتی پتہ



WHEAT-4
PLANT WHEAT
PROPERLY

- ۱۔ آکسیجن - سیم زدو زمینوں میں آکسیجن کی کمی کی وجہ سے اگاؤ کم ہوتا ہے کیلی جنہوں پر گندم کاشت نہ کریں۔ جب تک وہ خشک نہ ہو جائیں اور کڑھ نہ توڑ دی جائے۔
- ۲۔ بھر بھری سطح - زمین کی بھر بھری سطح جڑی بوٹیاں اگنے سے روکتی ہے۔ کیونکہ یہ جڑی بوٹیاں پودے کے لئے ضروری عناصر۔ روشنی۔ نشئی نمی اور خوراک حاصل کرنا شروع کر دیتی ہیں۔

ب۔ بیج کہاں اور کیسے ڈالا جائے

۱۔ گہرائی - زمین

نمی کو بر نظر رکھتے ہوئے

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

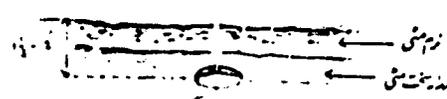
پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

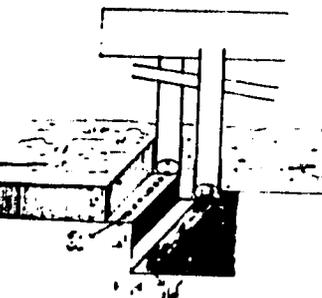
پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم

پراچ ۳ تا ۴ اینچ (۷.۶ تا ۱۰.۱) سم



۲۔ کھاد سے فاصلہ - بیج اور کھاد کا ملاپ نہ ہونا چاہیے۔ بیج کے تھوڑے نیچے اور ایک طرف ہونے چاہیے جیسا کہ شکل میں دکھایا گیا ہے۔ اگر آپ کے پاس کھاد ڈالنے کی ڈرل وغیرہ نہیں ہے تو آپ آخری ہل کے ساتھ کھاد کا چھتہ دے دیں۔



۳۔ شرح تخم - (شرح تخم فی ایکڑ کے پراچ گندم نمبر ۱۸۰۰ ہے) اس کا مطلب زمین میں برابر فاصلے پر لگائے ہوئے اتنے پودے ہونا چاہئے جو کہ انڈینس میں معادی تمام وقت ملتی ہے۔ زمین کی اور سو۔ بیج کی روشنی کو مکمل طور پر استعمال میں لائیں۔ عام طور پر تعداد ۲۰ سے ۳۰ پودے فی ایکڑ ہوتی ہے۔ کچھ اقسام زیادہ جھاڑنے کی خصوصیات کی وجہ سے زیادہ فاصلہ کا تقاضا کرتی ہیں۔ چھتہ کاشت کے لئے اگست کاشت کی نسبت زیادہ بیج درکار ہوتا ہے۔ چھتہ طریقہ کاشت میں بیج ڈرل کی نسبت زیادہ بیج

خلاصہ گندم نمبر ۳

- ۱۔ گندم کی بہتر پیداوار کے لئے صحیح طریقہ کاشت ضروری ہے۔
- ۲۔ گندم کی اچھی فصل لینے کے لئے ضروری ہے کہ بیج مقررہ مقدار میں مناسب فاصلہ پر اور ضروری گہرائی پر بویا گیا ہو۔
- ۳۔ فصل کی نشوونما کے درجہ حرارت، نمی اور آکسیجن کی مقدار کی فراہمی سے متاثر ہوتی ہے۔
- ۴۔ گندم کی بہتر فصل کے لئے بھر بھری سطح والی بہترین تیار زمین ضروری ہے۔
- ۵۔ پورے ذریعہ یا کسی بھی میکا کی ڈرل سے بجائی بہتر طریقہ پر کی جا سکتی ہے۔
- ۶۔ چھتہ کی نسبت میکا کی ڈرل سے آپ بیج کی حسب مشافی ایکڑ مقدار مناسب گہرائی پر کاشت کر سکتے ہیں۔
- ۷۔ آپ کو میکا کی ڈرل اختیار سے متنب کرنی چاہئے۔ کیونکہ چند ایسی بھی ہیں جو اچھی نہیں بنائی گئیں۔ یا آپ کی ضروریات کے مطابق نہیں۔

گندم کی اچھی فصل لینے کے لئے بجائی سے متعلقہ مندرجہ ذیل امور کا خیال رکھیں۔

الف: بجائی کے لئے بہترین حالات کون کون سے ہیں

- ۱۔ درجہ حرارت - بہترین زمینی درجہ حرارت ۱۵ تا ۲۵ ڈگری سنٹی گریڈ اور بہترین ہوائی درجہ حرارت ۱۵ تا ۲۰ ڈگری سنٹی گریڈ ہے۔ زیادہ زمینی حرارت پھپھوندی اور کھڑے کھڑوں کے پھیلنے میں مدد دیتا ہے اور آگے ہوئے بیج کو زخمی کرتا ہے۔ اس وقت تک بجائی نہ کریں جب تک کہ گرم موسم ختم نہ ہو جائے۔
- ۲۔ بیج کے اچھی طرح اگنے کے لئے زمینی نمی کا ہونا نہایت ضروری ہے۔ اگر زمین میں بار بار مل چلا یا گیا ہے اور اسے کھلا چھوڑ دیا گیا ہے تو نمی اڑ جائے گی۔ اگر زمینی نمی (دتر) ۲ یا ۳ اینچ (۵ تا ۷.۶) سم کی گہرائی تک ہو تو بجائی بخوبی کی جا سکتی ہے۔ یعنی کھلی بھر مٹی لے کر ہاتھ میں دبانے سے مٹی بھر بھری تو رہے لیکن دھاؤ سے اگھی بھی ہو جائے۔ پہلا بل ۶ اینچ (۱۵) سم) گہرا ہونا چاہئے۔ بعد ازاں خواہ ۳ اینچ (۱۰) سم) گہرے بل ہوں یا کم۔

استعمال ہوتا ہے۔ زیادہ بارش والے علاقوں میں بھی آپ شرح تخم فی ایکڑ بڑھا سکتے ہیں۔

۴۔ سیاڑوں کا درمیانی فاصلہ۔ سیاڑوں کا مناسب درمیانی فاصلہ سے ۸ اینچ (۲۰ تا ۲۵ سم) ہے۔ اگر ۲۰ سم سے فاصلہ زیادہ ہو تو بڑی بوٹیوں کا مسئلہ پیدا ہو جاتا ہے۔ اور اگر فاصلہ ۲۵ سم سے زیادہ بڑھا دیا جائے تو پیداوار میں کمی واقع ہو جائے گی۔ پھیرت کاشت میں سیاڑوں کا فاصلہ کم رکھا جائے۔

۵۔ طریقہ کاشت۔ گندم چھٹے یا ڈول دونوں طریقوں سے کاشت کی جاسکتی ہے۔ ڈول کی بجائی کو ترجیح دی جاتی ہے۔ کیونکہ یہ ۱۵ تا ۲۰ فی صد زیادہ پیداوار دیتی ہے۔ ڈول کے ذریعہ کاشت کرنے سے صحیح شرح تخم، سوزوں گہرائی کے علاوہ سیاڑوں کا درمیانی فاصلہ بھی برابر رکھ سکتے ہیں۔ بل کے ساتھ نالی دلپور، نکا کو بھی بہتر طور پر گندم کی بجائی کی جا سکتی ہے جیسا کہ شکل میں دکھایا گیا ہے۔ یہ طریقہ بھی عام طور پر رائج ہے۔ چھٹے کے



ذریعہ مساوی طور پر بیج بکیرنا اور اُسے ایک ہی گہرائی پر دبانا شکل ہے جب آپ چھٹے کے ذریعہ کاشت کرتے ہیں تو بیج کا مناسب فاصلہ اور یکسانیت برقرار رکھنا مشکل ہو جاتا ہے۔ آپ کو ایک ہی رفتار کے ساتھ چل کر تین میٹر (۱۰ فٹ) چوڑی پٹی پر بیج بکیرنے کی کوشش کرنی چاہیے۔ بیج کو مناسب طور پر ڈھانپنے کے لئے آپ کو کھیت میں ہسٹا بھی چلانا چاہیے۔ اور اگر آپ ٹریکٹر کے ساتھ بجائی کر رہے ہوں تو ایک بلی ہیر استعمال کی جاسکتی ہے۔ بیج کو ڈیڑھ اینچ یا چھ سنتی میٹر سے زیادہ گہرا نہیں دبانا چاہیے۔

ج۔ میکائلی ڈول کے انتخاب اور استعمال کے لئے احتیاطیں

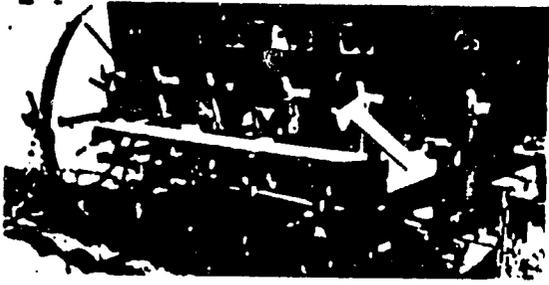
۱۔ ڈول کا انتخاب۔ بیلوں اور ٹریکٹر سے چلنے والی ڈول مشینیں بہت سے صنعت کار تیار کرتے ہیں۔ آپ اگر کوئی ایک لیتے ہیں تو دیکھیں کہ وہ صحیح طریقہ پر بنائی گئی ہو۔

۲۔ ڈول کے بیج زمین میں ڈالنے کا میکائلی طریقہ صحیح طور پر بنایا گیا ہو۔ اگر ڈول کے ساتھ کھاد ڈالنے کا بھی انتظام ہے تو اس کا یہ میکائلی طریقہ بھی درست بنا ہوا ہو۔



۳۔ شرح تخم کو کم و بیش کرنے والا سینڈل آسانی سے آگے پیچھے کیا جاسکتا ہو اور وہ جس جگہ رکھا جائے وہیں ٹھہر سکے۔

۱۔ ڈول کے بیج ایک ساتھ چھٹے والا تختہ لگا کر جو زمین پر چھڑک کر ڈول کو چلنے والا کھاد اور بیج لے جاتی والی نالیوں پر نگاہ رکھ سکے کہ بیج اور کھاد ٹھیک طور سے زمین میں جا رہی ہے۔



۲۔ ڈول کے دیکھ بھال اور استعمال

ڈول پر یا اس کی امدادی کتاب پر بجائی کا گوشوارہ یا نقشہ دیکھیں تب فیصد کریں کہ آپ نے فی ایکڑ کتنا بیج استعمال کرنا ہے اور بیج کے کم و بیش کرنے والے سینڈل کو مطلوب نشان پر رکھیں۔ بجائی کی شرح، بیج کی حسامت، اس کی شکل اور بیج کی مشین میں مقدار کے علاوہ جہاں سے بیج کو گزرا رہتا ہے۔ اُس کے بڑا چھڑا ہونے سے بھی متاثر ہوتی ہے۔ ڈول مشین سے یقینی صحیح بجائی کے لئے اس کی کتاب پر درج ہدایات پر عمل کریں۔ ڈول کو استعمال کرنے کے متعلق اپنے علاقہ کے محکمہ توسیع زراعت کے عملے سے بھی رابطہ قائم فرما سکتے ہیں۔ مشین کی دیکھ بھال کا مطلب یہ ہے کہ مشین کو صاف رکھیں۔ اور لٹے تیل، گرہیں دیتے نہیں



ہمیشہ ڈول میں بیج ڈالنے سے پہلے اس کے کس کو صاف کریں۔ اسی طرح کھاد والے کس کو بھی صاف رکھیں۔ خاص طور سے جہاں سے کھاد نچے جاتی ہے وہاں پر کوئی بیرونی چیز نہ جبرنجائی ختم کرنے کے بعد کبھی بھی مشین میں کھاد باقی نہ چھوڑیں۔

تمام گھومنے والے حصوں کو تیل دیں اور دیکھیں کہ وہ آداری سے حرکت کر سکتے ہوں۔ یہ یقین کرنے کے لئے کہ یہ آسانی سے گھوم سکتے ہیں مشین کے گزاری والے دھڑے کو بیج کی مدت کئی بار گھمائیں۔ اسی طرح بیج کے گزرنے والے راستے کی بھی پڑتال کریں کہ وہ کھلا ہے اور بیج آسانی سے گزرجائے گا۔



گندم میں سے جڑی بوٹیاں تلف کریں

کسانوں کے لئے عام معلوماتی پرچہ

اور فصل کے بیج کو بھی جراثیم آلود کر دیتا ہے۔ جڑی بوٹیاں مشینری کے استعمال میں بھی شامل پیدا کرتی ہیں لہذا کٹائی، تھائی اور سفائی میں مشکلات کی وجہ سے زمیندار کو زائد خرچہ برداشت کرنا پڑتا ہے۔ بعض جڑی بوٹیاں انسانوں اور جانوروں کے لئے زہریلی بھی ہوتی ہیں۔ جڑی بوٹیاں چونکہ بہت زیادہ مقدار میں بیج پیدا کرتی ہیں۔ لہذا یہ باآسانی پھیل جاتی ہیں۔ اکثر جڑی بوٹیوں کا بیج کئی سالوں تک زندہ (انگے کے قابل) رہتا ہے۔ کیت میں سے ایک کوگرام خشک جڑی بوٹیوں کی مقدار حاصل کرنے کا مطلب یہ ہوا کہ گندم کی پیداوار میں ایک کوگرام دانوں کی کمی ہوگئی ہے۔

جڑی بوٹیوں کی روک تھام کیسے کی جائے؟

کیماٹی مرکب، زرعی عوام کا استعمال جڑی بوٹیوں کی روک تھام کے دو نہایت اہم طریقے ہیں۔ کم قبضہ کے لئے زرعی عوام کے ذریعہ جڑی بوٹیوں کی روک تھام ایک سستا اور آسان طریقہ ہے۔ کیماٹی مرکب کے ذریعہ جڑی بوٹیوں کی روک تھام کا مطلب ہے کہ کیتوں پر جڑی بوٹیوں کو تلف کرنے والی دوائی کا سپر سے کیا جائے۔

الغے، زرعی عوام



۱۔ سب سے پہلے آپ کو اپنے علاقہ میں آنے والی جڑی بوٹیوں کی قسم کا علم ہونا چاہیے کیا وہ سالانہ ہیں یا پائیدار سے زیادہ دیر تک زندہ رہتی ہیں؟ کیا وہ چوڑے پتوں

والی ہیں۔ جڑی بوٹیوں کو ان کی بعض اہم خصوصیات کی وجہ سے پہچانا جاسکتا ہے مثلاً پتوں کی ترتیب اور شکل، پھولوں کا رنگ، پودے کی لمبائی اور پتوں کے پھیلنے کا طریقہ۔ جڑی بوٹیوں کو اچھی طرح پہچاننے کے قریب یا پھول آنے کے وقت آسانی سے لاشٹ کیا جاسکتا ہے۔ اگر ایک دفعہ آپ نے مکمل پودا اچھی طرح دیکھ لیا ہو تو اس کے انگٹے جوئے پودے کو آپ باآسانی شناخت کر سکتے ہیں۔ آپ کے علاقہ میں توسیع زراعت کے کارکن بھی جڑی بوٹیوں کی شناخت میں آپ کی مدد کر سکتے ہیں۔

۲۔ جڑی بوٹیوں سے پاک گندم کا بیج استعمال کریں۔ اگر آپ اپنا بیج استعمال کرتے ہیں تو بجائی سے پہلے اسے صاف کر لیں۔ اگر آپ بیج خرید کر استعمال کرتے ہیں تو دیکھ لیں کہ یہ جڑی بوٹیوں کے بیجوں سے پاک ہو۔

خلاصہ گندم نمبرہ

- ۱۔ جڑی بوٹیاں گندم کی پیداوار میں تشویشناک حد تک کمی کر سکتی ہیں۔
- ۲۔ زیادہ نقصان وہ جڑی بوٹیوں کے متعلق زمیندار کو علم ہونا چاہیے۔
- ۳۔ جڑی بوٹیاں گندم کے لئے ضروری زمینی نمی اور خوراک چوری کر لیتی ہیں۔
- ۴۔ جڑی بوٹیاں سوج کی روشنی اور مگر کے لئے گندم کے ساتھ مقابلہ کرتی ہیں۔
- ۵۔ جڑی بوٹیاں کئی کیڑے مکوڑوں اور بیماریوں کا منبع بھی بنتی ہیں۔
- ۶۔ جڑی بوٹیوں کو زیادہ عرصہ کے لئے آسانی سے تلف کیا جاسکتا ہے۔
- ۷۔ کیماٹی مرکب (جڑی بوٹیوں کو مارنے والی دوائی) کے ذریعہ بھی جڑی بوٹیوں کو مؤثر طریقہ پر تلف کیا جاسکتا ہے۔ بشرطیکہ دوائی کو صحیح طور پر استعمال کیا گیا ہو۔

گندم کا ایک اچھا کھیت جڑی بوٹیوں سے پاک۔ ہوتا ہے۔ جڑی بوٹیوں کو جب وہ چھوٹی ہیں تلف کرنا آسان ہے۔



جڑی بوٹیاں نقصان کیسے کرتی ہیں؟

برائے پودے کو جہاں اس کی ضرورت نہ ہو جڑی بوٹی سے تعبیر کیا جاسکتا ہے۔ جڑی بوٹیاں جگہ، نمی اور سوج کی روشنی کی خاطر مقدار چوری کر کے زمیندار کے لئے پیداوار میں کمی کا سبب بنتی ہیں۔ جڑی بوٹیاں آفاذ ہی سے اپنی جڑیں زمین میں بہت گہرائی تک پھیلا دیتی ہیں۔ اس طرح یہ جڑیں زمینی نمی اور خوراک حاصل کرنے میں جڑی بوٹیوں کی مدد کار ثابت ہوتی ہیں۔ گندم کی فصل کے شروع میں اور جھاڑا مارتے وقت جڑی بوٹیوں کا اس طرح خوراک حاصل کرنے کا مقابلہ قابل درگزر نہیں ہے۔

جڑی بوٹیاں کئی بیماریوں اور کیڑے مکوڑوں کا منبع بھی بنتی ہیں۔ جڑی بوٹیوں کا بیج خوراک

۱۔ کیمیائی ادویات :-

جزی بوٹیوں کو تلف کرنے والی ادویات ایک کیمیائی مرکب ہیں۔ جو باسانی اور منتر طسہ سے پر جزی بوٹیوں کی روک تھام کرتی ہیں۔ زمیندار کو ان ادویات کے بارے میں علم ہونا چاہیے کہ ان کو صحیح طریقہ کہاں، کب اور کس فصل پر استعمال کرنا ہے۔ نئی اور بہتر ادویات کثرت سے بازار میں آرہی ہیں۔

۱۔ ادویات کے فوائد، کم وقت میں زائد رقبہ پر استعمال کی جا سکتی ہیں۔

ادویات معتدب شدہ ہیں۔

یعنی ان سے خاص خاص

جزی بوٹیوں کی روک تھام

ہو سکتی ہے۔ مثال کے طور پر

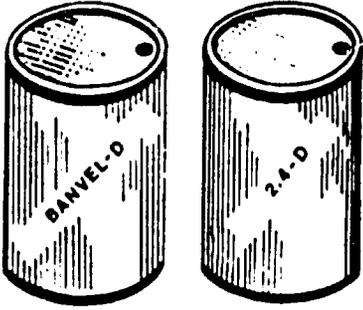
ٹو۔ غور۔ ڈی ۵۱-۴-۲۔

گندم میں موجود چوڑے پتوں

والی جزی بوٹیوں کی تلفی کرتی

ہے۔ چھوٹی چھوٹی جزی بوٹیوں

کو ادویات کے ذریعہ تلف



کرنے سے برداشت کے وقت شگفتا کم ہو جاتی ہیں۔ اس طرح فصل کی نشوونما

اور اس کے پکنے میں یکسانیت پیدا ہوتی ہے۔

۲۔ ادویات کے استعمال کے لئے ہدایات

۱۔ جس خاص جزی بوٹی کی

آپ روک تھام کرنا چاہتے ہیں

اسے تلف کرنے والی دوائی کا

انتخاب کریں۔

۲۔ دوائی کو اس وقت استعمال

کریں۔ جب وہ جزی بوٹیوں

کے لئے تو بہتک ثابت ہو چکیں

اصل فصل دگندم، کو کوئی

نقصان نہ دے۔ جزی بوٹیوں کو آٹھ زہی میں تلف کرنا آسان ہے۔

۳۔ دوائی کی بالکل صحیح مقدار استعمال کریں۔ نہ زیادہ، نہ کم۔ آپ کا رقبہ ایکڑ یا کنہ لڑائی

آپ کے علم میں ہونا کہ آپ یہ معلوم کر سکیں کہ آپ کو کس قدر دوائی استعمال کرنی ہے۔

۴۔ دوائی کا سپرے (چھڑکاؤ) لازمی طور پر یکساں ہونا چاہیے۔

۵۔ صرف اُس رقبہ پر سپرے کریں جہاں سے جزی بوٹیوں کو تلف کرنا ہے۔

۶۔ سپرے سے پہلے ہوائی سمت اور درجہ حرارت کا خیال رکھیں۔ درجہ حرارت ۶ سے ۱۰ ڈگری

سنٹی گریڈ ہونا چاہیے۔ جہاں کہ اس طرح نہ ہو کہ دوائی اُڑ کر اُس طرف چلی جائے جہاں آپ

سپرے کرنا نہیں چاہتے۔ اگر بارش ہو رہی ہو تو سپرے مت کریں کیونکہ اس طسہ ج

پودوں سے دوائی ٹوٹل جائے گی۔

ادویات کے ذریعہ جزی بوٹیوں کی روک تھام کے سلسلہ میں، یہ معلومات آپ اپنے علاقہ میں متعین

توسیع زراعت کے کارکن سے بھی حاصل کر سکتے ہیں۔

۳۔ اپنی فصل کو جزی بوٹیوں سے متاثر نہ کرنے کے لئے تیار کریں۔ گندم کی ایک ایسی تندرست فصل جسے مناسب فاصلہ پر لگا یا گیا ہر اور صحیح مقدار میں کھاد استعمال کی گئی ہو۔ بہت اچھا طریقہ پر جزی بوٹیوں سے متاثر نہ ہو سکتی ہے۔

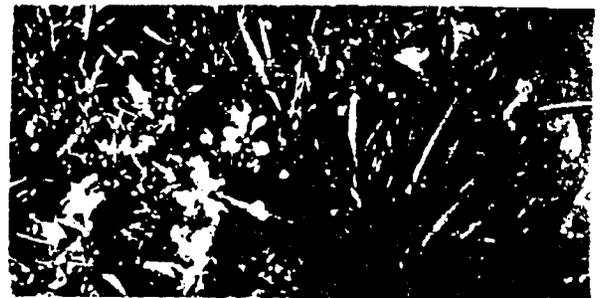
۴۔ فصل کی بجائی سے پہلے جزی بوٹیوں کی تلفی کریں۔ اگر ممکن ہو سکے تو جزی بوٹیوں کو آگے میں اور پھر بجائی سے پہلے ایک ہلال چلا کر انہیں تلف کریں۔ باسانی علاقوں میں خشک موسم کے وقت بجائی سے پہلے بل جیلانا ضروری نہیں ہے۔ بجلا کے بعد زمین کی خشک اور کھری

۵۔ اگر ممکن ہو سکے تو اپنے کھیت میں ہر سال مختلف فصل کاشت کریں۔ اسے فصلوں کا تھیل یا ہیرا پھیر کہتے ہیں۔ مثال کے طور پر گندم کے بعد چارے وغیرہ کی فصل کاشت کریں۔ اس سے بھی جزی بوٹیوں کی روک تھام ہوگی۔

۶۔ جزی بوٹیوں کو تلف کریں۔ جزی بوٹیوں کی تلفی ہتھوں سے یا کسی میکانیکی آلہ سے کریں۔ چھوٹی چھوٹی جزی بوٹیوں کو دستی زہری آلات سے منتر طریقہ سے تلف کیا جا سکتا ہے۔ کھریے ایک بہتر زہری آلہ ہے۔ آپ ہتھوں سے ہی جزی بوٹیوں کو کھینچ سکتے ہیں۔



۷۔ جزی بوٹیوں کو آغا زہی سے تلف کریں۔ چھوٹی جزی بوٹیوں کو بڑی جزی بوٹیوں کی نسبت باسانی تلف کیا جا سکتا ہے۔ شروع ہی میں جزی بوٹیوں کی تلفی سے فصل پیداوار میں کمی ہونے کے نقصان سے بچ جاتی ہے۔ اگر جزی بوٹیاں بڑی ہو گئی ہیں تو ظاہر ہے وہ زمینی نمی اور مرگ حاصل کر چکی ہیں۔ مزید ان کو تلف کرنا مشکل ہے۔



۸۔ جزی بوٹیوں کے بیج کی روک تھام کریں۔ کبھی کبھی فصل کے بیج میں جزی بوٹیوں کے بیج نہ ہونے دیں۔ اس طرح آئندہ سال کھیت میں بہت زیادہ جزی بوٹیاں پیدا ہو جائیں گی۔ اگر جزی بوٹیاں بیج نہیں بنائیں گی تو آئندہ فصل سے مقابلہ کے لئے جزی بوٹیوں کی مقدار خاص کم ہو جائے گی۔

بارانی زرعی ترقیاتی منصوبہ

شمال مغربی سرحدی صوبہ



گندم کی بیماریاں اور ان کا انسداد

کسانوں کے لئے عام معلوماتی پریچ

N.W.F.P

گندم کی کنگلی

پاکستان میں کنگلی کی جو اقسام گندم کو نقصان پہنچاتی ہیں وہ کالی کنگلی (سنے کی کنگلی) ریجنڈی (پسنے کی کنگلی) اور پہلی کنگلی (دھاری دار کنگلی) ہیں۔ پھپھوندی کے جراثیم (SPORES) جو گندم کے پودے کو نقصان پہنچاتے ہیں اتنے چھوٹے اور بکے ہوتے ہیں کہ وہ ہوا کے ساتھ کسی سوسکومیٹر تک بھی جا سکتے ہیں۔ پانی، کیڑے اور جانور بھی ان جراثیموں کو اپنے ساتھ لے جاتے ہیں۔ انسان بھی پودے سے ایچ اور فارم مشینری کو ایک جگہ سے دوسری جگہ لے جانے وقت ان جراثیموں کو اپنے ساتھ لے جاتا ہے۔



گندم کے فصل پر کنگلی

موسمی حالات ان بیماریوں پر گہرا اثر کرتے ہیں۔ گرم مرطوب موسم ان کی نشوونما کے لئے بہت موزوں ہے۔ گرم خشک موسم میں اس کا اثر قدرے کم ہو جاتا ہے۔ تاہم اگر پودے پہلے ہی کنگلی سے متاثر ہوں تو گرم خشک موسم اس بیماری کے نقصان میں اضافہ کرتا ہے۔

خلاصہ :- گندم نمبر ۶

- ۱۔ گندم اور دوسری ٹٹے دار فصلات کی بیماریاں پیداوار میں کمی کا باعث بنتی ہیں۔
- ۲۔ گندم کی عام بیماریاں کنگلی، کانگیاری اور مٹی ہیں۔
- ۳۔ کنگلی کی تین اقسام ہیں، بخوری اور کالی کنگلی عام طور پر اس علاقہ میں پائی جاتی ہیں۔
- ۴۔ کنگلی کے جراثیم (SPORES) ہوا کے ذریعہ سینکڑوں کلومیٹر فاصلے تک بھی گندم کی فصل کو متاثر کرتے ہیں۔
- ۵۔ کنگلی، کانگیاری اور مٹی جیسی بیماریوں کا بہترین تدارک یہ ہے کہ ایسی اقسام کاشت کی جائیں جن کو یہ بیماریاں متاثر نہ کر سکیں۔
- ۶۔ زمین کی بہتر تیاری اور تندہ دست فصل پودوں کو بیماری کا مقابلہ کرنے کے قابل بناتی ہے۔
- ۷۔ بیج کو روٹانی لگا کر کاشت کرنے سے کافی حد تک ان بیماریوں کا تدارک کیا جا سکتا ہے۔

پاکستان میں گندم اور دوسری فصلوں پر کئی بیماریاں حملہ کرتی ہیں اور ان کی پیداوار میں کمی کا باعث بنتی ہیں۔ عام بیماریاں کنگلی، کانگیاری اور مٹی ہیں۔ گندم کی بیماریاں عام طور پر پھپھوندی سے پیدا ہوتی ہیں۔ اگرچہ کچھ بیماریاں بکٹیریا (BACTERIA) یا وائرس (VIRUS) سے بھی پیدا ہوتی ہیں۔ پھپھوندی جس سے یہ بیماریاں پیدا ہوتی ہیں ایک بہت ہی چھوٹا سا خوردبین سے دیکھا جانے والا کیڑا ہوتا ہے جس کو جراثیم (SPORA) کہتے ہیں۔ گندم میں جراثیم پودے سے یازج میں اپنا گھر بنالیتا ہے۔ اگر اس جراثیم کو موافق درجہ حرارت اور نمی میسر آ جائے تو یہ پودے پر پرورش پانے لگتا ہے پودے کو نقصان پہنچاتا ہے۔ جو جاتا ہے اور پودے پر بیماری کی علامات ظاہر ہونی شروع ہو جاتی ہیں۔

گندم میں کنگلی سے متاثرہ حصے جراثیموں سے ڈھک جاتا ہے جو کہ دیکھنے میں پودے کا معلوم ہوتے ہیں۔ کنگلی سے متاثرہ حصے کنگلی کے رنگ کا پیلا، بھورا یا کالا ہوتا ہے۔ اگر گندم کا پودا تندہ سے تو کنگلی سے تو کنگلی کے جراثیم کو اپنی رگوں پر پھینکنے سے روک لیں اگر پودا کمزور ہے اور بیماری سے اڑ پڑ رہے تو اسے بیماری لگ جائے گی اور آخر کار وہ مر جائے گا۔



گندم کے صحت مند فصل

گندم کی منی اور کاٹھیاری

گندم کی منی اور کاٹھیاری بھی پھپھوندی کی بیماریاں ہیں۔ ان کی وجہ سے گندم کے پستے ضائع ہو جاتے ہیں اور ان میں دانہ بننے کی جگہ کالے پھپھوندی کے جسد ٹوٹے بن جاتے ہیں۔



دونوں قسم کی بیماریوں میں اور کٹھیاری کا بہتر علاج یہ ہے کہ ان بیماریوں سے متاثر نہ ہونے والی اقسام کا کاشت کی جائیں یا پھر بیماری سے پاک بیج کاشت کیا جائے۔ سید زینت منٹ بس لاڈر پر چھ نمبر ۲ میں کیا جا چکا ہے گندم کی ان بیماریوں کو روکنے میں فائدہ مند ثابت ہو گا۔ اپنے حلقہ کے ذریعہ تو سیدی کارکن سے ان کریج کو پھپھوندی مار دو لگانے کے بارے میں مشورہ کریں۔

پاکستان میں بیج کی منی اکثر پیداوار میں خاصی کمی کا باعث بنتی ہے اس کا بہتر علاج یہ ہے کہ اس بیماری سے متاثر نہ ہونے والی اقسام کاشت کی جائیں۔

دیگر بیماریاں

جڑ کا نکیر، تنے کی سڑناؤں اور دیگر بیماریاں بھی گندم کی فصل کو نقصان پہنچاتی ہیں لیکن عام طور پر کٹھیاری سے بہت کم نقصان کرتی ہیں۔

ان دیگر بیماریوں کا بہتر علاج بیماری سے متاثر نہ ہونے والی اقسام کی کاشت ہے یعنی وقت پھپھوندی مار دو لگانے میں فائدہ مند ثابت ہوتی ہیں۔ پھپھوندی مار دو لگانے کے استعمال کے سلسلہ میں اپنے حلقہ کے ذریعہ تو سیدی کارکن سے ملیں اور اس سے ان دو لگانے کے بارے میں نئی سفارشات ماس کریں کیونکہ یہ سال بے سال بدلتی رہتی ہیں۔ وہ آپ کو نئی سفارشات کردہ ترقی مادہ بیماریوں سے متاثر نہ ہونے والی اقسام کی فہرست بھی مہیا کر سکے گا۔

گندم کی کاہترین تدارک یہ ہے کہ ایسی اقسام کاشت کی جائیں جن کو یہ بیماری متاثر نہ کر سکے۔ ایسی اقسام بالکل کاشت نہ کریں جو اس بیماری سے متاثر ہو سکتی ہوں کیونکہ جڑوں سے جو گندم پر بیماری کا باعث بنتے ہیں۔ کچھ وقت گزرنے پر ایسی اقسام کو بھی متاثر کرنے لگتے ہیں جو پہلے ان سے متاثر نہیں ہوتی تھیں۔ ذریعہ ماہرین متاثر اس کو کشتیں یہ مندرجہ ہیں کہ گندم کی ایسی نئی اقسام پیدا کر سکیں جو موجودہ کٹھیاری کی اقسام سے متاثر نہ ہوں۔

ذریعہ ماہرین اب پودوں میں ایسی خاص خصوصیت پیدا کرنے کے قابل ہو گئے ہیں جس سے پودا گندم کی کسی خاص قسم سے متاثر نہ ہو سکے۔ مثلاً گندم کی نئی قسم کٹھیاری کی کسی خاص ایک قسم سے متاثر نہیں ہوتی لیکن گندم کی اقسام میں اکثر تبدیل ہوتی رہتی ہیں اس لئے ذریعہ ماہرین کو اس پیمانے کا مقابلہ کرنے کے لئے متاثر کام کرتے رہنا چاہیے۔

بعض حالات میں پھپھوندی مار دو لگانے کی تدارک کے لئے استعمال کی جا سکتی ہیں لیکن پھپھوندی مار دو لگانے کو مخصوص وقت میں زیادہ سے زیادہ وقت پر استعمال کرنے کے لئے نرس آلات کی ضرورت ہوتی ہے۔ ایسے آلات بہت قیمتی ہیں اور یہ طریقہ صرف اسی جگہ تک ہی جہاں رقبہ بہت وسیع ہو اور ان دو لگانے کے استعمال کو احتیاط سے سرانجام دیا جاسکے۔ وقت کاشت بھی گندم کی فصل پر گندم کے حملہ کو متاثر کرتا ہے۔ اگلی کاشت کی ہونے سے فصل بیماری سے محفوظ رہتی ہے جبکہ پھپھوندی کاشت کی ہونے سے فصل کی کٹھیاری اور پتے کی پھپھوندی سے کافی متاثر ہوتی ہے۔ دھاری دار کٹھیاری پھپھوندی کاشت کی ہونے سے فصل کو کم نقصان پہنچاتی ہے کیونکہ گرم موسم میں بیماری کا حملہ کم ہو جاتا ہے۔

زمین کی اچھی تیاری اور پودوں کی بہتر بڑھوتری سے پودے جلد بڑھتے ہیں اور بیماری کا بہتر طور پر مقابلہ کرنے کے قابل ہو جاتے ہیں یا اس سے محفوظ رہ سکتے ہیں۔ جڑی بوٹیوں کی



گندم کے سٹلائٹ

تعمیر کرنے سے بھی پودے صحت مند رہتے ہیں اور بیماری کا اچھی طرح مقابلہ کر سکتے ہیں۔ بیماری روکنے کا ایک طریقہ فصلوں کا ہیر پھیر بھی ہے یعنی ہر سال کھیت میں بدل کر فصل کاشت کریں۔ اس طرح آپ ایسے کھیت میں بھی گندم کاشت کر سکیں گے جس میں بیماری کے جراثیم موجود نہیں ہوں گے۔ اگر فصلوں کے ہیر پھیر سے ممکن ہو سکے تو گندم کو ایسی زمین میں کاشت کریں جس میں اسے پچھلے چند سال سے کاشت نہ کیا گیا ہو۔

بیماریوں کو اپنی فصل تباہ نہ کرنے دیں

آپ اگر کھادوں سے صحیح طور پر فائدہ حاصل کرنا چاہتے ہیں تو آپ کو زمین کی تیاری، جڑی پھوس کی تقنی اور زمین کے کٹاؤ کی طرف ہی توجہ دینی چاہیے۔

۲۔ کیمیائی کھادیں

پودے کی پختوری اور نشوونما کے لئے کم از کم ۳ (تین) غذائی عناصر کی ضرورت ہوتی ہے۔ تین غذائی عناصر نائٹروجن، فاسفورس اور پوٹاش کی زیادہ مقدار پودوں کو درکار ہوتی ہے۔ ان تین عناصر کو عموماً N-K-P (پوٹاش - فاسفورس - نائٹروجن) سے ظاہر کیا جاتا ہے۔ ان کو عام طور پر کیمیائی کھادیں کہا جاتا ہے۔

تمام کیمیائی کھاد کی پوری پیمانوں میں موجود عناصر کا وزن دماغ ہوتا ہے۔ مثال کے طور پر ڈی اے پی (D.A.P) کی پوری پرائس میں موجود عناصر کو ۰-۲۶-۱۸ کی صورت میں ظاہر کیا گیا ہے۔ اس کا مطلب ۱۸ فیصد نائٹروجن، ۲۶ فیصد فاسفورس اور صفر فیصد پوٹاش ہے۔



ڈی اے پی	یوریا	نائٹرو فاس
(D.A.P)	(UREA)	NITROPHOS
۱۸-۲۶-۰	۴۶-۰-۰	۲۳-۲۳-۰

یعنی ۵۰ کلوگرام وزنی ڈی اے پی کی ایک بوری میں ۹ کلوگرام نائٹروجن، ۲۳ کلوگرام فاسفورس اور صفر کلوگرام پوٹاش ہوتی ہے۔ غذائی عناصر کی یہ مقدار بوری کے وزنی کو ضامیر کی موجودگی سے ضرب دینے سے حاصل ہوتی ہے۔

مثلاً ۵۰ کلوگرام x ۱۸ فیصد = ۹ کلوگرام نائٹروجن
۵۰ کلوگرام x ۲۶ فیصد = ۱۳ کلوگرام فاسفورس

آپ دیکھ سکتے ہیں کہ ۵۰ کلوگرام وزنی ڈی اے پی کی بوری میں ۲۳+۹ یعنی ۳۲ کلوگرام غذائی عناصر ہیں۔ اسی ۳۲ کلوگرام غیر ضروری مادہ ہے۔ غیر ضروری مادہ کھاد کی حالت بہتر ناتا ہے۔ اور ڈھیلے بننے سے پھانسیا ہے۔ یہ غیر ضروری مادہ عام طور پر پوسے ہوئے مٹی کے جھٹے یا کوکڑے چھلکے ہوتے ہیں۔ غیر ضروری مادہ فصلوں کے لئے بے کار ہے۔ دیکھا اس کی وجہ سے کھاد خریدنے پر بار بار داری اور سڑک کا خرچہ بڑھ جاتا ہے۔ یہی وجہ ہے کہ زیادہ فی صد غذائی عناصر والی کھاد زیادہ آمدنی دیتی ہے۔

حسب ضرورت کھاد کی مقدار معلوم کرنا

اگر آپ کے حلقہ کا فیڈ اسٹنٹ آپ کی گندم کے لئے ۳۲ کلوگرام نائٹروجن اور ۲۳

کلوگرام فاسفورس فی ایکڑ کی سفارش کرے تو آپ بڑی آسانی سے معلوم کر سکتے ہیں کہ آپ کو کتنی ڈی اے پی اور کتنی بوری لینی کی ضرورت ہے۔ پہلے آپ معلوم کریں کہ ۳۲ کلوگرام فاسفورس کے لئے ڈی اے پی کی کتنی مقدار درکار ہوگی۔ ڈی اے پی کے لئے فارمولا ۱۸-۲۶-۰ ہے ۲۶ کو ۳۲ سے تقسیم کیا تو ۱.۲۳ آئے گا۔ ۱.۲۳ سے ضرب دینے پر جواب ۵۰ کلوگرام یا ایک بوری ڈی اے پی آئے گا۔ یہ مقدار ۳۲ کلوگرام فاسفورس کی ضرورت پوری کرنے کے لئے درکار ہوگی۔ ۵۰ کلوگرام کو ۱۰ فیصد سے ضرب دینے سے آپ معلوم کر سکیں گے کہ ۵۰ کلوگرام یا ایک بوری ڈی اے پی ۹ کلوگرام نائٹروجن بنیاد کرتی ہے۔ آپ کو ہیکٹو نائٹروجن کی ضرورت ہے۔ اس لئے آپ کو مزید ۲۷ کلوگرام نائٹروجن کی ضرورت ہوگی۔ یوریا کا فارمولا ۰-۴۶-۰ ہے اس لئے ۲۷ کو ۴۶ سے تقسیم کیا تو تقریباً ۰.۵۸ آئے گا۔ ۰.۵۸ کو ۱۰۰ سے ضرب دینے سے معلوم ہو جائے گا کہ آپ کو ۵۸ کلوگرام یا تقریباً ایک بوری یوریا کی ضرورت ہے۔ اس طرح آپ کی نائٹروجن اور فاسفورس کی مطلوبہ مقداریں نکل آئیں گی۔

نمبر شمار	کھاد کا نام	غذائی عناصر فی صد	
		نائٹروجن	فاسفورس
۱۔	یوریا	۴۶	-
۲۔	ایمریم سفیٹ	۲۰.۵	-
۳۔	کیلیم ایمریم نائٹریٹ	۲۳	-
۴۔	ایمریم سفیٹ نائٹریٹ	۲۶	-
۵۔	ڈائی ایمریم سفیٹ (ڈی اے پی)	۱۸	۲۶
۶۔	نائٹرو فاس (این۔ پی)	۲۳	۲۳
۷۔	سینگل سپر فاسفیٹ (ایس۔ پی)	-	۱۸
۸۔	ٹریپل سپر فاسفیٹ (ٹی اے پی)	-	۴۶
۹۔	پوٹاشیم سفیٹ	-	۵۰

کھاد کیسے استعمال کرنی چاہیے

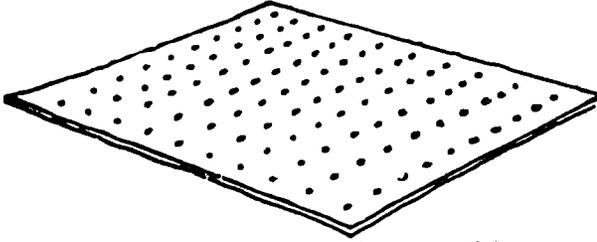
آپ جو کھاد استعمال کرتے ہیں اس کو مٹرنے کے لئے آگے نہیں لے کر ہی طرح ملانا چاہیے۔ اس کا مطلب ہے آپ کو آگے نہیں لے کر چلانے سے قبل استعمال کرنا چاہیے۔ کیمیائی کھاد کو کیت میں آخری بل چلانے سے ذرا پہلے استعمال کریں۔ یوریا کیت میں ٹالنے کے فوراً بعد مٹی میں ملا دیا جانا چاہیے۔ اس کے علاوہ آپ کھاد گندم کی فصل کی پختوری کے دوران بھی استعمال کر سکتے ہیں۔ یوریا میں ۶۶ فیصد نائٹروجن ہوتی ہے۔ اگر مناسب طریقہ سے استعمال کیا جائے تو فصل کی پختوری پختہ خواہ اثر کرتا ہے۔ آپ اپنے حلقہ کے زرعی ترمیمی کارکن سے نہیں لود معلوم کریں کہ گندم کے لئے یوریا کا کب اور کیسے استعمال کرنا ہے۔



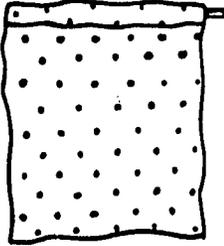
گندم نمبر ۹

خلاصہ

- ۱۔ اچھی میٹری فصل حاصل کرنے کے لئے یہ جاننا ضروری ہے کہ بیج کی روئیدگی کی صلاحیت کی مقدار کیا ہے۔
- ۲۔ بظاہر دیکھ کر آپ نہیں کہہ سکتے کہ بیج اگے یا نہیں۔
- ۳۔ بیجوں کی نشوونما کی استعداد (روئیدگی کی صلاحیت) کوئی طریقوں سے جانچی جاسکتی ہے۔
- ۴۔ کمزور روئیدگی کے متناسب ہو سکتے ہیں مثلاً بیج کا پڑنا ہونا، بیماری، طمانہ، گرم ضرورہ ہونا یا گودام کے اور دیگر حالات سے متاثر ہونا۔
- ۵۔ روئیدگی کی جانچ آپ کو بتا سکتی ہے کہ آپ کو بیج بونے کے لئے مناسب ہے یا نہیں۔
- ۶۔ روئیدگی کی جانچ آپ کو بونے کے لئے صحیح مقدار کا اندازہ لگانے میں مدد دے گی۔
- ۷۔ روئیدگی کی جانچ پرند کر کے عروج آتا ہے اور نہ ہی یہ عمل مشکل ہے۔



- ۱۔ اب میسا کو تصویر میں بتایا گیا ہے۔ بیج کے ان ۱۰۰ ٹاپوں کو کپڑے کے دونوں طرف دس دس کی قطاروں میں مساوی طور پر تقسیم کر دیں۔ ہر بیج کے ارد گرد ایک ایک انچ (۲.۵ سینٹی میٹر) کا ماسیہ چھوڑ دیں۔
- ۲۔ ایک اور کپڑا کر کے بیجوں کے اوپر احتیاط سے ڈال دیں۔
- ۳۔ جیسا کہ اس تصویر میں بتایا گیا ہے کپڑے کے کنارے کے ساتھ ایک ٹی سی چھڑی رکھ دیں۔



- ۴۔ کپڑے کے کنارے کو چھڑی کے اوپر ڈال کر کپڑے اور چھڑی کو احتیاط سے اٹھائیں۔ اس طرح بیٹھ دیں کہ بیج اپنی جگہ سے نہ ہلنے پائیں۔
- ۵۔ کپڑے اور چھڑی کو بجا رکھنے کے لئے اس کے دونوں سروں کو دھماگے یا بڑے پتے سے باندھ دیں۔



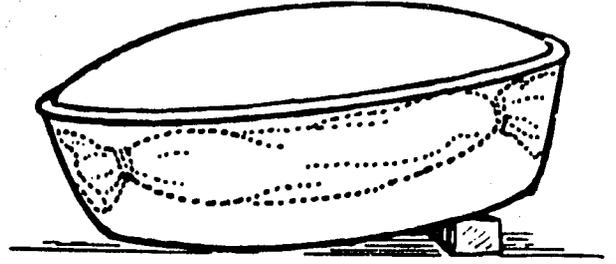
- ۸۔ اب کانڈ کے ایک پُرزے پر زم نسل سے فصل لایا اس کی قسم کا نام۔ بیج کے انوں کی تعداد اور تاریخ لکھ دیں اور اس کانڈ کے پُرزے کو کسی سرے پر بند من گنچے سر کا دیں۔
- ۹۔ اب اس کل شدہ ریگڈال پر بارانی چھڑکتے جائیں حتیٰ کہ یہ مرطوب ہو جائے اور پھر اسے کسی ٹوکھن والے پیالے میں یا پلاسٹک کی تھیل میں رکھ کر گھر میں لائسن کے اوپر کسی ایسی جگہ رکھ دیں۔

گندم یا کوئی جیسے بڑے بیجوں کی روئیدگی کی جانچ کے لئے ریگڈال یا ریگسے سیاہی چھڑیں کا طریقہ اچھا رہتا ہے۔ گھاس کی طرح کے چھوٹے بیجوں کے لئے آپ ایک چھوٹی بیٹھ بھی استعمال کر سکتے ہیں۔

۱۔ ریگڈال طریقہ

- ۱۔ ریگڈال طریقہ اختیار کرتے وقت تمام ذخیرے میں سے انتخاب کے بغیر، اٹلنے بیج کے لئے لیں۔ یہ ضرور بوری یا ڈبے کے کسی چھوٹے سے ایک ہی حصے سے سارے کا سا رازہ لیا جائے۔ اسی طرح اچھی شکل والے دانے بھی منتخب نہ کیجئے۔ یہ ضرور ایسا ہونا چاہئے جو تمام ذخیرے کی نمائندگی کرے اور اس میں اچھے اور خراب بیج جملے بیج ہوں۔
- ۲۔ تقریباً ۱۲ مربع انچ (۳۰ سینٹی میٹر) کپڑے کے دو عدد کپڑے لیں۔ انہیں پانی میں تر کر کے فاضل پانی چھوڑ ڈالیں۔ ان میں سے ایک کپڑے کو کسی چھڑی سے پڑھال دیں اور اس کے اوپر دوسرا کپڑا پھیلا دیں۔

گرم جگر رکھیں جس کا درجہ حرارت ۲۰ سے ۲۵ درجہ سینٹی گریڈ تک ہو۔



۱۰۔ نو روز بعد آگے ہونے والے بیج گن لیجئے جن کی کوئٹیں ایک انچ سے زیادہ لمبی ہوں اور جن کی جسم میں صحت مند دکھائی دیتی ہوں۔ بس یہ تعداد آپ کے بیج کی روئیدگی کی فی صد شرح ہوگی۔
اگر آپ کے بیج کی روئیدگی کی شرح ۹۰ فیصد سے کم ہو تو اسے مت بڑیے کیونکہ اس سے کمزور فصل حاصل ہوگی۔

اگر روئیدگی کی شرح سو فیصد سے بہت کم ہو تو اس حالت میں آپ کو بونے کے لئے بیج کی شرح میں اسی تناسب سے اضافہ کرنا پڑے گا۔ بونے کے لئے بیج کی مطلوب شرح کا تخمینہ لگانے کے لئے ذیل کا طریقہ اختیار کیجئے۔
فرض کیجئے آپ کے بیج کی روئیدگی ۸۵ فیصد ہے اور ایک ایکڑ قبضے کے لئے ایک من (۱۰۰ کلوگرام) بیج کی سفارش کی گئی ہے تو آپ کو $100 \times 85 = 8500$ گرام بیج ڈالنا ہوگا۔
۸۵۰۰ گرام کی یہ مقدار ایک ایکڑ قبضے کے لئے صحیح مقدار ہے۔

ج۔ ا۔ گیلے سیاہی چوس کا طریقہ

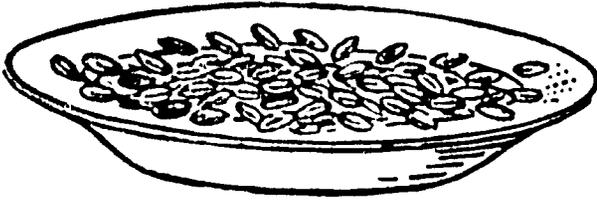
یہ طریقہ آندھریان شدہ ریگٹان طریقے سے متاثر ہونے والے فرق صرف یہ ہے کہ بیج کے ۱۰۰ ٹائپے دو سیاہی چوس کے یا کپڑے کے ٹکڑوں کے درمیان رکھ دئے جاتے ہیں اور انہیں کمرے کے درجہ حرارت میں ۹ روز تک گھلایا جاتا ہے۔ یہ سیاہی چوس یا کپڑے ایک فٹری میں بھی رکھے جاسکتے ہیں جسے مطلوب رکھنا ضروری ہے۔

ج۔ ب۔ پتالی یا پلیٹ کا طریقہ

اگرچہ یہ طریقہ بڑے بیجوں کے لئے بھی استعمال ہو سکتا ہے مگر عام طور پر اسے گھاس اور شفل لیسے چمڑے بیجوں کی جانچ کے لئے استعمال کیا جاتا ہے۔
۱۔ سب سے پہلے بیج کے جس ذخیرے کی جانچ کرنا ہو اس سے ۱۰۰ بیج نکالنے کے لئے تیار ہوں۔
سو بیجوں والے دو یا آس سے نائز ٹرینوں کے نتائج صرف ایک نمونے کے تجزیے سے زیادہ صحیح ثابت ہوتے ہیں۔
۲۔ جس پلیٹ کو ڈھکن کے طور پر استعمال کرنا ہو اس کے پینڈے پر مومی پمپل سے تھریڈ لپیٹ بیج کی قسم وغیرہ اور تاریخ لکھ دیں۔
۳۔ سیاہی چوس یا کپڑے پر گھلایا بیج والی پلیٹ میں رکھ دیں۔
۴۔ اب اس میں اتنا صاف پانی چھڑیں جو پینڈے کو لپیٹ میں لے لے کر خیال رکھ کر پانی

اتنا زیادہ ڈالا جائے جس پر بیج تیرتے پھریں۔

۵۔ اس گیلے کا ذخیرہ بیج کے ۱۰۰ دنوں کو سادی طور پر نکال دیں۔ ایسا کرتے وقت مزید پانی نہ ڈالیے کیونکہ اس سے بیج تیرتے ہوئے گردوں کی شکل اختیار کریں گے۔



۶۔ ڈھکنے کے طور پر استعمال ہونے والی پلیٹ کو کھلی پلیٹ کے اوپر اس طرح رکھ دیں کہ جوا کی آمد و رفت رکھنے نہ پائے۔



۷۔ اب ان پلیٹوں کو کسی ایسی گن اور محفوظ جگہ رکھ دیں جس کا درجہ حرارت ۲۰ سے ۲۵ درجہ سینٹی گریڈ ہو۔ پلیٹ کے اندر کا مذکور روئیدگی کی صحت کے دوران چھڑیل میں درج ہے۔
مطلوب رکھیں۔
۸۔ روئیدگی کی مدت کے اختتام پر ایسے بیجوں کو گن لیجئے جن کی کوئٹیں ۲ سینٹی میٹر یا اس سے نائز لمبی اور صحت مند ہوں اور جن کی جڑیں بھی اچھی ہوں۔

د۔ روئیدگی کے لئے درکار مدت

زیادہ تر پتلے اور شفل قسم کے چارے سے ۷ سے ۱۰ دن
زیادہ تر گھاس سے ۱۲ سے ۲۱ دن

۳۔ سفارشات

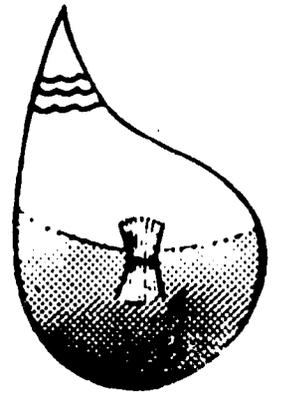
بونے سے قبل آپ کو اپنے بیج کی روئیدگی کی جانچ کر لینا چاہئے کیونکہ بعض اوقات بظاہر اچھے دکھائی دینے والے بیج بھی نہیں آگا کرتے۔ روئیدگی کی اوسط فیصد میں کمی کی وجہ گھاس کے غیر تسلی بخش حالات، بیج کی ساخت وغیرہ کی غیر موزوں نشوونما اور دیگر اسباب بھی ہو سکتے ہیں۔
بیج کو ایک مرتبہ نقصان پہنچ جائے تو اسے اصلی حالت میں نہیں لایا جاسکتا۔
روئیدگی کی جانچ بیج بونے سے بہت پہلے کر لینا چاہئے۔
بونے کے لئے ایسا بیج منتخب کریں جس کی روئیدگی کی شرح ۸۰ فیصد یا اس سے نائز ہونے والا گندم کٹی، جوار، بجرہ وغیرہ کے لئے بیج کو ترجیح دیجئے جس کی روئیدگی کی شرح ۹۰ فیصد تک یا اس سے بھی زیادہ ہو۔
اگر روئیدگی کی شرح ۸۰ فیصد سے کم کر ۹۰ فیصد سے اوپر ہو تو آپ کو روئیدگی کی کمی کا ازالہ کرنے کے لئے فی ایکڑ بیج کی شرح بڑھا دینی چاہئے۔
اگر روئیدگی کی شرح ۹۰ سے کم ہو تو ایسا بیج سوائے مٹی بوی کی حالت کے ہرگز نہ بڑھیں۔

بارانی زرعی ترقیاتی منصوبہ

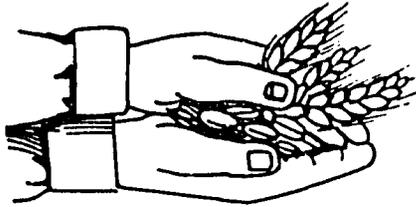
صوبہ پنجاب

گندم کی کٹائی اور گہائی صحیح طریقے سے کریں

کسانوں کے لئے عام معلوماتی پرچہ



لیتے ہیں۔ دانوں میں سے نئی بہت آہستہ آہستہ خشک ہوتی ہے۔ فصل کو اس مدت تک خشک ہونے دیں کہ دانوں میں ۱۵ سے ۲۰ فی صد تک نمی رہ جائے۔ دانوں میں نمی معلوم کرنے کے لئے گندم کے بٹے کو تھیل پر رکھ کر مٹسلیں۔ اگر بٹے میں



سے زیادہ تر دانے نکل آئیں تو گندم گہائی کے قابل ہے۔ نئی ترقی دادہ چھوٹے قد والی اقسام کو بڑے قد والی دیسی اقسام سے دو تین دن پہلے کاٹ لیں تاکہ رستور، میں سے دانے نہ گر جائیں۔

اگر پرندوں یا دیگر خراب موسمی حالات سے نقصان کا خطرہ ہو تو فصل جب پھیل جو جائے کاٹ لیں اور ان کو گڈیوں (بھریوں) کی صورت میں باندھ لیں ان گڈیوں (بھریوں) کو اس وقت تک اسی طرح پڑی رہنے دیں حتیٰ کہ ٹیکل طور پر خشک ہو جائیں۔

خلاصہ :- گندم نمبر ۱۰

- ۱۔ گندم کی کٹائی وقت پر کرنا بہت ضروری ہے۔
- ۲۔ فصل کی کٹائی کے لئے مزدوروں کا بعد واپس پھیلنے سے پہلے کر لیں تاکہ فصل جلدی برداشت کی جاسکے۔
- ۳۔ گندم سڑے میں پھول آنے کے تقریباً ۳۰ دن بعد پک جاتی ہے۔
- ۴۔ گندم میں ۱۵ سے ۲۰ فی صد تک نمی موجود ہوتی تو فصل کاٹ لیں۔
- ۵۔ سڑے کو ہاتھوں میں مٹسنے سے نمی کا اندازہ لگایا جاسکتا ہے۔
- ۶۔ نیچی جگہیں اور کیت کے ایسے حصے جہاں ابھی فصل پتی ہو چھوڑ دیں ان کی کٹائی بعد میں کیے پر کریں۔
- ۷۔ گہائی ہالوں سے یا مشین سے جیسی آپ کو سہولت ہو اس کے مطابق کریں۔
- ۸۔ جوڑی گہائی ختم ہو پیداوار کو جوڑی بوٹیوں، جھوسے، مٹی اور کیڑے کوڑوں سے صاف کر لیں۔
- ۹۔ پیداوار کو اچھی طرح خشک کر کے سٹور کریں۔
- ۱۰۔ پیداوار کو صاف ستھری بوٹیوں میں پرانی پیداوار سے علیحدہ رکھیں۔

آپ گندم کی جیتی بھی اچھی فصل پیدا کریں۔ مگر پورا فائدہ اسی وقت اٹھا سکتے ہیں جب پیداوار کو کٹائی اور گہائی کے وقت ضائع نہ ہونے دیں۔

الف: کٹائی

گندم کی صحیح وقت پر کٹائی بڑی اہمیت کی حامل ہے کیونکہ فصل پکنے کے وقت فصل کاگر جانا۔ دانوں کا گر جانا۔ بارش، نمی و دیگر موسمی حالات اس کی پیداوار پر بڑی طرح اثر انداز ہوتے ہیں۔ پنجاب کے بارانی علاقہ میں عام طور پر گندم کی کٹائی وسط اپریل سے پورا ماہ مئی جاری رہتی ہے اور شمال مغربی سرحدی صوبہ میں کٹائی ماہ مئی سے ماہ جون تک جاری رہتی ہے۔ فصل سڑے میں پھول آنے کے تقریباً ۳۰ دن بعد پک جاتی ہے۔ دانے بن جانے پر سڑے مکمل طور پر بھر جاتے ہیں۔ اس حالت کے بعد پتے۔ تنا اور سڑے سبز رنگ کی بجائے پہلی سبھری رنگت اختیار کر

گہائی کے بعد جسے کو اچھی طرح سٹور کرنا بھی بہت ضروری ہے تاکہ خراب موسمی حالات اور
جانوروں کے نقصان سے محفوظ رہ سکے صاف ستھرے سٹور جیسے تصویر میں
دکھائے گئے ہیں تجربے کو کافی حد تک استعمال کے لئے محفوظ رکھ سکتے ہیں۔

ج: غلہ کو سٹور کرنا

غلے کو اچھی طرح خشک کر کے سٹور کریں۔ ایک اچھا اور تجربہ کار زمیندار
دانے کو اپنے انگوٹھے سے دبا کر یا دانتوں سے توڑ کر بتا دیتا ہے کہ غلہ سٹور کرنے کے



حد تک خشک ہو گیا ہے اس کی
پہچان یہ ہے کہ دانہ کافی سخت ہوگا
مگر پتھر کی طرح سخت نہیں۔
کچھ لوگ دانوں کو سونگھ کر یا ان کو
بٹن کے ڈبے میں ڈال کر اور ہلکے
بتا دیتے ہیں کہ دانے خشک
ہو چکے ہیں۔ خشک دانوں کو جب
ڈبے میں ڈال کر ہلائیں تو وہ گینے
دانوں کی نسبت زیادہ تیز آواز

پیدا کرتے ہیں۔ غلہ اس وقت سٹور کرنے کے قابل ہوتا ہے جب دانے اچھی
طرح خشک ہوں اور اس میں سے مٹی، پتھر، چھنٹن، ٹوٹے ہوئے دانے اور گیزے
کوڑے وغیرہ اچھی طرح صاف کر دیئے گئے ہوں۔

غلہ سٹور رکھنے والے برتن اور کوسے اچھی طرح صاف ہونے چاہئیں۔ ان کو



غدر رکھنے سے پہلے فریگیکٹ کریں۔ اس
مقصد کے لئے میلا تھان ۵۰ فیصد
دوائی مائع یا حل پذیر پوڈر کی شکل میں
استعمال کی جاسکتی ہے۔ مائع دوائی کی
صورت میں ہر گیلن (۱۳ لیٹر) دوائی
۴ گیلن پانی میں ملائیں اور اگر پوڈر
والی دوائی استعمال کرنی ہے تو ہر ۴ پونڈ
(۱۳) اکو گرام دوائی ۴ گیلن پانی

میں حل کر کے اس محلول کو پریشر سپر سے سپرے کریں۔

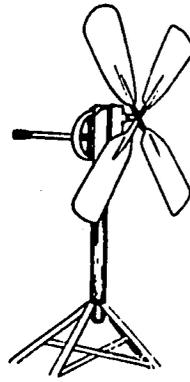
ہمیشہ نئے نئے گہڑانے غلے سے علیحدہ رکھیں اور پھرانے غلہ کو پہلے استعمال
میں لائیں۔

گندم کو سٹور کرنے کے بارے میں مزید معلومات کے لئے پڑھو
گندم نمبر ۱۱ پڑھیں۔

چونکہ گندم کی فصل میں مناسب وقت پر کٹائی کی بڑی اہمیت ہے اس لئے گندم
کی کٹائی کے لئے مناسب آدمیوں کا بندوبست پہلے ہی کر کے رکھیں تاکہ جو بھی ساڈا
حالات میسر آئیں ان سے فائدہ اٹھاتے ہوئے اس عمل کو جلد از جلد کم سے کم وقت میں
انجام دیا جاسکے۔ کیونکہ ممکن ہے آپ کو یہ عمل جاری رکھنے کا زیادہ وقت نہ مل سکے۔

ب: گہائی

بارانی علاقہ میں زمیندار عام طور پر گہائی جانوروں سے کرتے ہیں۔ لیکن اب شیٹوں
سے گہائی کا رواج بھی عام ہوتا جا رہا ہے۔ گہائی جس طریقے سے بھی چاہیں کریں مگر دانوں
کو ٹوٹنے سے بچائیں۔ ٹوٹے ہوئے دانے سٹور میں جلد خراب ہو جاتے ہیں۔



گہائی ختم ہونے پر پیداوار
کو جڑی بوٹیوں، جوڑے، مٹی اور
گیزے کوڑوں سے صاف کریں
تاکہ نقصان کم ہو۔ پیداوار کی
صفائی ہاتھ سے بھی کی جاتی ہے
اور مشینی آلات سے بھی جیسا
اس تصویر میں دکھایا گیا ہے۔



(د) گندم کو دوبارہ بڑے میں ڈھیں اور ملکان عمل طرہ بند کریں۔

گندم کا بورلیوں میں ذخیرہ کرنا

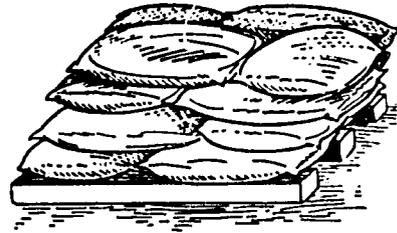
اگر آپ مندرجہ ذیل اقدام پر عمل کریں تو گندم کو کسی بیش طریقہ پر بورلیوں میں ذخیرہ کر سکتے ہیں۔

- ۱- بورلیوں میں برتنے سے پہلے گندم کو خوب اچھی طرح خشک کریں۔
- ۲- اپنے گودام کی دیواروں پر پانی سے محفوظ خاصیت رکھنے والا روغن کرہائیں۔ مثلاً پلاسٹک ایٹیشن یا ڈیٹیل پٹرول روغن کر کے اچھی طرح



- ۳- صفائی کریں۔ اور اسے تمام گرد و غبار سے پاک کریں۔ کیڑے کوڑوں کو جلا دیں۔ ہر کیڑے جلنے سے رہ جائیں انہیں باہر نکلانے کے لئے آگ کا ڈھواں استعمال کریں۔
- ۳- بورلیوں کی تہہ لگانے کے دوران پچیس گرام (۲۵ گرام) کیمیائی دوا میلاقیان (۲۰ فی صد) یا لائٹین (۵۰ فی صد) کا چھڑکاؤ دہرے کریں۔ دواؤں کا استعمال کرتے وقت حد درجہ احتیاط برتیں کیونکہ یہ زہریلی ہوتی ہیں۔ اگر آپ کو کیڑے مار دوا جیسا نہ ہو سکے تو خالی بورلیوں کو برائیم سے پاک کرنے کے لئے پہلے انہیں کھولتے ہوئے پانی میں ڈالیں اور پھر دھوپ میں خشک کریں۔

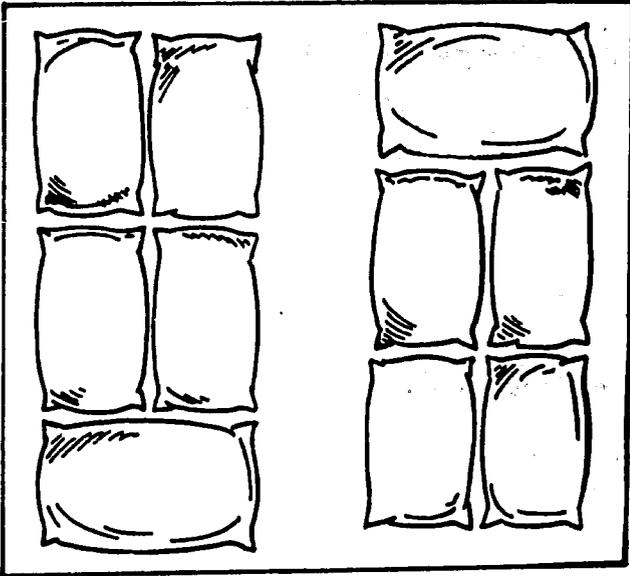
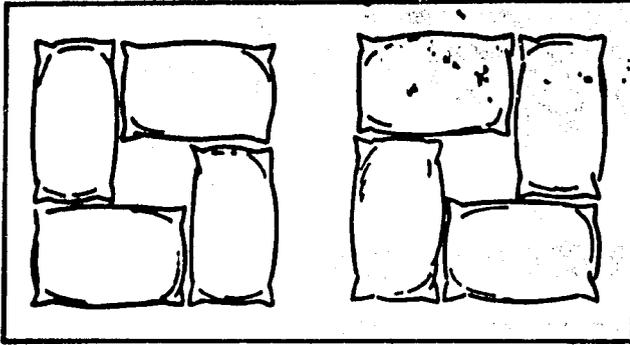
۴- کڑوی یا ایٹھوں سے بنا ہوا ایک ایسا پیٹ فارم (تھراپنٹین) جو کہ زمین کی سطح سے اٹھا ہوا ہو تاکہ گندم کے دانے



قرش سے نمی جذب نہ کر سکیں۔ جب آپ بورلیوں کی تہہ لگا چکیں تو کیڑے مار دوا ذخیرہ کی گئی بورلیوں کے نیچے پھیلا دیں تاکہ ریٹیلنے والے کیڑے کوڑوں

سے گندم محفوظ رہے۔ اس مقصد کے لئے عام طور پر میلاقیان کو ترجیح دی جاتی ہے۔ سطح زمین سے اٹھا ہوا پیٹ فارم بورلیوں کے ارد گرد ہوا کی آمد رفت میں معاون ثابت ہوگا اور انہیں خشک رکھے گا۔

۵- بورلیوں کی تہیں صفائی سے لگائیں اور ہوا کی آمد رفت کے لئے درمیان میں جگہ چھوڑیں۔ یہاں پر بورلیوں کی تہیں لگانے کے دوران بقیہ دکھائے گئے ہیں۔ ملاحظہ فرمائیں۔ دونوں طریقوں میں تہوں کی اندرونی جانب بورلیوں کے درمیان جگہ چھوڑی گئی ہے۔



۶- ہر دو ہفتے کے بعد گندم کے ذخیرہ کا معائنہ کریں کہ اس کے خراب ہونے کا اندیشہ تو نہیں۔ اپنا ہاتھ بوری کے اندر ڈالیں اور دیکھیں کہ گندم گرم تو نہیں ہے۔ پھپھوڑی کر سونگہ کر محسوس کریں اور سیاہ دانہ تلاش کریں۔ اگر ان میں سے کوئی بھی چیز موجود ہے تو تمام گندم کو باہر ڈھیر کریں اور اسے دوبارہ خشک کریں۔

۷- بورلیوں کے ارد گرد کی جگہ کو صاف ستھرا رکھیں تاکہ چڑیوں کو دباں خوراک یا پناہ گاہ نہ مل سکے۔ اگر وہاں چڑیوں کی موجودگی کا امکان نظر آئے تو چڑیے مار دھری گوبیسیا یا چڑی بھان کا استعمال مل میں لائیں۔

۸- گودام کے اندر کیڑے مار دوا (مثلاً میلاقیان یا پائیرتھرم (PYRETHRUM) کا چھڑکاؤ کریں تاکہ گرم کشی ہو جائے۔

۹- جب آپ استعمال کے لئے گندم باہر نکالیں تو اسے خوراک کے طور پر استعمال کرنے سے پہلے دھو لیں۔



مونگ پھلی کیلئے زمین کا انتخاب اور پیمائش

خلاصہ ۱-

- ۱۔ مونگ پھلی ریتی میرا یا لکی زمین میں بہت اچھی پیداوار دیتی ہے۔
- ۲۔ مونگ پھلی کی کاشت کے لئے ایسی زمین منتخب کریں جس میں پانی کا نکاس اچھا ہو۔
- ۳۔ زمین سیلابی یا زیادہ نمی والی نہیں ہونی چاہیے۔
- ۴۔ مونگ پھلی کے لئے ایسی زمین ہونی چاہیے جس میں مناسب مقدار میں خوراک کی اجسزا موجود ہوں۔
- ۵۔ یہ ضروری ہے کہ آپ اپنے کھیت کی پیمائش کریں تاکہ آپ کو معلوم ہو سکے کہ آپ نے کتنا بیج اور کھاد استعمال کرنا ہے۔
- ۶۔ کھیت کا رقبہ معلوم کرنا کون سا زیادہ مشکل نہیں۔
- ۷۔ کھیت کا رقبہ آسانی سے معلوم کیا جاسکتا ہے۔ اگر کھیت کی مربع شکل میں حدود بندی کرنی جائے۔
- ۸۔ کھیت کا رقبہ عام طور پر ایکڑ اور کنال میں ظاہر کیا جاتا ہے۔ گلاس کو پیکٹوں میں بھی ظاہر کیا جاسکتا ہے۔

اگر بارش کے موسم میں نمی، بھروسہ کر چھٹے اور ڈھیلے بن جائیں تو زمین بہت ہی آسانی سے آبی ہوگی۔ اس لئے مونگ پھلی کی کاشت کے لئے موزوں نہیں۔ اگر آپ مونگ پھلی کی کاشت کے لئے ہلکی یا ریتیل میرا زمین منتخب کریں تو ایسی زمین میں پھلیاں آسانی سے پرورش پائیں گی اور ان کی گریاں موٹی ہوں گی جس سے زیادہ پیداوار حاصل ہوگی۔

ایسی زمین سے پھلیاں برداشت کے وقت آسانی سے زمین میں سے نکل آتی ہیں اور بہت ہی کم پھلیاں زمین میں باقی رہتی ہیں۔

بارانی علاقوں میں زیادہ تر مناسب خوراک کی اجزا ہٹا کر لینے کے لئے زمین میں کھاد کا استعمال کیا جاتا ہے۔ کھاد کے استعمال کے لئے مونگ پھلی کا پرچہ فریم پڑھیں۔

مونگ پھلی کو پھلیاں اور گریاں بنانے کے لئے پانی کی ضرورت ہوتی ہے لیکن پانی زیادہ درجہ کھیت میں کھڑا نہیں رہنا چاہیے۔ اس کو پانی کا اچھا نکاس کہتے ہیں۔ پانی ہلکی اور تیل میرا زمینوں میں آسانی سے جذب ہو جاتا ہے۔ کئی زمینوں میں پانی کا بہتر طور پر نکاس ہوتا ہے۔ پانی کے اچھے نکاس والی زمینوں میں مونگ پھلی کی سونیاں آسانی سے داخل ہو جاتی ہیں۔ بہ نسبت ایسی زمینوں کے جو سخت اور سیلابی ہوں۔

الف ۱۔ بہتر قسم کی زمین کا انتخاب

آپ مونگ پھلی کی زیادہ پیداوار حاصل کر سکتے ہیں۔ اگر آپ ہلکی۔ پانی کے اچھے نکاس والی اور ایسی زمین جو سیلابی نہ ہو کر کاشت کے لئے منتخب کریں۔

ہلکی زمین کیسے؟
مونگ پھلی کی پھلیاں زمین کے اندر پرورش پاتی ہیں۔ وہ سونیاں جن سے پھلیاں پرورش پاتی ہیں آسانی سے زمین میں داخل ہو سکتیں۔ بھاری زمین میں سطح زمین سخت ہونے کی وجہ سے پودوں سے نکلنے والی سونیاں زمین میں داخل نہیں ہو سکتیں۔



پانی ریتیل چکنی زمین میں فوراً جذب ہو جاتا ہے



ج۔ کھیت کا رقبہ معلوم کرنا

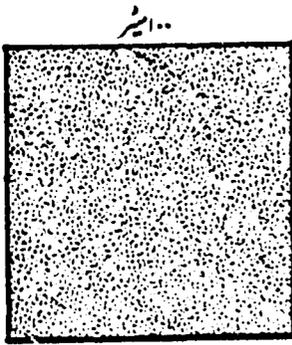
اگر آپ کے کھیت کے چاروں کونے قائمہ زاویہ ہیں تو کھیت کا رقبہ معلوم کرنا برا آسان ہے۔ آپ کھیت کی لمبائی کو چوڑائی سے ضرب دیں تو رقبہ نکل آئے گا۔

مثلاً نمبر ۱۔ ایک کھیت ۱۰۰ میٹر لمبا ہے اور ۱۰۰ میٹر چوڑا ہے۔ اس کا رقبہ 100×100 برابر ہے۔ ۱۰۰۰۰ مربع میٹر۔ ایک مربع میٹر کا مطلب ہے ایک میٹر لمبا اور ایک میٹر چوڑا۔ ایک ہیکٹر برابر ہے ۱۰۰۰۰ مربع میٹر۔

مثلاً نمبر ۲۔ ایک کھیت کی لمبائی ۱۰۰ میٹر ہے اور اس کی چوڑائی ۵۰ میٹر ہے تو اس کا رقبہ 100×50 برابر ہے ۵۰۰۰ مربع میٹر۔ یہ رقبہ ہزار ہیکٹر ہوگا۔

مثلاً نمبر ۳۔ ایک کھیت ۱۰ میٹر لمبا اور ۱۰ میٹر چوڑا ہے۔ اس کا رقبہ 10×10 برابر ہے ۱۰۰ مربع میٹر۔ یہ بھی تقریباً ہزار ہیکٹر ہے۔

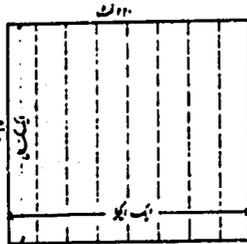
نیچے دی گئی تصویر میں دو کھیت دکھائے گئے ہیں۔ ہر کھیت کا رقبہ ایک ہیکٹر کے برابر ہے۔



ایک ہیکٹر رقبہ کے دو کھیت



۲۰۰۰



اگر آپ اپنے کھیت کا رقبہ ایکڑ اور کنال میں معلوم کرنا چاہتے ہیں تو ایک کھیت اگر ۲۲۰ فٹ لمبا ہے اور ۱۹۸ فٹ چوڑا ہے تو اس کا رقبہ 220×198 برابر ہے ۴۳۵۶۰ مربع فٹ جو کہ ایک ایکڑ کے برابر ہوگا۔ ایک ایکڑ میں ۸ کنال ہوتے ہیں۔

اگر آپ کو اپنے کھیت کا رقبہ معلوم ہے تو آپ ایک ترقی یافتہ زمیندار بن سکتے ہیں جو آسانی سے یہ معلوم کر سکتا ہے کہ اسے کتنے ذیح کی ضرورت ہے۔ کتنی کھاد کی ضرورت ہے اور کیا اس کے کھیت سے زیادہ پیداوار حاصل ہوتی ہے یا کہ کم۔

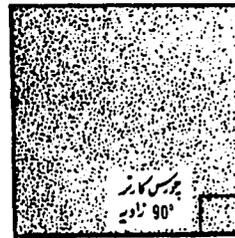


پانچ گنٹ زمین میں آہستہ آہستہ جذب ہوتا ہے

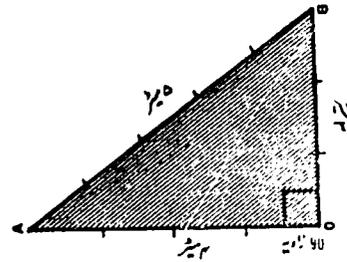
ج۔ کھیت کی حد بندی کرنا

آپ کو اپنے کھیت کا رقبہ معلوم ہونا چاہیے تاکہ آپ فیصلہ کر سکیں کہ آپ نے کاشت کے لئے کتنے من بیج اور کتنی کھاد استعمال کرنی ہے۔

کھیت کا رقبہ معلوم کرنے کے لئے آپ کو پہلے کھیت کی لمبائی لگانا چاہیے۔ کھیت کا رقبہ بڑی آسانی سے معلوم کیا جاسکتا ہے۔ اگر آپ اپنے کھیت کی مربع یا مستطیل کی شکل میں نشان دی کر لیں۔ یعنی کہ اس کے کنارے قائمہ زاویہ ہوں جیسا کہ شکل میں ایک مربع کھیت دکھایا گیا ہے۔



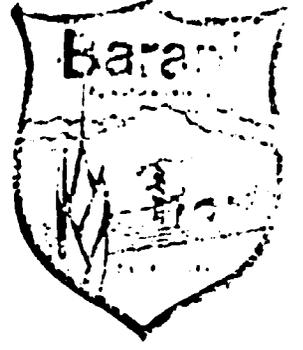
۹۰ میٹر کا رقبہ ۹۰ میٹر



نیچے دی گئی برائیاں پر عمل کرتے ہوئے کونوں پر قائمہ زاویہ بنائیں۔

- ۱۔ جیسا کہ اوپر تصویر میں دکھایا گیا ہے ۰ نشان پر ایک کھونٹی گاڑیں۔
- ۲۔ کھونٹی کے ساتھ ایک رشتی بانڈ میں اور رسی کو ۵۰ گھیر کر پھیلاتے ۵ قطر پر لائیں جو کہ ۳ میٹر کے فاصلہ پر ہے۔
- ۳۔ اسی طرح ایک رشتی ۰ نشان سے لفظ A تک لائیں جو کہ ۴ میٹر کے فاصلہ پر ہے۔
- ۴۔ اب A اور ۵ نقطوں سے دونوں رسیوں کو چلاتے جائیں، حتیٰ کہ رسیوں کے سر سے ایک دوسرے سے مل جائیں۔ یہ فاصلہ ۵ میٹر ہوگا۔ جیسا کہ اوپر تصویر میں دکھایا گیا ہے جو کہ راس آپ نے بنایا ہے وہ قائمہ زاویہ ہے۔

بارانی زرعی ترقیاتی ادارہ
پنسلووا



مونگ پھلی کے بیج کا چناؤ اور دوائی لگانا

کسانوں کے لئے مفید اور دلچسپ

N V F



مرن صاف ستھرا، بیماری اور کیڑے کے حملہ سے پاک بیج ہی لیں۔ جب آپ پھلیوں میں سے گریاں نکالیں تو خراب گریاں پینک دیں کیونکہ ایسی گریوں کا اکاؤنٹ نہیں ہوگا۔ کئے اور نامکمل بیجوں کا اکاؤنٹ بھی نہیں ہوگا۔ چھ بیج کے چناؤ کا بیج دقت وہ ہے



صحت مند قابل کاشت بیج کے ڈالنے



ناکارا اور ناقابل کاشت بیج کے ڈالنے

خلاصہ :- مونگ پھلی نمبر ۲

- ۱۔ مونگ پھلی کی اچھی پیداوار حاصل کرنے کے لئے اچھا بیج لونا چاہیے۔
- ۲۔ سفارش کردہ ترقی دادہ اور زیادہ پیداوار دینے والی قسم کاشت کریں۔
- ۳۔ برونے سے قبل بیج کی روئیدگی معلوم کر لیں۔
- ۴۔ بیج کو پھپھوندی مادہ دوا لگا کر برونے، اس طرح بیج کی تیار دی اور کیڑے کے نقصان سے محفوظ رہتا ہے۔
- ۵۔ پھلیوں میں سے گریاں فصل کاشت کرنے سے چند روز ہی پہلے نکالیں ورنہ وہ فٹک ہو جائیں گی۔
- ۶۔ پھلیوں سے گریاں نکالنے وقت برونے کے لئے اچھی صاف ستھری تندرست اور کیڑے کے حملہ سے پاک گریاں منتخب کریں۔
- ۷۔ اگر کسی کیفیت میں مونگ پھلی تین سال سے کاشت نہ کی گئی ہو تو ایسے کیفیت میں کاشت سے پہلے عمق زراعت کے توسیعی عملہ سے بیج کو ٹیک لگوائیں۔

دوسری فصلوں کی طرح مونگ پھلی کی کاشت کے لئے بھی صاف ستھرا۔ تندرست۔ عمدہ قسم کلا چھلی شکل والا بیماری سے پاک بیج استعمال کریں۔ مونگ پھلی کی سفارش کردہ قسم ہی کاشت کریں اور برونے سے قبل بیج کو پھپھوندی مادہ دوا لگائیں تاکہ بیج بیماری وغیرہ کے حملہ سے محفوظ رہے۔

اچھے بیج کا چناؤ

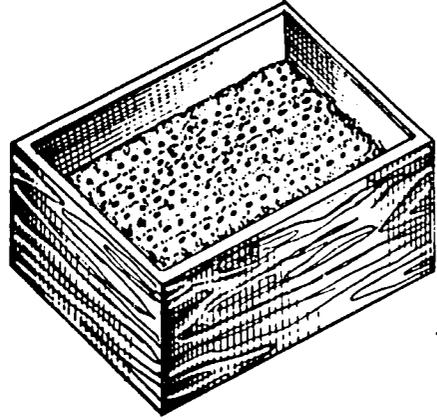
ایسی قسم کا چناؤ کریں جس کی کاشت کا آپ کے علاقہ میں رواج ہو۔ نمبر ۲۳۲ ایک پھینے والی قسم ہے۔ یہ زیادہ پیداوار دیتی ہے اس کی پھلیاں درمیانی جسامت کی ہوتی ہیں۔ یہ بیماری کے حملہ سے کم متاثر ہوتی ہے جب کہ باگنی سیدی اگنے والی قسم ہے۔ یہ ذرا دیر سے پکتی ہے لیکن پنجاب میں کاشت ہونے والی چند دوسری اقسام سے پہلے پک جاتی ہے۔ اس کی پھلیاں چند دوسری اقسام سے جسامت میں چھوٹی ہوتی ہیں لیکن دانوں سے مکمل بھری ہوتی ہیں۔ آپ کے علاقہ کا ذمہ داری توسیعی کارکن بتا سکتا ہے کہ آپ کے علاقہ کے لئے کونسی اقسام سفارش کردہ ہیں۔

جب آپ پھیلوں میں سے گریاں نکال رہے ہوں۔ پھیلوں میں سے گریاں زیادہ دیر پہلے نہ نکالیں ورنہ وہ خشک ہو جائیں گی اور ان کا آگواڑا چھان نہیں ہوگا۔ یہ عیاں بہے گم گریاں نکالتے وقت بیج کی گلابی رنگ کی تہہ نہ اتر جائے۔ جن دانوں سے یہ تہہ اتر جائے گی ان کا آگواڑا نہیں ہوگا۔ زیادہ خشک دانہ فی صدے کم نمی والی پھیلوں کی گریاں اور چیلکا آسانی سے ٹوٹ جاتا ہے۔ اگر پھیلوں میں ۶۰ فی صدے زیادہ نمی ہو تو نقصان کم ہوتا ہے۔ بیج کو ایک برتن سے دوسرے برتن میں ڈالتے وقت احتیاط سے کام لیں ورنہ پھیلکے کو نقصان پہنچتا ہے اور بہت سی گریاں ٹوٹ جاتی ہیں۔ ٹوٹی ہوئی گریاں میں بونے کے بعد مٹی کے ذرات داخل ہو جاتے ہیں جن سے بیج گل سڑ جاتا ہے۔

کیسے معلوم کیا جائے کہ بیج اچھے ہیں؟

ایک سادے مسلسل سے آپ اپنے بیج کی روئیدگی معلوم کر سکتے ہیں۔ بغیر چنے سو بیج لیں۔ ان کو ایک کیسل ریت والے بس میں رکھ دیں گیلی

ریت کو کپڑے سے ڈھانپ دیں اور کس کو کسی گرم کمرے میں تقریباً ۶ دن تک پڑا رہنے دیں۔ ریت کو اس دوران گھیلنا رکھیں۔ ۶-۷ دن بعد ایسے بیج گن لیں جو آگنے شروع ہو گئے ہوں۔ اگر ۹۰ یا اس سے زائد بیج آگ آئے ہیں تو آپ



کے بیج کی روئیدگی ۹۰ فی صد یا اس سے زائد ہے۔ اور یہ بیج کاشت کے لئے موزوں ہیں۔ اگر ۸۵ بیج آگ آئیں تب بھی یہ بیج اچھی فصل کے لئے موزوں ہیں۔ اگر روئیدگی کی شرح ۸۵ فی صد سے کم ہے تو بیج کی مقدار بڑھادیں یا دوسرا اچھا بیج کاشت کریں۔

بیج کی روئیدگی بڑھانے کا ایک یہ طریقہ بھی ہے کہ آپ بیج کے طور پر استعمال کرنے والی مرنگ پھلی کو صاف ستھری اور خشک جگہ سٹور کریں جہاں چوہے سے اسے نقصان نہ پہنچا سکیں۔ سٹور کر کے بڑے سے بڑے لیور دوا بھی پاک کر لیں تاکہ وہ پھیلوں کو نقصان نہ پہنچائیں۔

بیج کو ٹیسکے لگانا

چونکہ مرنگ پھلی ایک پھلی دار فصل ہے۔ لیکن میں اگر مناسب جڑوں سے موزوں ہوں تو فصل

کاشت کے ایک ماہ بعد اپنی ٹائٹروجن کی ضرورت محدود پوری کرنے لگتی ہے۔ ایسی زمین کے لئے جہاں تین سال سے مرنگ پھلی کے بیج کو ٹیسکے لگا کر نہ بڑیا گیا ہو وہاں بیج کو ٹیسکے لگا کر لونا زیادہ سود مند ہے۔ بیج کو ٹیسکے لگانے کے لئے اپنے علاقے کے ذمہ داری تو سیسی لاکن سے ملیں۔

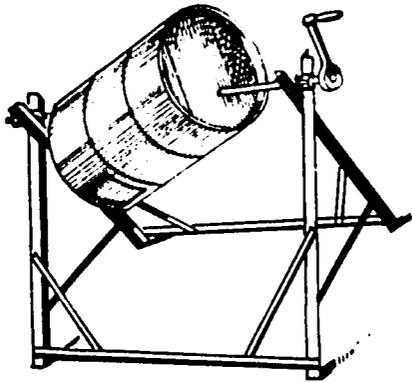
بیج کو پھپھوندی مار دوانا لگانا

مرنگ پھلی کاشت کرنے سے قبل اس کے بیج کو پھپھوندی مار دوا لگائیں۔ دوائی بیج کو زمین اور زمین میں موجود کیڑے اور بیماریوں سے محفوظ رکھتی ہے۔ بیج کو دوائی لگانے کے مندرجہ ذیل فائدے ہیں۔

- ۱۔ بیج کیڑوں سے محفوظ رہتا ہے
- ۲۔ دوائی لگا بیج جلدی خراب نہیں ہوتا۔
- ۳۔ بیج کا آگواڑا چھان ہوتا ہے۔
- ۴۔ پیداوار زیادہ حاصل ہوتی ہے۔

بیج کو ٹیسکے کرنے کے لئے پھپھوندی مار دوا دوائی تھین ایم۔ ۵۰ استعمال کریں۔ ۱۰ اونس دوائی ۱۰۵ پونڈ بیج، ۱ پونڈ کوگرام دوائی ایک من بیج کے لئے کافی ہے۔ دوائی کو بیج کے ساتھ اچھی طرح ملائیں۔ حتیٰ کہ بیج پر دوائی کی ہلکی سی تہہ جم جائے۔

اس مقصد کے لئے ایک ڈرم فاسٹ ڈریئر میسا شکل میں دکھایا گیا ہے آسانی سے استعمال کیا جاسکتا ہے۔ لیکن ہے ایسا ایک آپ کے گاؤں میں بھی موجود ہو بیج کو دوائی لگاتے وقت اس بات کا خیال رکھیں کہ بیج کی گلابی رنگ کی تہہ نہ اترے پائے۔ کیونکہ ایسے بیج کا آگواڑا نہیں ہوگا۔



چونکہ یہ دوائی زہریلی ہوتی ہے اس کو استعمال کرتے وقت ہاتھوں پر دستانے یا پلاسٹک کا نفاذ چڑھائیں اور کام ختم ہو جانے پر ہاتھوں کو صابن دھیرے سے اچھی طرح صاف کر لیں۔

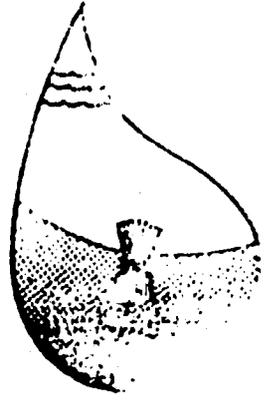
دوائی لگا بیج کسی انسان یا جانور کو نہ کھانے دیں اور نہ ہی اس کو ایسی جگہ رکھیں جہاں سے بچے اسے حاصل کر لیں۔

بیج کو پھپھوندی مار دوا لگانے کے عمل کے لئے اپنے علاقے کے ذمہ داری تو سیسی لاکن سے ضرور ملے۔

بارانی زری ترقیاتی منصوبہ
پنجاب

مونگ پھلی کے لئے زمین کی تیاری

تین دنوں کے لئے مناسب معیار مانتی ہے۔

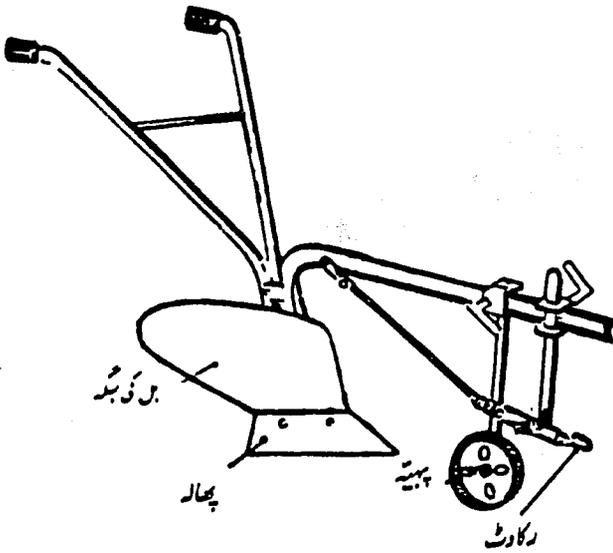


مونگ پھلی نمبر ۲

خلاصہ :-

- ۱۔ مونگ پھلی کی اچھی اور کامیاب فصل کے لئے زمین کو اچھی طرح تیار کرنا ضروری ہے۔
- ۲۔ زمین ہموار اور بھری ہوئی چاہیے۔ جس میں ڈھیلے نہ ہوں۔
- ۳۔ پہلا بل ۶-۸ اینچ (۱۵-۲۰ سینٹی میٹر) گہرا چلائیں۔
- ۴۔ گہرا بل چلانے سے جڑی بوٹیاں اور کیڑے بھی تلف ہوجاتے ہیں۔
- ۵۔ گہرا بل چلانے سے مونگ پھلی کی جڑیں آسانی سے اور بہتر طور پر زمین میں داخل ہوتی ہیں۔
- ۶۔ جڑی بوٹیوں کو مکمل طور پر تلف کرنے کے لئے تین چار دفعہ بل چلائیں اور زمین کو گھس رکھیں۔
- ۷۔ کاشت سے پہلے سہاگہ دے کر زمین کو اچھی طرح ہموار اور بھری کر لیں۔

پہلیں۔ مگر کوشش کریں کہ یہ عمل کافی دیر پہلے موسم کی پہلی بارش کے بعد فوراً ہی انجام دیا جائے۔ اس سے یہ فائدہ ہوگا کہ بعد میں ہونے والی بارش کا پانی زمین میں اچھی سرعت بہنے دے گا اور آہستہ آہستہ زیر زمین پانی سے بات لگا۔
بل چلانے یعنی نیچے والی مٹی اوپر لانے کا عمل بیوں اور روٹاتی دیسی بل یا اور کسی کمزورے والے زری آلات سے انجام دیا جاسکتا ہے۔
لوٹ کے بل سے "بیسا نیچے تصویر میں دکھایا گیا ہے" یہ عمل بڑے اچھے اور موثر طریقے سے کیا جاسکتا ہے۔ یہ بل دیسی بل سے نسبتاً کام جلدی اور آسانی سے کرتا ہے مگر اس کو کھینچنے کے لئے زیادہ طاقت کی ضرورت ہوتی ہے۔



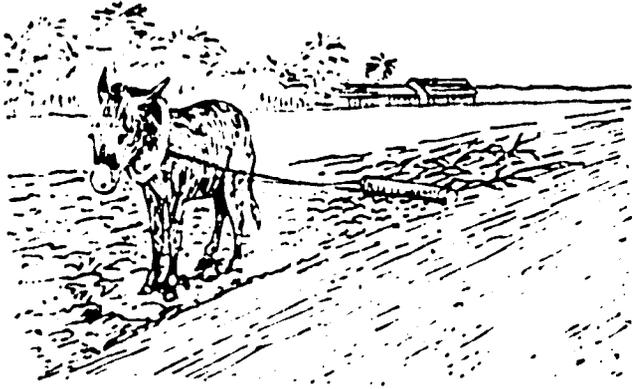
یہ نہایت ضروری ہے کہ کھیت خالی ہوتے ہی اس میں مٹی پٹنے والا بل چلایا جائے۔ موسم کی پہلی بارش کے فوراً بعد اس عمل کو چلانا شروع کرنے کا بہترین وقت ہوتا ہے۔ اس عمل سے زمین نرم ہوجاتی ہے۔

فصل کی برائی سے قبل آخری بل کے ساتھ کھیت میں زمین ہموار کرنے اور زمین کو رتنے کے لئے سہاگہ دینا بہت ضروری ہے۔ سہاگہ دوہرا دینا چاہیے یعنی ایک دفعہ



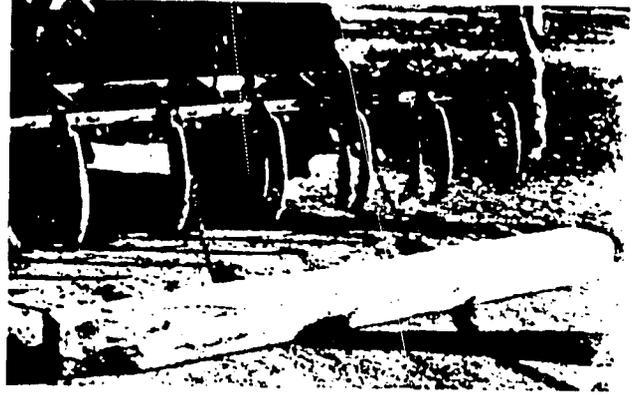
ایک ہموار، بھری اور اچھی طرح تیار کی گئی زمین جیسی اوپر شکل میں دکھائی گئی ہے۔ مونگ پھلی کی کامیاب فصل کی ضمانت ہے۔ پہلا بل ۶-۸ اینچ گہرا

اگر آپ کے پاس سہاگہ نہیں ہے اور نہ ہی آپ گاؤں میں کسی سے لے سکتے ہیں تو اس صورت میں زمین کو ہموار کرنے اور ڈھیلے توڑنے کے لئے میل یا گدھے کے یا بچے درخت کی موٹی شاخیں بانٹ کر کھینچیں۔ جیسے تصویر میں دکھایا گیا ہے۔



اگر آپ نے زمین اچھی طرح تیار کر لی ہے یعنی زمین ہموار ہے۔ بھر بھری ہے اور اُس میں کوئی ڈھیلے وغیرہ نہیں ہیں۔ اس طرح زمین کی کوہر والی سطح نرم ہوگی جس سے زمین میں ہوا اور پانی کا گزر آسانی سے ہو سکے گا۔ کیت میں کوئی بڑے پتے بل چلانے سے بڑی بوٹیاں وغیرہ زمین میں دب جاتی ہیں اور نفوس کاشت کرنے سے قبل گل سر جاتی ہیں ان کے گلے سڑنے سے جو مہیاقتی وہ بنتا ہے وہ زمین کی طاقت پہنچانے کا باعث بنتا ہے جس سے مزید پھل کی پیداوار میں اضافہ ہوتا ہے۔

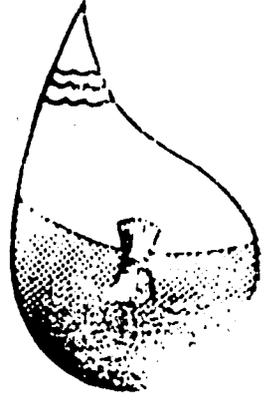
لجے رُخ اور ایک دفعہ چوڑے رُخ، سہاگہ بیلوں سے بھی دیا جاتا ہے اور ٹرکٹر سے بھی۔



بارانی زرعی رقبہ کی زمبوسہ

دوبہ پنجاب

مونگ پھلی میں کھاد کا استعمال اور طریقہ کاشت



کاشت کرنے کے لئے مناسب موسم

مونگ پھلے نمبر ۲

ذریعہ کبیر دیں۔ مونگ پھلی کو زیادہ ترقی خمر کی اجسزا نامٹروجن فاسفورس اور کیشیم کی ضرورت ہوتی ہے۔

کھاد کی فی ایکڑ سفارش کردہ مقدار

۱۔ شمال مغربی سرمدی صوبہ کے لئے	ڈی اے پی	۱۶۶ پونڈ (۵۵ کلوگرام)	+ ایک بوری
۲۔ پنجاب کے لئے	ڈی اے پی	۱۶۶ پونڈ (۵۵ کلوگرام)	+ ایک بوری
	المونیم سلفیٹ	۲۶ پونڈ	+ ایک بوری
	سنگل پیر فوسفیٹ	۲۶ پونڈ	+ ایک بوری

اگر کیت کاربہ بیٹروں میں ہے تو آپ اوپر دی گئی کھاد کی مقدار کا ۲/۳ گت زیادہ استعمال کریں۔

گوبر کی کھاد بھی اچھی ہوتی ہے لیکن اگر گوبر کی کھاد ڈالنا ہو تو ۱۵ فٹروں سے پہلے ڈالنی چاہیے۔ کاشت سے فوراً پہلے گوبر کی کٹی کھاد ڈالنے سے دیکھ کا بہت سخت حملہ ہوتا ہے۔

ایسے بارانی علاقے جہاں کیشیم کی کمی ہے وہاں جہسما استعمال کرنی چاہیے ایسے علاقوں میں اس کے استعمال سے مونگ پھلی کی پیداوار میں خاطر خواہ اضافہ ہوتا ہے۔ جہسما کے استعمال کے لئے اپنے صنتہ کے زرعی توسیعی کارکن سے مشورہ کریں۔

وقت کاشت

مختلف علاقوں میں مونگ پھلی کی کاشت کا وقت بھی مختلف ہے شمال مغربی سرمدی صوبہ میں اسے ۱۵ مارچ سے ۳۰ اپریل تک کاشت کیا جاتا ہے جبکہ پنجاب میں یکم اپریل سے ۵ اپریل تک اس کی کاشت کی جاتی ہے۔ کاشت کے وقت موسم گرم مرطوب ہونا چاہیے۔ درجہ حرارت تقریباً ۲۱ ڈگری سینٹی گریڈ ہونا چاہیے۔ اگر بارانی کے وقت موسم سرد ہوگا تو مونگ پھلی کے بیج کو چھوڑنے سے نقصان ہوگا۔ مونگ پھلی کی کاشت بادش کا موسم شروع ہونے سے ۲۰-۳۰ دن پہلے کر لینی چاہیے۔ بادش کا موسم شروع ہونے پر پودا پھول اور پھل بنانے کی حالت میں ہوتا ہے اور اس وقت پودے کو ہانی کی زیادہ ضرورت ہی ہوتی ہے۔

خلاصہ :-

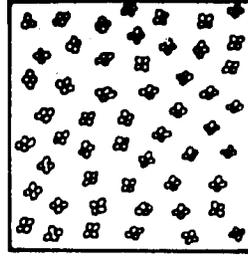
- ۱۔ مونگ پھلی کی اچھی پیداوار حاصل کرنے کے لئے بارانی علاقہ کی زیادہ تر زمینوں میں کھاد کا استعمال ضروری ہے۔
- ۲۔ اگرچہ مونگ پھلی کی فصل اپنی نامٹروجن کی ضرورت ہوا سے خود ہی پوری کر لیتی ہے مگر پودے کی بڑھوتری کے شروع میں تو ڈی سی نامٹروجن ضروری ہے۔
- ۳۔ مونگ پھلی کی فصل میں فاسفورس کھاد کا استعمال ضروری ہے۔
- ۴۔ اگر آپ نے گوبر کی کھاد استعمال کرنی ہے تو اسے ۱۵ فٹروں سے قبل کیت میں ڈال دیں تاکہ دیکھ فصل کو نقصان نہ پہنچا سکے۔
- ۵۔ اچھی پیداوار حاصل کرنے کے لئے مونگ پھلی کی پھیلنے والی اور سیدھی اگنے والی اقسام کو مختلف فاصلوں سے کاشت کریں۔
- ۶۔ وتر کا خیال رکھتے ہوئے بیج کو ۲-۳ انچ گہرا کاشت کریں۔
- ۷۔ جس طریقہ سے آپ فصل کاشت کرنا چاہتے ہیں اس کا منصوبہ بنائیں۔
- ۸۔ فاصلہ بنانے والے پھلے سے آپ پودوں کو مناسب فاصلہ پر کاشت کر سکتے ہیں۔
- ۹۔ فی ایکڑ یا فی ہیکٹر پودوں کی سفارش کردہ تعداد رکھنے سے آپ مونگ پھلی کی زیادہ سے زیادہ پیداوار حاصل کر سکتے ہیں۔

مونگ پھلی کے لئے کھادوں کا استعمال

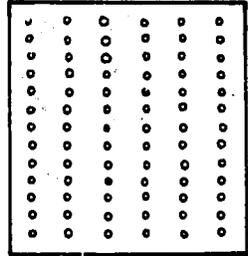
بارانی علاقہ میں مونگ پھلی بلی ریسی اور ریسی میکانیزم میں کاشت کی جاتی ہے۔ ایسی زمینوں سے اچھی پیداوار حاصل کرنے کے لئے کھاد کا استعمال ضروری ہے۔ لیکن صرف کھاد ہی اچھی پیداوار کی ضامن نہیں ہے بلکہ اس کے لئے زمین کی اچھی تیاری جڑی بوٹیوں کی تمہنی و دیگر دوسرے ترقی دادہ عوامل کرنے بھی ضروری ہیں۔ فصل کاشت کرنے سے قبل ادا آخری بل چلانے سے پہلے کھاد کو کیت میں چھٹا کے

طریقہ کاشت

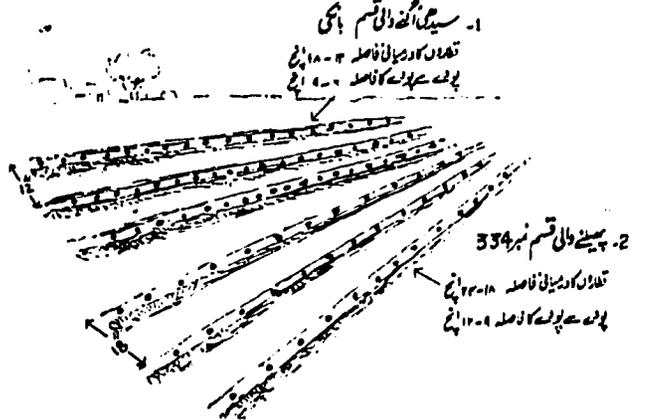
بسن لینار مونگ پہلی کی فصل چنے کے ذریعہ کاشت کرتے ہیں۔ جیسا اس تصویر میں دکھایا گیا ہے۔ لیکن اس طرح وقت کی بچت سہجائی ہو مگر اس طریقہ سے آپ ایک ایکڑ میں پودوں کی نمائندگی کے تعداد حاصل نہیں کر سکتے۔ چنے کے ذریعے کاشت کی ہوئی فصل میں جڑی بوٹیوں کی تلفی اور گوڈی وغیرہ کرنے میں بھی کافی وقت ہوتی ہے۔



فصل کو قطاروں میں کاشت کرنے سے جیسا تصویر میں دکھایا گیا ہے آپ کثرت میں پودوں کی حساب مشا سفارش کردہ تعداد برقرار رکھ سکتے ہیں۔ اس طرح قطاروں کے درمیان دالی جگہ سے ہاتھ یا بل کے ساتھ جڑی بوٹیوں کی تلفی بھی بڑی آسانی سے کی جاسکتی ہے۔



فصل قطاروں میں کاشت کرنے سے برداشت کے وقت بھی آسانی رہتی ہے اور آپ دیکھ سکتے ہیں کہ پودے کہاں ہیں اور کیا کوئی پودا باقی تو نہیں رہ گیا ہے۔ قطاروں اور پودوں کا فاصلہ زرعی ماہرین کی سفارشات کے مطابق رکھیں۔ پھیلنے والی اور سیدھی اگنے والی اقسام کے سفارش کردہ فاصلے مختلف ہیں جیسا نیچے تصویر میں دکھایا گیا ہے۔



پودوں کا سفارش کردہ درمیان فاصلہ

و۔ قسم نمبر ۳۳۴ ۱۲ - ۹
 ہ۔ قسم باقی ۹ - ۹

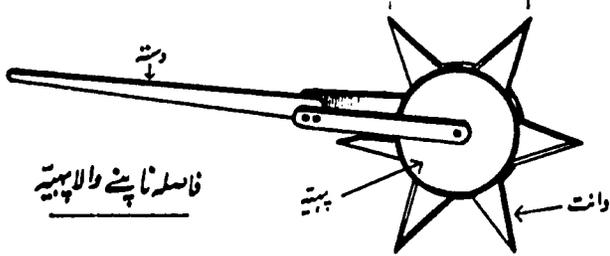
بیج کو درکار خیال رکھتے ہوئے ۲-۳ اینچ گرا ہوئیں۔ ایک سوراخ میں ایک بیج لگائیں۔ اگر درکار سے خشک ہو گیا ہو تو بیج کو ذرا گرا ہوئیں۔ بیج کو کھساں گہرائی پر ہوئیں اور اوپر ہلکا سا گدے دیں تاکہ درکار خشک نہ ہو جائے۔

اگر زمین ڈھلوان والی ہے تو زمین کو کٹاؤ سے چمانے کے لئے تھکریں اداصلوں کی نمائندگی میں لگائیں۔

فصل کاشت کرنے کے ایک ہفتہ بعد تک جزیج نہ لگائیں ان کی جگہ نیچے بیج لگائیں۔ آپ بر قطار میں ہاتھ سے ناپ کر اور نشان لگا کر یا فاصلہ ناپنے والے پھیتے سے نشان لگا کر پودوں کو سفارش کردہ فاصلہ پر لہ سکتے ہیں۔ فاصلہ ناپنے والا پھیتہ جیسا نیچے تصویر میں دکھایا گیا ہے بر یا ۹ یا ۱۲ اینچ کے دائروں کو بننے فاصلہ پر رکھیں گے زمین میں ایک سوراخ بنا دیتا ہے۔ فاصلہ ناپنے والا پھیتہ آپ کو لڑی یا لہ سے جیسا آپ مناسب خیال کریں بنا سکتے ہیں۔ اس پھیتہ نامشین کو زمین پر رکھ کر دبانے سے اس کے دائروں کے برابر فاصلہ پر زمین میں سوراخ بن جاتے ہیں۔ بر سوراخ میں ایک ایک بیج بویں اور بیج کو بعد میں کھوپ یا اپنے پاؤں کی مدد سے مٹی سے ڈھک دیں۔

۱۲ - ۹ پھیلنے والی اقسام

۹ - ۹ سیدھی اگنے والی اقسام



اس فاصلہ ناپنے والی پھیتہ نامشین سے آپ آسانی سے پودوں کی سفارش کردہ مطلوب تعداد لگا سکتے ہیں۔

نی ایکڑ مونگ پہلی کی قسم باقی کے ۵۰۰۰ پودے اور قسم نمبر ۳۳۴ کے ۴۵۰۰ پودے لگانے سے بہتر پیداوار حاصل کی جاسکتی ہے۔ پودوں کی یہ مطلوب تعداد حاصل کرنے کے لئے باقی کا ۵ پونڈ (۲۳ کلوگرام) اور قسم نمبر ۳۳۴ کا ۶۰ پونڈ (۲۷ کلوگرام) بیج کاشت کرنا چاہیئے۔

فصل کو مناسب فاصلہ سے قطاروں میں کاشت کرنے سے جڑی بوٹیوں کو تلف کرنے میں بھی آسانی رہتی ہے اور زیادہ پیداوار بھی حاصل ہوتی ہے۔

قطاروں کا سفارش کردہ درمیان فاصلہ

و۔ قسم نمبر ۳۳۴ ۲۴ - ۱۸
 ہ۔ قسم باقی ۱۲ - ۱۸

مونگ پھلی کی برداشت

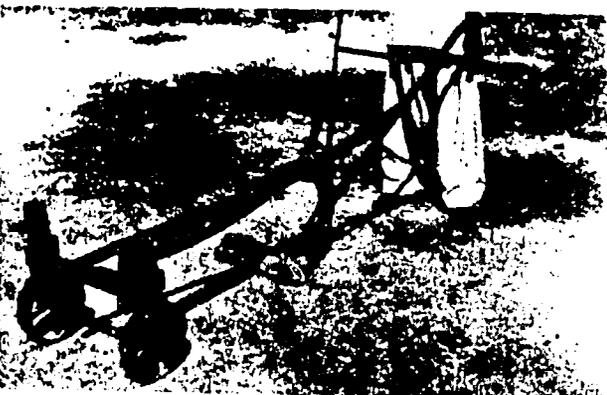
مونگ پھلی کی برداشت ایک ایسا عمل ہے جو پیداوار اور اس کے میسار اور آمدنی پر اثر انداز ہوتا ہے اس لئے اس کی برداشت کے لئے مندرجہ ذیل باتوں کا خیال رکھیں۔
۱۔ برداشت کب کی جائے

۱۔ مونگ پھلی کی برداشت اُس وقت کرنی چاہئے جب پھلیوں کے اندر چمکے پر کالی دھاریاں نظر آتے ہوں۔ کھیت سے چند پودے اکھاڑ کر رکھیں۔ اگر ۵۰ سے ۷۰ فیصد پھلیوں کے چمکوں کے اندر کی طرف کالی دھاریاں نظر آئیں تو برداشت شروع کر دیں۔ جب ۱۰۰ فیصد برداشت کرنے سے پودوں سے پتے گر جاتے ہیں اور پودے جانوروں کے کھانے کے قابل نہیں رہتے تو پھلیوں کی برداشت سے کیڑوں، بیماریوں اور چرموں کی وجہ سے بھی کافی نقصان ہوتا ہے۔ اس طرح زمین سمٹ کر ہر جانے سے برداشت کے وقت کالی پھلیاں زمین میں ہی رہ جاتی ہیں۔

۲۔ اگیتی برداشت کرنے سے پھلیوں میں نمی زیادہ رہ جاتی ہے جس سے سٹوریج کے دوران پھلیاں گل جاتی ہیں اور ان میں سے تیل بھی کم نکلتا ہے نیز اگیتی برداشت کی گئی فصل سے بیج بھی اچھا نہیں بنتا کیونکہ وہ کچا ہوتا ہے۔

۲۔ برداشت کیسے کی جائے

۱۔ مونگ پھلی کی برداشت ہاتھوں سے بھی کی جاسکتی ہے لیکن مونگ پھلی اکھاڑنے والے پیلوں سے چلنے والے بل سے یہ عمل جلد اور آسانی سے کیا جاسکتا ہے۔ ٹریکٹر سے چلنے والے زرعی آلات اسی وقت مؤثر طور پر استعمال کئے جاسکتے ہیں جب فصل قطاروں میں کاشت کی گئی ہو۔ مونگ پھلی اکھاڑنے والے بل استعمال کرنے سے بہت ہی کم پھلیاں زمین میں باقی رہ جاتی ہیں۔ نیچے مونگ پھلی اکھاڑنے والے دو بل دکھائے گئے ہیں۔ ممکن ہے آپ کے گاؤں میں بھی ٹریکٹر سے چلنے والا بل موجود ہو۔



ٹریکٹر سے چلنے والے بل کے لئے اپنے حلقے کے زرعی تو سیسی کارکن سے رابطہ قائم کریں۔
مونگ پھلی اکھاڑتے وقت پودوں کو پیسے ہی نہ کاٹ لیں بلکہ نوکراس وقت اٹھا لیں جب وہ اچھی طرح زمین سے اکٹریں۔ پھلے پودے کاٹ لینے سے بہت ساری پھلیاں زمین میں ہی رہ جاتی ہیں۔

۲۔ زمین سے پودے اکھاڑنے کے بعد فوراً ہی ان سے پھلیاں میلندہ کریں۔ پھلیوں کو ۱۰-۱۵ دن تک رُحوب میں خشک کریں۔ اچھی طسٹ خشک کی جونی پھلیاں بخافت سٹور کی جاسکتی ہیں۔ برداشت کے وقت پھلیوں میں مام طور پر ۳۰-۴۰ فیصد تک نمی جوتی ہے لیکن سٹور کرنے کے لئے پھلیوں میں نمی ۸-۱۰ فیصد سے زیادہ نہیں ہونی چاہئے۔ مونگ پھلی کی گرمی و انت سے کاٹنے سے آسانی سے ٹوٹ جائے تو آپ کہہ سکتے ہیں کہ نمی بہت کم ہے۔ اور پیداوار سٹور کی جاسکتی ہے۔

۳۔ پودوں کو پھلے پھلیوں کے ڈھیر کی صورت میں نہیں رکھنا چاہئے۔ اس سے پھلیاں گنا شروع ہو جاتی ہیں اور ان کا رنگ تبدیل ہو جاتا ہے۔ پھلیوں کو اچھی طرح خشک کر کے سٹور کرنے سے پہلے حجاج کے ذریعہ صاف کر لینے چاہئے۔ اس طرح کچی فصل اور مٹی جونی پھلیاں میلندہ ہو جائیں گی۔

۳۔ فروخت و سٹوریج

آپ غالباً اپنی پیداوار کا کچھ حصہ فروخت کریں گے۔ صاف ستھری، خشک اور اچھی طرح پکی ہوئی پھلیوں سے آپ زیادہ قیمت حاصل کر سکیں گے۔ اگر آپ نے تمام ترقی دادہ طریق اختیار کئے ہیں تو آپ کی پیداوار نیچے دی گئی تصویر کی طرح فروخت ہوگی۔



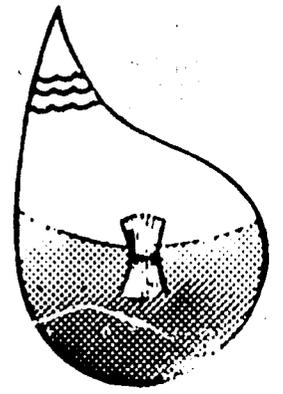
آپ اپنی پیداوار کا کچھ حصہ اپنے بچوں کے کھانے اور آئندہ فصل کے بیج کے لئے بھی رکھیں گے۔ پیداوار کو سٹور کرنے سے پہلے سٹوروں اور برتنوں کو اچھی طرح صاف کر لیں۔ پیداوار کو پھلیوں کی صورت میں سٹور کریں۔ اس طرح پیداوار کسی مدت تک کیڑوں کے نقصان سے محفوظ رہے گی اور زیادہ خشک بھی نہیں ہوگی۔ سٹور کو کسی مناسب دوائی ذیادتیان ۵۰ فیصد سے سپرے کر دینا چاہئے۔
اپنے حلقے کے زرعی تو سیسی کارکن سے سٹور سپرے کروانے کے لئے ملیں۔

بارانی زرعی ترقیاتی منصوبہ

صوبہ پنجاب

فصلوں میں چوہوں کا سدباب کیجئے

تساؤں کے لئے عام معلوماتی پرچہ



بارانی علاقوں میں چوہوں کی اقسام

چوہے اور پرندے مبرا

خلاصہ ۱-

- ۱- چوہے اور اس قسم کے دوسرے جانور کسان کی آمدنی کم کرتے ہیں۔
- ۲- چوہے عموماً وہی خوراک کھاتے ہیں جو انسان کھاتا ہے اور پسند کرتا ہے۔
- ۳- جب خوراک اور پھیننے کی جگہ کافی ہوتی ہے تو چوہوں کی تعداد میں تیزی سے اضافہ ہوتا ہے۔
- ۴- چوہے آگے سوئی فصلوں کو اور گوداموں میں نقصان کرتے ہیں۔
- ۵- اگر آپ کھیتوں کو جڑی بوٹیوں سے اور گھروں کو کڑا کرکٹ سے پاک رکھیں تو چوہے کم ہو سکتے ہیں۔
- ۶- چوہوں کی مکمل تلفی ناممکن ہے۔ مگر آپ ان کی تعداد اور نقصان کو بہت کم کر سکتے ہیں۔
- ۷- بارانی علاقوں میں چوہوں کی تلفی کے لئے زہریلے مٹیرے کا استعمال مفید ہے۔
- ۸- چوہوں کی رہنے بہنے کی عادات مختلف ہوتی ہیں اس لئے ان کی تلفی مختلف قسم کے طریقہ کار سے ہوتی ہے۔

چوہے اور انسان

ہزاروں سال سے چوہے انسان کے کھیتوں اور گھروں میں اُس کا ساتھ دے رہے ہیں۔ چوہے ہمارے مکانوں، کھیتوں اور گوداموں میں پائے جاتے ہیں۔ چونکہ چوہوں کی خوراک کی پسند انسان جیسی ہوتی ہے اس لئے یہ سب سے پہلے اچھی قسم کی فصلوں کو تباہ کرتے ہیں۔ وہ آگے ہونی گندم اور دوسرے پودوں کی تیلیاں کاٹتے ہیں اور دانوں کو جب فصل کو کاٹ لیا جاتا ہے۔ یہیں خوراک کی پیداوار انسانوں کے لئے کرنی سے چوہوں کے لئے نہیں۔

بارانی علاقوں میں تین قسم کے چوہے پائے جاتے ہیں۔ ان میں سے ریگستانی چوہا۔ برن چوہا اور اندھا چوہا فصلوں کا بہت زیادہ نقصان کرتے ہیں۔ یہ چوہے ریگستانی جانور کہلاتے ہیں اور زمین دو زبل بناتے ہیں۔ انہیں پینے کے لئے پانی کی کم ضرورت ہوتی ہے اس لئے کہ انہیں مناسب مقدار میں پانی اناج کے دانوں، پودوں کی جڑوں اور سبزہ سے حاصل ہوتا ہے۔ یہ تینوں قسم کے چوہے انسان کے حامل اور فصلوں میں رہ سکتے ہیں اور کافی نقصان کرتے ہیں۔

ریگستانی اور برن چوہے ایک ساتھ کھیتوں میں رہ سکتے ہیں مگر ان کے عادات و اطوار مختلف ہیں۔ ریگستانی چوہا دن کے وقت ہی بل سے باہر آکر فوس کو نقصان کرتا ہے۔ یہ پہلے چوہوں سے ننگ کا ہوتا ہے۔ کان چھوٹے ہوتے ہیں اور دم بہیل ہوتے ہیں۔ ہزاروں ناگیں ایک ہی سائز کی ہوتی ہیں۔ یہ چوہے ایک دوسرے کے قریب ایک کاٹنی کی شکل میں رہتے ہیں اور بل ریتی زمین میں جانا پسند کرتے ہیں۔



چوہوں کا سداب کیسے کیا جائے؟

نعلوں کو نقصان پہنچانے والے ٹہہوں کے سداب کے علاوہ سب سے اہم بات وقت کا تقاضا ہے۔ بہترین وقت وہ ہے جب بیکت نال ہوں یا فصل چھوٹی ہو کر کٹس وقت ان کی تعداد کم ہوتی ہے۔ گوداموں میں چھبے کچے مایوں کو رستہ بسا دیا جائے۔ گھروں میں چوہوں کی پیشہ سارا سال رہتی ہے اس لئے یہ ایک مسئلہ ہوتا ہے۔

جب فصل چھوٹی ہو تو آپ کو پناہ لینے کا اپنے کھیتوں اور ارد گرد کے رقبہ میں چوہوں کے کٹھے ہونے کی بات آوازہ نئی کے ڈھیروں کا ہرگز نہیں۔ چھبے آپ کی فصل کو نقصان پہنچانے کے لئے قند کے علاقوں میں آجاتے ہیں۔ تو چھبوں کے ہر کو بند اور مٹی کے ڈھیروں کو ہرگز کوئی اور شخص کے لئے جھاڑوں کے نیچے اور درگرمی اچھی حالت معائنہ کریں۔ وہ دیکھتا ہے کہ یہ ارد گرد بارہ ان کا جائزہ لیں۔ تمام کٹھے ہونے والے ارد گرد کے نئے ڈھیروں اس بات کی دلیل ہیں کہ چھبے موجود ہیں۔



اب ان ہوں میں کافی اندر کی طرف زہریلا پودے کا ٹکڑا رکھیں اور اسے مٹی سے ڈھکیں اور نہ ٹکڑے منسائے جو جائے گا۔ دو سے چار روز تک انتظار کریں اور دوبارہ بولوں کو بند اور مٹی کے نئے ڈھیروں کو ہرگز کریں۔ اس کے بعد دو روز یا انتظار کریں، تازہ کٹھے بولوں میں زہریلا ٹکڑا ڈال دیں۔ اگر آپ کوئی نہ سب ٹکڑا استعمال کریں تو اس طریقہ سے ۹ فیصد چھبے ہر جاتے ہیں۔ ٹکڑے بنانے کی معلومات کے لئے محکمہ زراعت کے توسیع زہری کارکن سے رجوع کریں۔ مناسب اور اچھی طریقہ یہ ہے کہ آپ جب بھی کھیتوں میں کسی کام سے جائیں تو اپنے ساتھ ہارنگ کے تیل میں ٹکڑے لیتے جائیں۔ کٹھے ہونے بل جب بھی آپ دیکھیں چھبے کا ٹکڑا رکھیں۔ اس طرح چھبے کوئی مسئلہ نہیں رہیں گے۔

کسان بھائیوں کا آپس میں تعاون

اگر تمام کسان جن کے کھیت ایک دوسرے کے ساتھ یا قریب ہیں ان کو چوہوں کے خلاف ہم چلائیں تو خرچہ بھی کم ہوگا اور زیادہ چھبے بھی مریں گے۔ اجتماعی کرشمہ سب کے لئے فائدہ مند ہوتی ہے۔



مزید معلومات اور ہدایات در شہر ٹی پی پی کے کنٹریکٹ سینٹر پوسٹ بکس نمبر ۸۲ کراچی - ۳۲ سے حاصل کی جاسکتی ہیں۔

برقی چھبے کی علامات مختلف ہوتی ہیں۔ یہ دوسرے چھبوں کے ساتھ نہیں۔ چھبے کی رنگتانی چھبے۔ ایک بل میں ایک ہی چھبہ رہتا ہے۔ یہ چھبہ بھی وہی کے وقت بل سے باہر آتا ہے۔ اس چھبے کے جسم کے اوپر والے بال سنہری بھورے رنگ کے اور پیٹ پر سفید رنگ کے ہوتے ہیں۔ اس کی آنکھیں نمایاں نکلنے سے اور کھلی ناگیں اگی ناگیں سے بڑی ہوتی ہیں۔ انہما چھبہ اور لذات دونوں وقت بل سے باہر نہیں آتا۔ یہ زیر زمین بل بنا کر ان میں رہتا ہے اس چھبے کی آنکھیں اور لاق چھٹے ہوتے ہیں۔ دم پر بل نہیں ہوتے۔ ڈیکسی ناک اور سٹے والے نمایاں زرد رنگ کے دانت ہوتے ہیں۔ اس کے جسم کے بال گہرے بھورے رنگ کے ہوتے ہیں۔ یہ کھیت کی خذیروں، پانی کی نالیوں اور کھیتوں کے اندر بل بناتا ہے۔ زمین کے اندر سٹیکس بناتے وقت زمین کی سطح پر مٹی کے ڈھیروں بناتے ہیں۔ ایک بل میں صرف ایک ہی چھبہ رہتا ہے۔ یہ بل ۱۳-۱۴ میٹر تک لمبا ہو سکتا ہے۔

دوسری اقسام کے چوہے



دن کے وقت رنگتانی چھبے



رات کے وقت مرنے چھبے



اندا چھبے اپنے بل میں

چھت کا چھبہ اور گھر کی چھبیا دو ایسی اقسام ہیں جو گوداموں اور گھروں میں بہت نقصان کرتی ہیں۔ چھت کے چھبے کے جسم کے بال بھورے اور مٹیالے رنگ کے ہوتے ہیں یعنی اوقات پیٹ پر سفید رنگ کے بال ہوتے ہیں۔ اس کی لمبی اور بغیر بالوں والی دم، بڑے کان اور ناگیں ہوتی ہیں۔ یہ رات کو یا اندھیرے میں نقصان کرتا ہے۔ گھر

کی چھبیا کی جسامت ایک بڑے باق کے انگوٹھے کے برابر ہوتی ہے۔ اس کے جسم کے بال نرم، سنہرے بھورے رنگ یا بھورے مٹیالے ہوتے ہیں۔ بعض اوقات پیٹ پر سفید رنگ کے بال ہوتے ہیں۔ یہ چھبہ یا دوسرے چھبوں کی طرح کھاتی کم اور نقصان زیادہ کرتی ہے۔ یہ



خوراک کو اپنے پیشاب اور فضلے سے خراب کرتے ہیں جس سے خوراک زہریلی ہو جاتی ہے یا اس سے انسان کو بیماریاں لگ جاتی ہیں۔ یہ چھبے عمر مند درکانوں، گھروں اور گوداموں میں پائے جاتے ہیں۔

بارانی زرعی ترقیاتی منصوبہ

شمال مغربی سندھ کی منصوبہ



چوہ مارنے کیلئے طعمہ بنانا

کے نون کے لئے عام - معصومانہ - چ

بارانی علاقوں میں گیس کا استعمال زیادہ مؤثر نہیں۔ اس لئے کوڑے میں نشک اور بولا برتی ہے۔ ایک مناسب اور اچھے ذہریلے طعمہ میں درج ذیل غریبوں کوئی چاہیئے۔

- ۱۔ مقامی اشیاء سے بنایا گیا سبوز۔
- ۲۔ کسائی جس کو آسانی سے بنا سکیں۔
- ۳۔ مناسب قیمت
- ۴۔ استعمال میں آسان

۱۔ زنک فاسفائیڈ (۲ فیصد) کا طعمہ بنانا

الف۔ چھوٹے ٹکڑوں کے شکل میں:

سب سے پہلے ایسے اجناس کا انتخاب کریں جو مقامی طور پر مل جائیں اور چوہے بھی ان کو پسند کرتے ہوں۔ مثلاً گندم، گندم آگانے والے علاقوں میں۔ کٹی، کٹی آگانے والے علاقوں میں۔ مٹی اور گروا اگر والوں میں بڑا تو اس سے اچھا طعمہ نہیں بنے گا۔ اس لئے یہ اچھی طرح صاف ہوں۔ پھینک دی والوں پر نہیں ہونی چاہیئے ورنہ چوہے نہیں کھائیں گے۔ اور ایسے اجناس بھی امت استعمال کریں جن پر کڑے کوڑے ہوں۔ گندم اور مٹی کا استعمال سے پہلے ان کا ذلیہ نالیوں میں ڈرنا بڑا چاول استعمال کریں۔

ایسا طعمہ بنانے کے لئے آپ کو درج ذیل اشیاء کی ضرورت ہوگی:

- ۲ کلو آنا گندم یا کٹی
- ۱/۲ کلو گندم یا کٹی کا ذلیہ یا ٹوٹا چاول
- ۱۰۰ گرام کھانے والا تیل
- ۱۰۰ گرام زنک فاسفائیڈ اور مناسب مقدار میں پانی

بنانے کی ترکیب

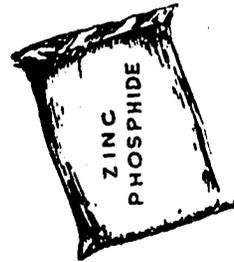
- ۱۔ صاف ستھری باٹی یا کسی اور برتن میں آنا اور ذلیہ ڈال کر اچھی طرح ملائیں۔ ایسا برتن مت استعمال کریں جس میں دوسری ذہریلے دوائی رکھی یا استعمال کی گئی ہوں۔
- ۲۔ اب اس میں زنک فاسفائیڈ ڈال دیں اور اچھی طرح ملائیں حتیٰ کہ ایک جیسا سیس رنگ ہو جائے۔
- ۳۔ تیل ڈالیں اور اچھی طرح ملائیں۔
- ۴۔ اب آہستہ آہستہ پانی ڈالیں اور ملائیں حتیٰ کہ گوند سے جوئے آئے کی طرح جو جائے اور ضروری وقت ہو۔

خلاصہ :- چوہ اور پرندے نمبر ۲

- ۱۔ بارانی علاقوں میں چوہوں کو مارنے کے لئے طعمہ کا استعمال گیس سے زیادہ مؤثر ہے۔
- ۲۔ زنک فاسفائیڈ یا کال دوائی سے بنایا ہوا طعمہ چوہوں کے لئے ایک مفید طعمہ ہے۔
- ۳۔ راکومین اور اناج گندم یا چاول یا کٹی سے بنایا ہوا طعمہ چوہوں کو بہتر طور پر مارتا ہے مگر زنک فاسفائیڈ کی نسبت آہستہ اثر کرتا ہے۔
- ۴۔ طعمہ استعمال کرنے کے لئے مناسب وقت بہت اہم ہے نقصان ہونے سے قبل اس کا استعمال کرنا ضروری ہے۔
- ۵۔ تازہ بنایا ہوا طعمہ نسبت پرانے زیادہ مؤثر ہوتا ہے۔ طعمہ کی کچھ اقسام جلدی خراب ہو جاتی ہیں۔
- ۶۔ طعمہ کو ترکیب کے مطابق بنانا چاہیئے۔
- ۷۔ چونکہ طعمہ ذہریلا ہوتا ہے اس لئے اس کے بنانے میں احتیاط ضروری ہے۔ اس کو تیار کرنے کے بعد اپنے ہاتھوں کو اچھی طرح دھو ڈالیں۔
- ۸۔ طعمہ کو بچھڑوں اور جانوروں سے دور رکھیے اور مناسب جگہ محفوظ کریں۔

راکومین اور زنک فاسفائیڈ کے طعمہ کا مقابلہ

زنک فاسفائیڈ چوہوں کو جلدی مارتا ہے مگر خطرناک ہے۔ اس کے برعکس راکومین آہستہ آہستہ اثر کرتی ہے مگر محفوظ ہے اور زیادہ چوہے مارتی ہے۔ چوہے محفوظ رہنے کے بعد زنک فاسفائیڈ کو کھانا چھوڑ دیتے ہیں مگر راکومین میں نہیں۔



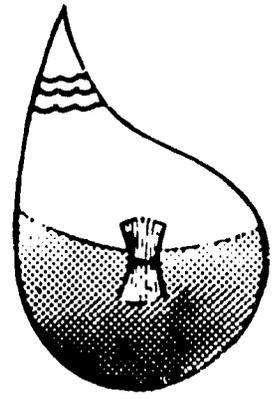
یہ سلسلہ واقعات پر مبنی پرچہ زمینداروں کے لئے بارانی پروجیکٹ - توسیعی سرکاری محکمہ زراعت - ایگریکلچرل ریسرچ انسٹیٹیوٹ ٹرناپ - ریسرچ انسٹیٹیوٹ کٹی جوار - باجرہ پیرساک - مرلوٹا دیہی ترقیاتی پروگرام شمال مغربی سندھ کی منصوبہ - پاکستان ایگریکلچرل ریسرچ کونسل اور یو ایس ایڈ کے تعاون سے تیار کیا گیا ہے۔

بارانی زرعی ترقیاتی منصوبہ

صوبہ پنجاب

گندم پرندوں کو مت کھائیں

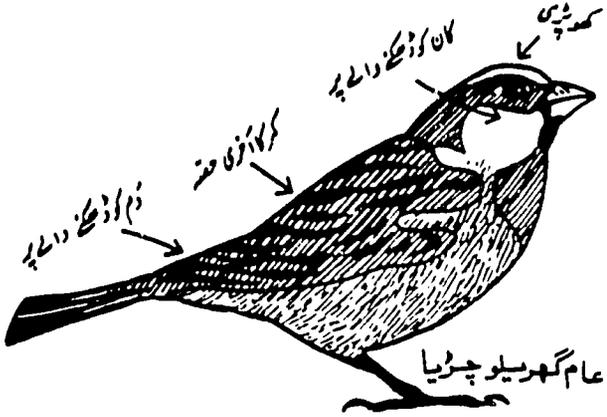
کسانوں کے لئے عام معلومات پرچہ



RODENTS AND BIRDS CONTROL-3
DON'T LET BIRDS
- AT YOUR GRASS

گھریلو چڑیا کی شکل، شبہت اور رہنے بہنے کی عادات

گھریلو چڑیا تقریباً چوہا کی طرح لہلہاتی پرند ہے۔ یہ پرندہ پاکستان کے زمینی اور دیہاتی علاقوں میں بوجھ پایا جاتا ہے۔ اس کے تاج، پشت اور دم کے پرنا کستری ہیں۔ کانوں کے پرفید ہیں اور نر پرندے کے گلے اور چھاتی پر سیاہ دھبے ہوتے ہیں۔



ماہ کا چھلکا حصہ سیاہی مائل بھورا ہوتا ہے اور جیسے کال معاریں ہوتی ہیں۔ اور اس کے گلے یا چھاتی کے درمیان کالے دھبے نہیں ہوتے۔ اگرچہ پیدائش کا کل سارا سال ملدی رہتا ہے لیکن خوردی سے جولائی تک پیدائش زیادہ ہوتی ہے۔ برس ۲ یا ۳ نسلیں بڑی ہر چھاتی ہیں۔ گندم کی کھڑی فصل میں دانے بننے سے برواشت تک یعنی فروری ماہ سے اپریل یا مئی (بطابق قسم گندم) عام گھریلو چڑیا گندم کے لئے خطرناک دشمن ہے۔ پرندے سے تھوڑے تھوڑے وقتوں کے ساتھ تمام دن خوراک کھاتے ہیں۔ اور چھوٹے چھوٹے گروہوں کی شکل میں اڑھار اور جلتے ہیں۔ یہ کھڑی گندم کے خوشوں پر بیٹھ کر اس میں سے دانے کو باہر نکال لیتے ہیں اور



چڑیا گندم کے خوشے پر

خلاصہ :- چوھے اور پرندے نمکبر

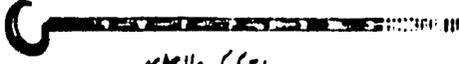
- ۱۔ پاکستان میں پرندے ۳ لاکھ پانچ ہزار ٹن ساونہ گندم اور دوسری دانے دار اجناس کا نقصان کرتے ہیں۔
- ۲۔ گھریلو چڑیا ایک سی کھڑی فصل کا سالانہ ایک لاکھ ستر ہزار ٹن سے زیادہ کا نقصان کرتی ہے۔
- ۳۔ بارانی اور آبپاش دونوں علاقوں میں پرندے گندم کو کیساں نقصان پہنچاتے ہیں۔
- ۴۔ عام گھریلو چڑیا سب سے زیادہ تباہی پھیلانے والا پرندہ ہے تاہم دوسری چڑیاں۔ مثلاً کک اور دوسرے پرندے بھی نقصان کا باعث بنتے ہیں۔
- ۵۔ مؤثر روک تھام کی منصوبہ بندی کے لئے پرندوں کی اقسام، نقصان زدہ فصلوں، اور روپوں کے دیگر متسی عوامل کے بارے میں مکمل معلومات ہونا ضروری ہے۔
- ۶۔ اچھی روک تھام کا انحصار اس بات پر ہے کہ تمام طریقوں یعنی دستی، میکانیکی اور کیمیائی ادویات کا استعمال مجموعی طور پر کیا جائے۔
- ۷۔ کامیاب روک تھام کے منصوبہ کے لئے کسان اور گاؤں کے رہائشیوں سے کا تعاون بے حد ضروری ہے۔

پاکستان کے کچھ علاقوں میں جن میں بارانی اور آبپاش دونوں علاقے شامل ہیں۔ گندم کی فصل کو چڑیا کی وجہ سے ۹۰ فی صد تک نقصان پہنچتا ہے۔ کئی، جلا، باجسہ، سوسہ، مٹی، مسروں اور دوسری فصلوں کو بھی پرندوں کی وجہ سے کافی نقصان ہوتا ہے۔

ایک دفعہ پرندوں کا مسئلہ پیدا ہونے کے بعد ان کی روک تھام کے طریقے کم ہی کامیاب ہوتے ہیں۔ روک تھام کا ایک اچھا منصوبہ تمام سال کے عملی مطالعہ، پرندوں کی عادات اور پرندوں پر قابو پانے کے طریقوں کے علم کی بنیاد پر بنانا چاہیے۔ یہی ضروری ہے کہ روک تھام کے طریقے فوج اور مشافہ کے اصولوں کے مطابق ہوں۔ روک تھام کے طریقے زیادہ جتنے نہیں ہیں۔

گھریلو چڑیا کے علاوہ نقل مکانی کرنے والی چڑیاں بھی ہرج ہرج دھاری دلا لٹا اور دوسرے پرندے بھی نقصان کا باعث بنتے ہیں۔ چونکہ گھریلو چڑیا سب سے زیادہ نقصان پہنچاتی ہے۔ لہذا اس معلوماتی پرچے میں اس کے بارے میں بتایا جائے گا۔ اس سلسلے کا ہر چہ نمبر پرندوں کی روک تھام کے لئے چھندے بنانے کی ترکیب اور کیمیائی ادویات کے استعمال کے بارے میں معلومات فراہم کرے گا۔

ایک منظم طریق پر پتوں سمیت مگر کے تمام افراد میں کسی بھی وقت گھرنے اور ان کے مواد کو تباہ کر سکتے ہیں۔ یہ عمل مارچ تا جولائی پیدائشی عمل کے دوران زیادہ اہم ہے۔ دعات کی ٹبک والی ایک بسی کٹڑی کی چھڑی گھونسوں کو چھین باہر کرنے کے لئے بہت موثر

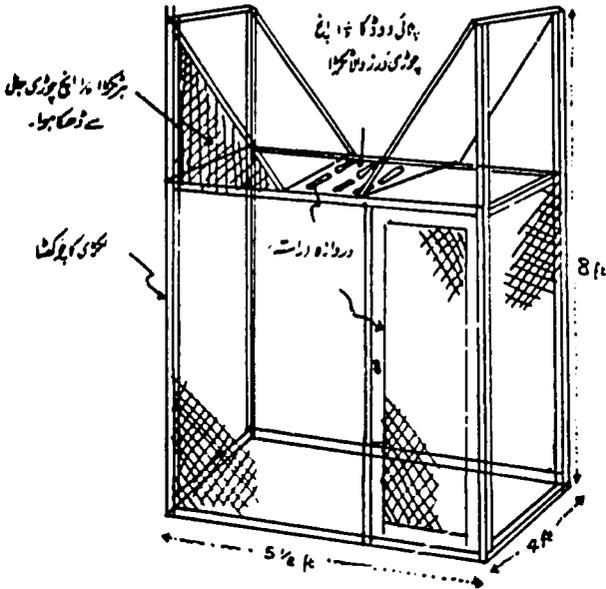


دعات کی ٹبک والی چھڑی

ہے۔ بعض اسی ایک ترکیب سے آپ پرندوں کی آہڑی میں قابل ذکر حد تک مخفی کر سکتے ہیں۔

تیم شدہ آسٹریٹین کوڑا جال جس کے ہارے میں اسی سلسلہ کے پرچہ فریم میں بتایا گیا ہے، کے استعمال سے پرندے پڑنے جاسکتے ہیں۔ یہ کٹڑی کا بنا ہوا ایک پھندہ ہے جسے تاری جالی سے ڈھانپا گیا ہے۔ آپ اسے باآسانی اپنے گاؤں میں بنا سکتے ہیں۔

کوڑے پھرنے والا نیا آسٹریٹین جال



گھریلو چڑیا باریک جال کے استعمال سے ایسی کٹڑی جاسکتی ہے۔ اس کے ہارے میں بھی اسی سلسلہ کے پرچہ فریم میں بیان کیا گیا ہے۔ یہ پھندے ٹیرالین یا نائکین کے بہت ہی نفیس سیاہ دھلے سے بنائے جاتے ہیں اور انہیں دو گھبوں کے درمیان لٹکا دیا جاتا ہے۔ اور رات کے ذریعہ پرندوں کی دنگ تمام اور کشش پیدا کرنے والی ٹیٹیوں کے ہارے میں تفصیلی بیان اسی سلسلہ کے آئندہ پرچہ فریم میں آئے گا۔

والے کو ڈھانپنے والے حصے کو ویسے ہی گھلا چھوڑ دیتے ہیں۔ آپ پرندوں سے کیڑے مکوڑوں سے تقصیل نہ فصل کی صاف پہچان کر سکتے ہیں۔ کیڑے مکوڑے خرشے میں والے کے ساتھ آئے ڈھانپنے والے حصے کو بھی اتنا ہی کھا جاتے ہیں۔

گھریلو چڑیا اپنے گھرنے مٹی کی دیواروں کے سر درمیں وگاس پھرس کی بہت ہڈییر کے درمیان اور دوسری مارتوں میں بناتی ہے۔

فصل پکنے کے موسم میں پانچ آسٹریٹین جالوں کے دوران چڑیا سے گندم کو نقصان پہنچتا ہے۔ جمل ہی لاند ابتدائی شکل اختیار کرتا ہے۔ چڑیا فصلوں سے خوراک حاصل کرنا شروع کر دیتی ہے۔ یوں معلوم ہوتا ہے کہ چڑیا مکمل ڈھکیا والے کو کھانا زیادہ پسند کرتی ہے۔ جب ہالیوں پکنے کو پہنچ جاتی ہیں تو پرندے کھیتوں کے کناروں سے کھیتوں کے درمیان کی طرف چلے جاتے ہیں۔ چٹروں کی روک تمام کا سلسلہ شکل ہے۔ کیونکہ بہت بڑے رتبے میں گندم کی کاشت کی جاتی ہے۔ دافتر میں پلانٹ گھونسوں کے لئے درخت سرسوں اور تمام ملک میں بہت بڑی تعداد میں گاؤں پھیلے ہوئے ہیں جس میں خوراک پرندے کے باہر پھیل کر رہنے کے لئے بہترین مواقع مہیا کرتے ہیں۔

روک تمام کے لئے پرندوں کا جائزہ ضروری ہے

آپ کامیابی سے پرندوں کی روک تمام نہیں کر سکتے جب تک آپ کو ان کے متعلق مندرجہ ذیل متعلق معلوم نہ ہوں۔

- 1- کون سا مخصوص پرندہ آپ کی فصل کو کیا نقصان پہنچا رہا ہے؟ اس کی خوراک، پیدائشی عمل اور گھرنے میں رہنے کی عادات کیا ہیں؟ گل بکتے پرندے ہیں اور وہ گروہوں کی شکل میں کیسے نقل و حرکت کر سکتے ہیں۔
- 2- کون سی فصل کو اور کون سے مرحلے پر نقصان ہوتا ہے؟ کیا فصلوں کا نقصان مقامی ہے یا یہ تمام جگہ پھیلا ہوا ہے۔ فصلوں کے نقصان کا تخمینہ کتنے فی صد ہے۔
- 3- نقصان کا موسم کونسا ہے اور اس وقت پرندے کس خوراک کو ترجیح دیتے ہیں۔ مختلف حفاظتی تدابیر اختیار کرنے کی عملی صورت کیا ہے۔

پرندوں پر کیسے قابو پایا جائے

بارانی علاقوں میں پرندوں پر قابو پانے کی تدابیر کے لئے تین اقدام کی سفارش کی جاتی ہے۔ جیسا کہ اوپر بیان کیا جا چکا ہے پرندوں کا جائزہ لینے کے بعد ان میں ترمیم کی جاسکتی ہے اقدام حسب ذیل ہیں۔

- 1- پیدائشی عمل کے ایام میں گھونسوں اور گھونسوں کے مواد کی تباہی۔
- 2- کھیتوں اور دیہاتوں میں جال کی مدد سے پرندوں کو زندہ پکڑنا۔
- 3- کھیادی ادویات کا استعمال۔

مزید معلومات اور ہدایات ورثہ ویسٹ پیسٹ کنٹرول سینٹر پوسٹ بکس نمبر ۸۴ کراچی - ۳۲ سے حاصل کی جاسکتی ہیں۔

بارانی زرعی ترقیاتی منصوبہ

شمال مغربی سرحدی صوبہ

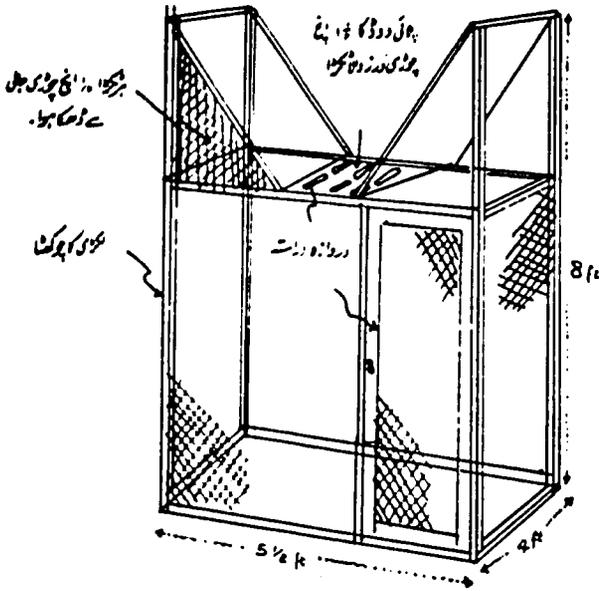
فصل کھانے والے پرندوں کا خاتمہ کریں

کسانوں کے لئے عام معلوماتی پرچہ

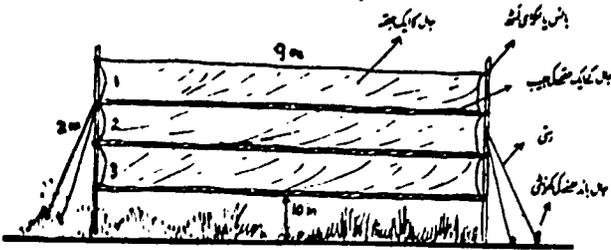


N.W.F.P.

کوٹے پکڑنے والا نیٹ اسکرین جال



پرندوں کو نظر آنے والا جال



خلاصہ :- چوھے اور پرندے نمبر ۴

- ۱۔ اچھی طرح لگائے گئے جال پرندوں کی آبادی قابل ذکر حد تک کم کریں گے۔
- ۲۔ کوٹے پکڑنے والا نیٹ اسکرین جال آپ کے گاؤں میں باآسانی بنایا جاسکتا ہے اور یہ مہنگا بھی نہیں۔
- ۳۔ جال کی بہت احتیاط سے نگہبانی کریں۔ جال میں جانوروں کو ترفیب دینے کے لئے خورداک ڈالتے رہیں اور پھنسنے ہوئے پرندوں کو بعد از ان باہر نکال لیں۔
- ۴۔ باریک جال مقامی طور پر بنائے جاسکتے ہیں۔ اور اگر اچھی طرح لگائے جائیں تو ان سے بہت سے پرندوں کو پکڑا جاسکتا ہے۔
- ۵۔ پرندوں کی نقل و حمل کا مشاہدہ کرنے کے بعد جال کو موثر ترین طریقے پر ٹھیک جگہ پر لگایا جاسکتا ہے۔
- ۶۔ پرندوں پر قالو پانے کے لئے مختلف کیمیائی ادویات کا میانی کے ساتھ استعمال کی جا چکی ہیں۔ ان کو استعمال کرنے سے پہلے کیمیائی ادویات کے ماہر سے جانچ پڑتال کر لیں۔
- ۷۔ کھیتوں کے ارد گرد ترفیب دلانے والی درپوشش (فصل کی کاشت آپ کی فصل کی حفاظت کر سکتی ہے۔ اس بارے میں مشورہ کے لئے اپنے فیلڈ اسٹنٹ سے رجوع فرمائیں۔

کوٹے پکڑنے والا نیٹ اسکرین جال تمام کوڑی کا بنا ہوا ہے۔ اور ہر ۲ x ۲ اینچ کی

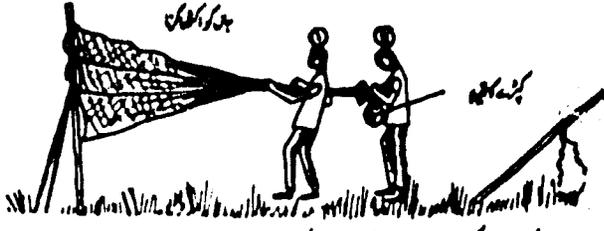
تاروں کی جالی سے ڈھانپا گیا ہے۔

ایک گاؤں کے لئے دو جال اور ۱۵ ایکڑ پر مشتمل رقبے کے لئے ایک جال کام شروع کرنے کے لئے معمولی تعداد ہے۔ آپ کو چاہئے کہ گندم کے نقصان زدہ علاقوں کو زیر نظر رکھتے ہوئے جال لگانے کی جگہ وقتوں وقتوں سے بدلتے رہیں۔ جال میں پرندوں کو پھانسنے کے لئے جانور خورداک اور پانی ضرور ہرنا چاہئے۔ آپ ہر دو جال کو دیکھیں اور مفید پرندوں کو آزاد کریں۔ بلاشبہ آپ دوسرے پرندوں کو نکال کر ختم کر دیں گے۔ کچھ لوگ جال سے پکڑی گئی چڑیوں کو کھاتے ہیں اور ان کا کھانا ہے کہ پرندے سے ایک لذیذ خورداک ہیں۔

گھریلو چڑیاں باریک جال کی مدد سے بھی پکڑی جاسکتی ہیں۔ جو نہایت ہی نفیس سیاہ نائین یا ٹیرالین سے بنایا جاتا ہے اور دو گھبروں کے درمیان عمودی لٹکایا جاتا ہے

جو پرندے تقریباً نظر آنے والے جال میں گرتے ہیں۔ وہ ڈوری کے خانوں کے نیچے والی ڈھیل سیسوں میں پلے جاتے ہیں اور پھر باہر نہیں نکل سکتے۔ دونوں گھبروں کے درمیان ڈوری کے خانے مضبوط ریشہ کے بنے ہوں اور اچھی طرح کچھن کر لگائے گئے ہوں۔ گھریلو چڑیا اور اسی سائز کے دوسرے پرندے پکڑنے کے لئے پڑا یا ٹیٹا اینچ باریک جال استعمال کریں۔ عام طور پر دو گھبروں کے درمیان جال کے چار خانے یا رسیاں ہوتی ہیں۔

آپ ۱۰ سے ۲۰ میٹر لمبا اور ۳ میٹر اونچا جال کہیں بھی بنا سکتے ہیں۔ چھوٹے جال تنگ دالوں میں یا دیگر محدود جگہوں پر استعمال کیے جاسکتے ہیں۔ بہت لمبے جال غیر موثر ثابت ہو سکتے



پرنندوں کی روک تھام کے لئے کیمیاوی ادویات کا استعمال

پرنندوں کی روک تھام کے لئے جرگیمایادی ادویات استعمال ہوتی ہیں۔ ان میں کیڑے کھولنے والے کو بھگانے و مارنے والی اور زہر آلود گولیاں شامل ہیں۔

کیڑے کھولنے والی دواؤں میں میتھوکارب (METHIOCARB) اور مینڈرول (MESUROL) دواؤں پرنندوں کے نغلام ہانڈہ کو خراب کر دیتی ہیں لہذا جن فصلوں پر ان دواؤں کو استعمال کیا گیا ہو پرنندے ان کے نزدیک جانے سے گھبراتے ہیں۔

کیڑے مار دواؤں میں کیڑیٹیکس (QUELETOX) براہ راست پرنندوں کے گھونسلوں یا گھونسلے بنانے والے علاقوں میں استعمال کی جاتی ہے۔

زہر آلود گولیاں ٹرگیٹول (TERGITOL) بھی پرنندوں کے گھونسلوں کے قریب یا گھونسلے بنانے والے علاقوں میں استعمال کی جاسکتی ہیں مگر بڑی احتیاط کی ضرورت ہے تاکہ دوسرے فائدہ مند جانور متاثر نہ ہوں۔ اس بات کا خیال رکھنے میں کہ آپ کے علاقہ میں پرنندوں کی روک تھام کے لئے کیمیاوی ادویات کا استعمال کرنا چاہیے یا نہیں۔ آپ کے محکمہ توسیع زراعت کا ملا آپ کی مدد کر سکتا ہے۔ وہ آپ کو بتائے گا کہ کونسی ادویات استعمال کرنی ہیں۔ اور وہ کہاں سے مل سکتی ہیں۔

پرنندوں کے لئے کشش رکھنے والی فصلوں کا استعمال

چونکہ گھڑیوں پر زیاں کھیتوں کے کناروں سے خوراک پہلے حاصل کرتی ہیں لہذا ایسا ممکن ہے کہ ان کو کھیتوں کے چاروں طرف کناروں پر لگائی گئی فصل کی فٹ رافٹ کیا جاسکے۔ خیال کیا جاتا ہے کہ چڑیاچند فصلوں کو ترجیح دیتی ہے۔ کشش رکھنے والی فصل اس حساب سے لگائی جائے کہ جب اصل فصل کو بچانے کا وقت آئے تو اس سے پیشتر کشش رکھنے والی فصل کے دو حصہ لگائے گئے ہوں مثلاً مکئی یا اچھی پیداوار دینے والی جوار کی اقسام کو بچانے کے لئے جلد پکنے والی باجرا کی قسم کاشت کی جاسکتی ہے۔ آپ اپنی فصل کو بچانے کے لئے جو طریقے استعمال کر رہے ہیں ان کی کشش رکھنے والی فصل کا طریقہ محض اضافی طور پر استعمال کیا جائے۔ ایسا نہ ہو کہ تمام کششیں صرف اسی ایک طریقہ پر محدود کر دیں۔ محکمہ توسیع زراعت کا عملہ پرنندوں کی روک تھام کے ہانس میں ماہرانہ رائے دے سکتا ہے۔

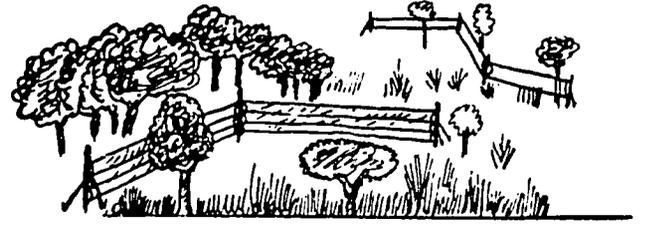
ہیں۔ کیڑے کھولنے والے پرنندوں کو لنگر آجائیں گے۔ کندوں پر لگانے کے کچھ یا تو بالوں کے سہوں یا کسی اور جلی کڑی یا دھت کے۔ ایسے کچھ آسانی سے لائے اور لے جانے جاسکتے ہیں۔ جو جلی دھت کے ۵۰ امیٹر کی لمبائی پر اس اخلا سے لائے جائیں کہ ضرورت پڑنے پر انہیں ایک دوسرے سے جوڑا جاسکے۔

پرنندوں کے گھونسلوں کی مدد میں تاکہ وہ زمین سے جے زمین اور جلی کو اچھی طرح کس کر سنبھالے رکھیں۔ انہی رسیوں کو خراب کسی ہوئی ہوتی چاہئیں جب کہ عمودی رسیاں ڈھیلی ہوئی چاہئیں۔

جال کی سطح زمین سے تقریباً ۱۰ اینچ بلند رکھیں۔ گھبوں کے درمیان رسیاں نیچے سے اوپر تک باقاعدہ ایک ہی فاصلے پر ہونی چاہئیں۔ ایک خاص فاصلے سے پرنندوں کی نقل و حرکت کے شاپر کے بعد رسیاں لگانے کی عین درست جگہ متعین کی جاسکتی ہے اور اسی نسبت سے ترتیب دی جاسکتی ہیں۔

پرنندوں کے گھونسلوں کے قریب باریک جال کی بالترتیب صف بندی بہت سی چڑیاں پکڑنے کا ایک موثر طریقہ ہے جیسا کہ شکل میں دکھایا گیا ہے۔

پرنندوں کے پھالوں کے نزدیک جال لگانے کا طریقہ



جال سے پرنندوں کو باہر نکلنے کا طریقہ آپ کے لئے کچھ مشکل ہو سکتا ہے جب تک کہ آپ کو ایسا کرنے کی کچھ مشق نہ ہو جائے۔ جس راستے سے پرنندہ اندر داخل ہوا ہے اسی راستے سے باہر نکلنا چاہیے۔ پہلے پرنندے کے پاؤں کو حال کے پھندے سے چھڑائیں اور انہیں ایک ہاتھ سے پکڑیں تاکہ وہ دوبارہ جال کے پھندے کو نہ پکڑ سکیں۔ اب جال کے ڈھیلے پھندے کو سب سے پہلے پرنندے کے پوروں اور جسم کے اوپر سے آگے کی طرف آتاریں اور پھر سب سے آخری سر کے اوپر سے پھندے کو گزادیں۔

جال بڑی آسانی سے آتار کر اکٹھا کیا جاسکتا ہے اور دوسری جگہ لے جایا جاسکتا ہے اس کام کو کرنے کا طریقہ یہ ہے کہ دو آدمی لگے کام کریں۔ ایک آدمی جال کو تھیلے میں ڈالتا جائے اور دوسرا جال کو زمین سے اوپر اٹھائے رکھے۔ جیسا کہ شکل میں دکھایا گیا ہے۔ عام طور سے سفارش کی جاتی ہے کہ جال کو رات کے وقت آتار لینا چاہیے تاکہ بڑے جانور اس میں داخل نہ ہوں۔

COMPLETED
FACT SHEETS
IN
ENGLISH *

*In some cases, fact sheets were only printed for one province; this packet contains one fact sheet on each subject for either NWFP or Punjab province.

PLANT GOOD WHEAT SEED



A fact sheet for farmers

Summary

1. Good seed is pure seed—that is, one variety only and free from weed and other crop seeds.
 2. Germination should be 80% or better.
 3. Seed should be well matured, large size, free of damage from diseases and insects.
 4. Good seed is free from shrunken and broken kernels.
 5. Good seed will not have a musty or sour smell.
 6. Good seed will not contain sprouted seeds.
 7. It is a variety recommended for your area.
- A. When choosing wheat seed, you should consider:

1. *Seed purity*—this means one variety.
 - (a) If you must have a mixture, the varieties should be of the same maturity. For example, never mix an early variety with a late one.
 - (b) Seed should be free from other crop seed such as oats, barley, gram, mustard, etc.
 - (c) Pure seed has no broken or damaged kernels, weed seed, straw or other foreign matter.



Insects and insect damaged kernels



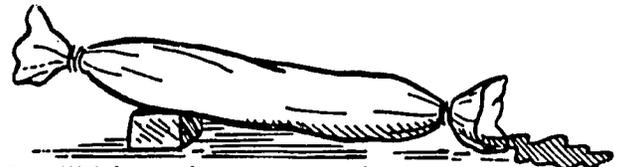
An unfinished seedbed



A good seedbed

2. *Germination*—it should be 80% or above. (At least 80 out every 100 seeds should germinate).

- (a) If your seed germination is less than 80%, you should increase the rate of seeding proportionately.
- (b) Never plant seed of less than 60% germination.
- (c) A ragdoll germination test is a good method to determine the viability of your seed. Or you can test the seed by putting it between two pieces of moist blotting paper. (See Fact Sheet No. 9 for information on these tests). In either case, you will know after about nine days what your percent of germination is.



3. *Weight and Appearance*—Your wheat seed should be heavy. In appearance, the seed should be plump, bright and free from insect damage. It should not be shrivelled or broken.
4. *Diseases*—Wheat seed should have no diseases. It should be from disease free fields. You should treat the seed with a fungicide before planting it.

B. When producing your own seed

1. *Select a variety* adapted to your area.
2. *Follow recommended sowing time* as given on Table 1.

3. *Observe your field* to see that it is free from leaf rust and flag smut.
4. *Prevent mixing* with another variety or crop by having a buffer strip if another variety of wheat is planted near.
5. *Select the area* from which you will save seed soon after the wheat has headed out.
 - (a) Rogue it to remove all other varieties and other crops.
 - (b) Keep the area free from weeds, diseases, and insect damage.
 - (c) Select only plump kernels. Avoid shrivelled seed.
6. *Harvest, thresh and store* the seed properly.
 - (a) Clean thresher before threshing selected seed. When not using machine thresh on the upper level.
 - (b) Store in clean bags or a clean bin.
 - (c) Before planting next season, clean the seed again and treat it with a fungicide.



Having good seed wheat is an important first step in getting a big wheat crop.

TABLE I

Varieties Grown in Barani Area of Punjab Province

Variety	*Time of Sowing	Recommended Seed Rate (Kg/acre)	Leaf Rust	Flag Smut
1. Lyallpur-73	Oct. 25—Nov. 15	35	R	+
2. Nuri	Oct. 25—Nov. 15	35	R	+
3. Blue Silver (Sonalika)	Nov. 24—Dec. 31	38	R	S
4. SA-75	Nov. 15—Dec. 15	38	R	+
5. Arz	Nov. 10—Dec. 10	38	R	+
6. Sandal	Nov. 15—Dec. 10	35	I	S
7. Mexi-Pak-65	Oct. 20—Nov. 15	38	S	S
8. LU-26	Nov. 15—Dec. 5	35	MS	S
9. Barani-70	Oct. 15—Nov. 15	30	S	+
10. Pothowar	Oct. 8—Nov. 1	30	VS	S
11. C-591	Oct. 20—Nov. 15	30	S	S
12. C-271	Oct. 20—Nov. 15	30	S	S

*Seed Rates and times are approximate only—subject to change with moisture availability. At elevations of 3000 to 5000 feet, planting dates should be ten days earlier.

Abbreviations:

R	— Resistant	S	— Susceptible
I	— Intermediate	VS	— Very susceptible
MS	— Moderately susceptible	+	— Data not available

In the above table, variety numbers 1 through 5 are highly recommended. Note that Mexi-Pak-65, LU-26, C-591, C-271, Pothowar and Barani-70 are susceptible to leaf rust infections. Pothowar and Barani-70 are not on the approved seed list.

TREAT SEED WITH A FUNGICIDE



A fact sheet for farmers

Summary

1. Treating your wheat seed before planting will help control many soil and seed-borne diseases.
2. Treating your wheat seed is not expensive.
3. Your Agricultural Extension Service staff can help you get a recommended seed treatment chemical.
4. Complete coverage of the seed is required for good protection.
5. You can treat your seed at home.
6. The fungicide you use is a poison. Handle it carefully.
7. Never let humans or animals eat any of the seed you have treated.
8. Mark your treated seed with a tag and store it carefully.

Why Treat Seed?

Your wheat seed should be protected against disease damage when it is planted. This is important because it will help ensure a good stand and get the crop off to a good start at small cost.

Fungicide seed treatment increases germination and protects the seed against soil-borne diseases. It also prevents some seed-borne diseases.

How Should a Fungicide be Handled?

Fungicides are chemical poisons. You must handle them carefully and properly.



1. Don't touch the chemicals or seed that has been treated unless you wear gloves or have plastic bags on your hands.



2. Cover your nose with a cloth or mask. You must not breathe the dust.



Don't use the gloves or mask for anything else when you have finished treating the seed.

3. Never allow humans or animals to eat treated seed. If you broadcast the seed, cover it as soon as possible to prevent birds, chickens, and other animals from eating it. Bury unused treated seed deep in the soil.
4. Wash your hands and face and other exposed parts of your body after treating the seed.

What Seed Treatment Chemicals are Recommended?

Several are on the market. If you can't get the first one, try to get one of the others. They all help you control diseases.

1. **VITAVAX**—Use one spoonful for 1/2 maund (2 oz. for 28 Kg.) of seed wheat. This fungicide controls loose smut and other seed-borne diseases like bunt. It is called a systemic fungicide because it is absorbed and distributed to the seed and seedling tissue. It can be combined with other fungicides to control seed rots and seedling blights.



2. **GRANOSAN**—Use 1/2 spoonful for 1/2 maund (1 oz. for 28 Kg.) of wheat. This is a seed protectant and will prevent injury to the seedling by soil-borne and seed-borne organisms after planting.

3. **ARASAN**—Use about three quarters of a spoonful for 1/2 maund (1-1/2 oz. for 28 Kg.) of wheat.
4. **AGROSAN**—Use one spoonful for 1/2 maund (2 oz. for 28 Kg.) of wheat. Like Granosan, it is a seed protectant. It controls the same diseases and helps prevent seed decay. You can use this fungicide or any of the others—whichever is easier to get

How is Seed Treated?

Treating just means a good mixing of the chemical with the wheat seed. The field staff of the Agricultural Extension Service located in your area will show you how if you ask them.

1. First determine how much seed you will treat and then select a container in which you will put the seed and the chemical. For small amounts of wheat (5 to 8 Kg) you might use a clean empty bag or empty parafin can.

A clean empty parafin can is good for treating small amounts of wheat.



Another way is to make a very clean place on the floor and mix the wheat and chemical as these drawings show. You must be protected from the wind. Or you may be able to use a mechanical seed treater if there is one in your village. With a mechanical seed treater, you can treat more seed in less time and do it more accurately. In these pictures, you see two types of mechanical seed treaters.

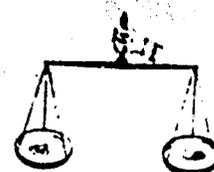


A revolving drum type seed treater like this can be made easily from an old steel barrel with the help of a mechanic.

This is a commercially made seed treater which does an excellent job of treating seed. There may be one in your village.

Notice the farmer has his nose covered as he puts the seed treating chemical in with the wheat.

2. Measure out the required amount of chemical for the seed you have. If you have scales, it is better to weigh the chemical and the wheat because you can do a more accurate job of treating the wheat. It will be easier to mix the chemical and the wheat if you first mix about 1/2 Kg. of dry powdered clay soil with the chemical.



3. Shake or stir or turn the crank till the chemical and the wheat are completely mixed. This may take several minutes. Every kernel of wheat must be covered with the chemical.
4. When you have finished mixing the seed and the fungicide, put the treated wheat in a clean bag and label it with the kind of treatment and the date. Then store the bag in a safe dry place.



PREPARE A GOOD SEEDBED



A fact sheet for farmers

Summary

1. A well prepared seedbed is important if you are to have a good crop of wheat.
2. You should plough early (during late August) to control weeds and save soil moisture.
3. The first ploughing should be at least 16 inches (15 cm.) deep.
4. Later ploughings might be 4 inches (10 cm) deep to keep weeds down. Weeds use valuable moisture.
5. Use recommended doses of fertilizer containing nitrogen and phosphorus or apply them separately.
6. Put most of the fertilizer on your field at the time of last ploughing and work it into the soil.
7. Fertilizer is most effective if placed just below and to one side of the wheat seeds.
8. Apply additional nitrogen fertilizer during the tillering stage of the plants if moisture conditions are good.

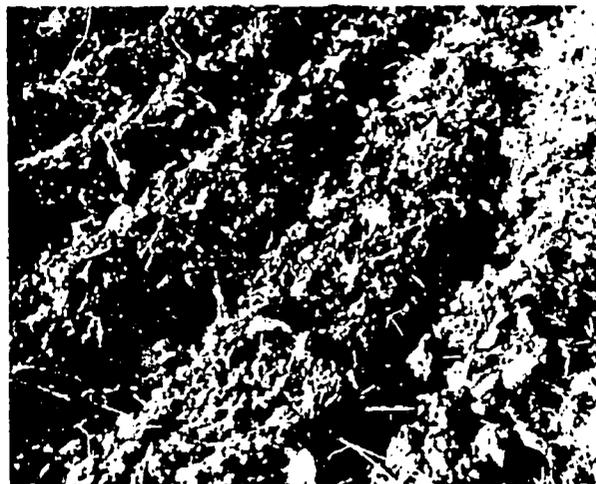
A most important step after selecting and treating your seed is to prepare a good fertile seedbed—*early*.

A well prepared seedbed has been ploughed and planked with a swaga until the surface looks like the good seedbed shown below in the picture.

However, the seedbed should not be so fine that wind and water will easily erode it.



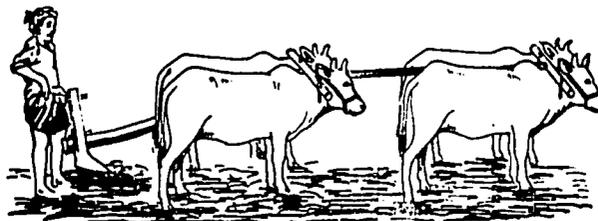
A good seedbed



An unfinished seedbed

Early ploughing (during late August) for wheat reduces weeds, saves soil moisture, and helps release soil nitrates so the plants can use them. Early ploughing is good for fallow fields, also.

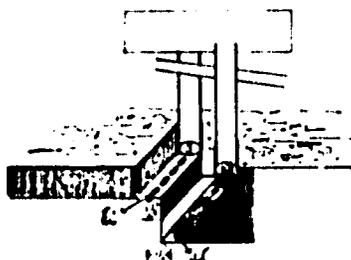
Plough immediately after harvest those fields on which a kharif crop was grown (maize, sorghum, millets, groundnuts, etc.) The first ploughing after a crop or on fallow land should be at least 6 inches (15 cm) deep. If you have two large bullocks or four small ones or a tractor you can do this easily. If you have only one bullock, just plough as deeply as you can.



Later tillage operations may be done four inches (10 cm.) deep every two to four weeks as required to control weeds and maintain a soil mulch (loose-top-soil) until planting time.

Most barani soil has a low level of fertility. Therefore, you will normally need nitrogen and phosphorus fertilizer to produce a good wheat crop.

The best time to apply fertilizer is before the last tillage operation just before seeding. This will mix the fertilizer with the soil in the root zone of the seedbed. If you broadcast the fertilizer by hand, treat only as much land as you can plough in one day. This is very important if you use urea as a source of nitrogen. Urea should be mixed with the soil as soon as possible after application to prevent loss.



If applied in the row, fertilizer should be near the seed but not touching it. This drawing shows the best place to put the fertilizer. It is 1-1/2 inches (2.4 cm) below and the same distance to one side of the seed. This method of application requires a seeder with a fertilizer attachment. There may be one in your village for use with bullocks or a tractor.

Nitrogen fertilizer stimulates vegetative growth, yield, and protein content of the grain. Because nitrogen moves in the soil and may be lost, in areas of heavy rainfall (500mm or more), you should apply a part of the total fertilizer as a top dressing during the tillering stage of the plants. In areas of high rainfall, all the phosphorus and up to 70% of the nitrogen fertilizer should be applied by broadcasting just before the last ploughing. Then save the last part of the nitrogen fertilizer for the tillering stage of the wheat. Top dress the crop only when the plant leaves are dry. If the leaves are wet, nitrogen can burn them. In areas of lower rainfall, check with the field staff of your Agricultural Extension Service before you do any top dressing of wheat.



Phosphorus fertilizer stimulates root growth and early plant vigour. Therefore, apply the phosphorus fertilizer before seeding so it will be available to the young plants. Phosphorus and nitrogen fertilizers can be applied as a mixture or can be put on separately. Table 1 shows the recommended doses of various kinds of fertilizer for the Barani areas.

TABLE 1

Recommended Doses of Fertilizer for Wheat in the Barani Areas

Amount of Rainfall	Doses of Fertilizer per Acre. Nutrients in Kg. and Lbs.			Quantity in Bags per acre
	Nitrogen	Phosphorus	Potash	
Up to 350 mm annually (low rainfall)	23 Kg. or 50 Lb.	23 Kg. or 50 Lb.	—	One bag of DAP and $\frac{1}{2}$ bag of urea at sowing time or Two bags of Nitrophos at seeding time or 2 $\frac{1}{2}$ bags of SSP and 1 $\frac{1}{2}$ bags of Ammonium Nitrate with 2 bags of Ammonium Sulphate.
Between 350 mm and 500 mm annually (medium rainfall)	34 Kg. or 75 Lb.	23 Kg. or 50 Lb.	—	One bag of DAP and one bag of urea at sowing time or 2 bags of Nitrophos and $\frac{1}{2}$ bag of urea or 2 $\frac{1}{2}$ bags of SSP and 2 $\frac{1}{2}$ bags of Ammonium Nitrate with 3 $\frac{1}{2}$ bags of Ammonium Sulphate.
500 mm and over annually (heavy rainfall)	41 Kg. or 90 Lb.	27 Kg. or 60 Lb.	—	1 $\frac{1}{2}$ bags of DAP and 1 $\frac{1}{2}$ bags of urea at sowing time or 2 $\frac{1}{2}$ bags of Nitrophos and $\frac{1}{2}$ bag of urea or 3 bag of SSP and 3 $\frac{1}{2}$ bags of Ammonium Nitrate with 4 bags of Ammonium Sulphate.

One exception to the above recommendations might be on suburb land that has received large applications of farmyard manure. Here less nitrogen fertilizer could be used and you might eliminate the phosphorus fertilizer.

PLANT WHEAT PROPERLY
a fact sheet for farmers

Summary

1. Correct seeding is important for a good yield at harvest.
2. For a good stand of wheat, you must have the right number of well spaced seeds placed at the right depth.
3. Soil temperature, moisture, and availability of oxygen in the soil will affect your stand of wheat.
4. A good stand of wheat requires a firm seedbed with a loose soil mulch on top.
5. Seeding can be done effectively with a pora or one of the mechanical seeders available.
6. Mechanical seeding equipment enables you to seed at a more uniform depth. You can measure and spread the right amount of seed per acre more accurately with mechanical seeders than by broadcasting.
7. You should select mechanical seeding equipment carefully because some of it is not well made or adapted to your needs.

If you want a good stand of wheat, consider these seeding conditions.

A. What are best conditions for seeding?

1. Temperature - the best soil temperature is 4 to 15 degrees C. and best air temperature is 15 to 20 degrees C. Higher soil temperatures promote fungus diseases, insect pests, and injure emerging seedlings. Delay seeding till hot weather has gone.

2. Moisture - Wheat seed must be in contact with moist soil if it is to germinate well. If the soil is overworked or is kept too loose, to a depth of several inches, the moisture will evaporate.

If soil moisture is within two or three inches (5 to 7 cm.) of the surface, seed can be safely sown. When you squeeze a handful of soil, it should be somewhat crumbly but hold together under pressure. The first plowing should be six inches (15 cm.) deep. Later ones may be four inches (10 cm.) or less - just enough to kill weeds and maintain a shallow mulch which conserves moisture.

3. Oxygen - Waterlogged areas reduce seed germination because of lack of oxygen. Don't plant in wet places until the soil has dried out and the crust is broken up.
4. Loose top mulch - This will discourage weeds from growing. Weeds compete with the crop by using moisture, light, and soil nutrients.

B. Where and how should seed be placed?

1. Depth - Preferred depth is 1 1/2 to 3 inches (4 to 7 1/2 cm.), depending on moisture conditions. Seed placed deeper than 8 cm. will be slow to emerge and the number of plants will be reduced. Seed left on the surface may be taken by birds and rodents and it may dry out.
2. Distance from fertilizer - seed should not be in contact with fertilizer. The best placement is a little below and to one side

of the seed. If you don't have fertilizer placement equipment, the fertilizer should be broadcast just ahead of plowing.

3. Rate of seeding - (see Wheat Fact Sheet No. 1) provide enough plants evenly spaced to fully utilize all growth conditions - moisture, fertility, sunlight. Usually this is 275 to 300 seeds per square meter. Some varieties can use more space because of greater tillering habit. Later plantings require more seed than early plantings. Broadcasting requires more seed than drilling. You can also use higher rates of seed in high rainfall areas (over 500 mm).
4. Row spacing - 6 to 8 inches (15 to 20 cm.) apart is desirable. Weeds can become a problem if the rows are more than 20 cm. apart, and yields will decline if spacing is more than 35 mm. Late seeding should be planted in narrower rows.
5. Method of seeding - either broadcasting or drilling of wheat in rows can be done satisfactorily. Drill seeding is preferred because it usually produces 15 to 20 percent higher yields. Drilling also gives better control of seeding rate, depth of planting, and uniformity of row spacing. The pona attached to a plow is an effective way to seed wheat and is quite commonly used. When you broadcast the seed, it is difficult to spread it evenly and to cover it uniformly. You should walk at a constant speed and try to cover a strip about three meters wide. You can go over the field with a plank to cover the seed or if you have a tractor, use a light harrow. Do not cover with more than 1 1/2 inches (6 cm.) of soil.

When seeding with a drill, keep the speed constant at 4 to 8 km. per hour. Press wheels at the back of the drill or some other mechanism should firm the soil over the seed to insure good contact with the soil.

C. What are the precautions when selecting and using mechanical seeders?

1. Selecting grain drills

Several manufacturers make bullock and tractor-drawn grain drills. If you get one, be sure it is well designed.

The feed mechanism that lets the seed down to the ground must be accurate and correctly spaced. If you have a fertilizer attachment, the feed mechanism must be accurate, also. The rate control lever must be easy to adjust and stay in position once it is set. A walk plank at the rear of the drill going all the way across is useful because it enables the operator to watch the flow of seed and fertilizer. If either one bridges over and stops flowing, the stand will be poor.

2. Adjusting and maintaining grain drills

Read the seeding chart on the drill or in your operator's manual. Then determine the amount of seed you need per acre and set the rate control lever at this figure.

The rate of seeding is affected by size, shape, and density of the seed in the box and size of the opening through which the seeds must pass. To be sure your drill is seeding accurately, calibrate it as your instruction manual describes. Your field representative of the Agricultural Extension Service can tell you more about calibrating your drill.

Maintaining your drill means keeping it clean and well lubricated. Always clean the grain box before putting seed in it. You should also keep the fertilizer box clean and the feed mechanism free from foreign matter. Never leave fertilizer in your drill when you finish seeding.

Lubricate all moving parts and see that they turn freely. Turn the feed shafts several times with an adjustable wrench to be sure they turn easily. Check the adjustable feed gates to see that they are open so the grain will pass through freely and that the gates move easily.

CONTROL WEEDS IN WHEAT
a fact sheet for farmers

Summary

1. Weeds can seriously reduce the wheat crop at harvest.
2. Farmers should recognize weeds that do most damage.
3. Weeds use water and soil nutrients that the wheat should use.
4. Weeds compete with the wheat plants for space and sunlight.
5. Weeds are hosts to insects and plant diseases.
6. You can control weeds easily without much expense.
7. Chemical weed control (herbicides) is effective if used properly.

A good wheat field does not have weeds in it. Weeds are easiest to control when they are small.

How do weeds cause loss?

Weeds are plants growing where they are not wanted. They cause loss to the farmer by competing with crops for water, soil nutrients, sunlight, and space. When weeds are young, they develop a rapidly spreading deep root system which gives them an advantage in obtaining water and nutrients. This competition to wheat plants in their seedling and tillering stages is very serious.

Weeds provide a home for insects and plant disease. Weed seeds contaminate feed and crop seed. Weeds also reduce the effectiveness of machinery and increase costs of harvesting and threshing. Some weeds are poisonous to livestock and to humans.

Weeds spread easily because generally they produce large numbers of seeds. Many varieties of weed seeds will remain viable for several years. Each kilogram of weeds (dry matter) produced in your field means one kilogram less of wheat at harvest time.

How can weeds be controlled?

The two most important methods of weed control are cultural and chemical. Cultural methods are less expensive on small fields and easy to do. The chemical method means spraying your fields with herbicides (chemical weed killers).

A. Cultural practices

1. First, you must know the kind of weeds that grow in your area. Are they annuals or perennials (living more than one year)? Are they broadleaf weeds? Some of the more important characteristics to help you identify weeds are: leaf shape, leaf arrangement, flower color, length of plant life, and root system. Weeds are easiest to identify when they are nearly mature in growth and are flowering. Once you know the mature plant, it is easier to identify the seedlings. The field staff of your Agricultural Extension Service can help you identify the weeds.
2. Plant wheat that is free from weed seed. If you raise your own seed, clean it before planting. If you buy seed, examine it first for weed seeds.

3. Make your crop compete with the weeds. A strong, healthy wheat crop which is properly spaced and well fed with fertilizer can compete more successfully with weeds.
4. Kill the weeds before planting your crop. If possible, let the weeds germinate and then do a shallow tillage of the soil to kill them before seeding the wheat. During dry weather in barani areas, tillage may not be necessary before seeding. A loose dry mulch at the top of the soil helps prevent weed seed germination after you plant the crop.
5. If possible, have a different crop each year on your field. This is called rotating the crops. For example, follow a grain crop with a cultivated crop. This will control some of the weeds.
6. Remove the weeds. Remove weeds either by hand or with mechanical equipment. You can use hand tools effectively when the plants are small. The kurpi is a good tool. Or you can pull the weeds by hand.
7. Control weeds when they are small. Small weeds are much easier to kill than large ones. Killing small weeds prevents early crop damage which lowers the yield. When the weeds are large, they have already taken nutrients from the soil and the weeds are more difficult to kill.
8. Prevent weed seeds from forming. Never let the weeds go to seed because you will have more weeds next year. If the weeds do not form seeds, there will be fewer in the soil to compete with your next crop.

B. Using herbicides

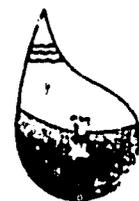
Herbicides are chemicals which control weeds safely and successfully. Farmers should learn what these chemicals are and how to use them properly

on their crops. New and better herbicides frequently appear on the market.

1. Advantages of herbicides - large areas can be covered in a short time. Many herbicides are selective; that is, they will kill only certain weeds. For example, 2, 4-D will kill broadleaf weeds in wheat. Chemical control when weeds are small means fewer difficulties at harvest time. This also promotes more uniform development and maturing of the crop.
2. Guidelines for using herbicides
 - a. Select the chemical that will kill the weeds you want to get rid of.
 - b. Apply the chemical when it will be most destructive to weeds but will not cause ill effects on the wheat crop. Weeds are killed most easily by chemicals when the weeds are small.
 - c. Apply at the correct rate of application - no more, no less. You must know the size of your field (area in acres or kanals) in order to determine how much of the herbicide you will need.
 - d. Be sure that you have uniform distribution of the chemical.
 - e. Treat only the area where weed control is desired.
 - f. Consider air temperature and wind before spraying. Temperature should be between 6 and 20 degrees C. There should be no wind to blow the spray where it is not wanted. Do not spray if it is raining or the herbicide may be washed off the plants.

Your field staff of the Agricultural Extension Service can give you more information on controlling weeds with herbicides.

CONTROLLING DISEASES IN WHEAT



A fact sheet for farmers

Summary

1. Diseases of wheat and other cereal crops in Pakistan cause substantial losses in yields.
2. The most common diseases of cereals are rusts, smut and bunt.
3. Three major types of rust prevalent in Pakistan—black rust, brown rust and yellow rust.
4. Rust spores which affect wheat plants may be carried by the wind for hundreds of kilometres.
5. The most successful method of controlling rusts, smut and bunt in Pakistan is to plant resistant varieties.
6. Improving the soil and plant growth conditions will help plants withstand diseases.
7. Seed treatment will help control some of the diseases of wheat.

Many diseases attack wheat and other crops in Pakistan reducing their yields. The common diseases are rust, smut and bunt. Most diseases of wheat are caused by fungi although some may be caused by bacteria and viruses. The fungus which causes these diseases is a tiny living organism which develops from microscopic seed-like structures called spores. In the case of wheat spores get inside a seedling or an adult plant or the seeds and make a home there.

If the temperature and moisture conditions are favourable, the organism feeds on the plant and increases in size. The plant is damaged and symptoms of the disease begin to show on it.

In the case of wheat rust, the diseased areas become covered with spores which seem like a powder. The areas are yellow, brown or black depending upon which rust disease has infected the plant.

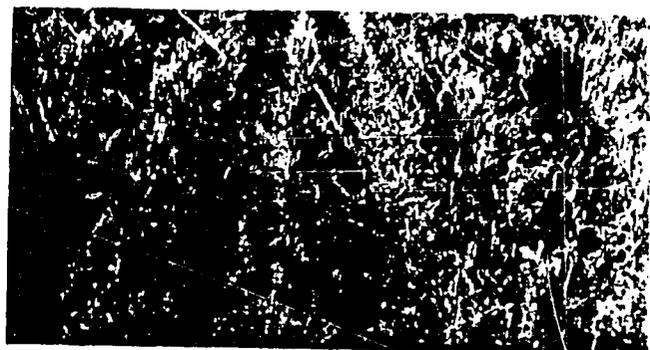
If the wheat plant is healthy, it may resist the organism growing in its tissues. If the plant is weak or susceptible to the organism, it will get the disease and finally will die.

The Wheat Rusts

The three major rusts which affect wheat in Pakistan

are black rust (stem rust), brown rust (leaf rust), and yellow rust (stripe rust).

Spores of the fungi which infect wheat plants are so small and light that they may be carried by the wind for hundreds of kilometres. The spores may be carried by water, insects or animals. People also may carry the spores by moving plant materials, seeds, or farm machinery from place to place.



Weather conditions have a strong effect on these diseases. Warm, humid conditions favour rust development. Hot, dry weather may decrease rust infection. However, if the plants are already badly infected by rust, then hot, dry weather may increase the losses caused by the disease.

The most successful way to control rust and prevent losses from it is to plant seed from varieties that are resistant to rust diseases. You should never use seed of varieties that you know are susceptible to rusts. Because the organisms which cause rust of wheat change over a period of time and affect plants that were formerly resistant, plant breeders are constantly working

to produce new varieties which are resistant to prevalent rust strains.

Agricultural scientists are now able to breed different characteristics into plants which will cause the plants to react to disease organisms in specific ways. For example, the new wheat plants may resist a particular new strain of rust. It requires several years to do this, however. The strains of rust often change so plant breeders must work continually to meet this challenge.

In some cases, fungicides can be sprayed on a field to help control rust. This requires rapid application of the fungicide at a specific time over large areas and special equipment is needed to do it. Equipment to apply chemicals in this manner is expensive and may be practical only where the fields are very large and application methods are carefully controlled.

Planting date also affects the probability of rust attacking wheat. Early seedings may escape the disease. Late seedings are more susceptible to attack by stem (black) rust and leaf (brown) rust. With stripe rust, late plantings may be damaged less because hot weather retards the disease.

Improving soil and plant growth conditions will produce healthier and more rapidly growing plants which are better able to resist or outgrow a disease. Destroying weeds also will help make healthier plants that are better able to fight disease. Another disease



control measure is to rotate your crops, that is, change crops from year to year on the same piece of land. In this way, you may plant your wheat on land that does not have the disease causing organisms in it. If your cropping system will permit, plant wheat on land that has not had wheat growing on it the last few years.

Healthy plants are better able to withstand disease.



Bunt and Smut on Wheat

Bunts and smut are also caused by fungi but in these cases, the seeds on the heads of wheat are destroyed and are replaced by black fungus spores.



Both bunt and loose smut are best controlled by the use of resistant varieties and by using seed that is known to be free from the disease. Seed treatment which is described in Wheat Fact Sheet number 2 will help control these diseases of wheat. Ask your Agricultural Extension Service staff about the fungicides to use in treating your seed.

Karnal bunt (partial bunt) occurs frequently in Pakistan and can reduce yields seriously. The best control for karnal bunt is to use resistant varieties.

Other Diseases

Mildews, root rots, leaf blotches, stem rots and other diseases may be a problem but are usually less serious than the rusts and smuts.

For these other diseases, the use of resistant varieties is your best method of control. Sometimes fungicides will be of help. Ask your Agricultural Extension staff about using fungicides for these diseases. They can give you up-to-date information since the recommendations change from year to year. They can also give you an up-to-date list of recommended varieties which will resist diseases.

Don't let diseases ruin your crop.

USING FERTILIZERS FOR WHEAT



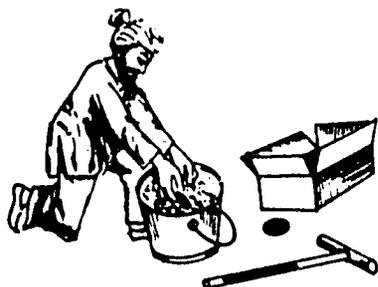
A fact sheet for farmers

Summary

1. Most Barani soils have a low level of fertility so wheat (and other crops) will respond profitably to the use of fertilizer.
2. The sunlight, air, water, and warmth which your plants need will be utilized fully only if they have enough food from the soil.
3. You can get recommendations for fertilizers in your area from your Agricultural Extension staff and from other sources.
4. Farmyard manure, and commercial (chemical) fertilizers are effective and are the commonly used in Pakistan.
5. At least 13 different nutrient elements are needed by plants.
6. Three elements, nitrogen (N), phosphoric acid (P_2O_5) and potash (K_2O) are used by plants in far greater quantities than the others.
7. It is not difficult for you to compute the amount of fertilizer you need from the formula on the bag.

"Take care of your soil and it will take care of you". This good advice means that if you till your soil well and supply it with the correct amount of plant food nutrients, it will provide you with the maximum profits.

Most soils in the Barani areas are lacking in one or more of the commonly needed nutrient elements. The amount of fertilizer you apply should be determined not only by the cost of the fertilizer but by the extra crop yields you can expect and by the results of a soil test that tells you which elements your soil needs most for the crop you are growing.



Even though you have ample water, sunlight, air and warmth, these cannot be utilized fully by the plants if your soil is lacking in plant food nutrients.

The amount and kinds of fertilizer recommended for crops in your area are given by the Soil Fertility Survey and Soil Testing Institute periodically. You may get a copy of their recommendations from your Agricultural Extension Service staff or by writing to this address:

Director, SOIL FERTILITY SURVEY
and SOIL TESTING INSTITUTE
Lahore, Pakistan.

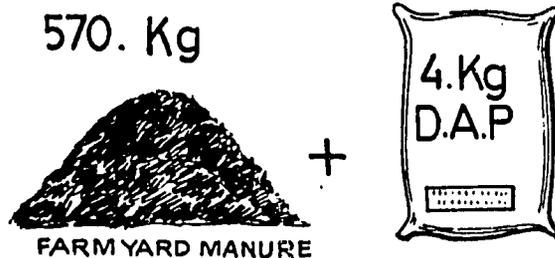
Sources of Plant Food Nutrients for the Soil

The two common sources of plant food nutrients that can be added to your soil are farmyard manure and commercial (chemical) fertilizers.

1. Farmyard Manure

This is an excellent source of organic matter. However, as a source of mineral nutrients, it is quite low when compared to chemical fertilizers. When properly stored, spread and mixed into the soil, it has more influence on crop production than you might think. This is because farmyard manure increases the soil's water holding capacity and improves the soil structure. This reduces soil erosion and the amount of crusting of the soil.

To get the best use of farmyard manure on most Barani fields, you should spread at least 570 Kg per kanal of land (about ten donkey loads). One problem with farmyard manure is that its nutrient content is not well balanced. To correct this, you can uniformly spread 4 Kg of DAP over the 570 Kg of farmyard manure which you apply on each kanal of land. This



will add more value to your farmyard manure than the DAP costs. The full value of your farmyard manure will not be realized unless you add the chemical fertilizer. You also must use good seedbed preparation, weed control, and soil erosion control practices if you are to get full value from your fertilizers.

2. Commercial (Chemical) Fertilizers

At least 13 different plant food or nutrient elements are essential for plant growth. Three of these that are used in greatest quantities are nitrogen (N), phosphoric acid (P_2O_5) and potash (K_2O). These three are commonly referred to as N.P.K. in that order. They are generally called the commercial fertilizer elements.

All commercial fertilizers must carry a guarantee showing the content of these three elements on each bag. For example, a bag of diammonium phosphate (DAP) commonly carries a guarantee of 18-46-0. This means that it contains 18% total nitrogen, (N) 46% available phosphoric acid (P_2O_5), and 0% water soluble potash (K_2O). The importance of this is that a 50Kg,



ڈی اے پی (D A P) 18-46-0	یوریا (UREA) 46-0-0	نائٹروفاس NITROPHOS 23-23-0
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bag of DAP contains 9 Kg of N plus 23 Kg of P_2O_5 and no K_2O . These figures are obtained by multiplying the total weight of the bag by the percentage of each element. For example:

$$50 \text{ Kg} \times 18\% = 9 \text{ Kg of N and}$$

$$50 \text{ Kg} \times 46\% = 23 \text{ Kg of } P_2O_5$$

You can see that a 50 Kg bag of DAP contains 9+23 or 32 Kg of plant nutrient elements and 18 Kg of filler or conditioner. The conditioner improves the physical condition of the fertilizer and helps prevent caking. Ground maize cobs or cocoa shells are common conditioners. The conditioner has no value for your crop but adds to the transportation and storage costs when you buy the fertilizer. This is why high analysis fertilizer gives you most for your money.

How to Compute the Amount of Fertilizer You Need

If your Agricultural Extension field assistant recommends 34 Kg of nitrogen and 23 Kg of phosphorus per acre for your wheat, you can easily calculate the number of bags of DAP and urea needed. First calculate the amount of DAP necessary to supply 23 Kg of phosphorus. The formula for DAP is 18-46-0. So you divide the 23 by 46 and get .5. Multiply .5 by 100 and the answer is 50 Kg or one bag of DAP needed to provide 23 Kg of phosphorus. Multiply 50 Kg by 18% and you can determine that the 50 Kg or one bag of DAP will furnish 9 Kg of nitrogen. Since the recommendation calls for 34 Kg of nitrogen, you will need an additional 25 Kg of nitrogen.

Urea has a formula of 46-0-0 so by dividing 25 by 46 you get approximately .5. Multiply this by 100 and you find you need 50 Kg of urea or about one bag. Thus you have met the requirements for both nitrogen and phosphorus.

Here are the most common fertilizers available in the Barani areas and their guaranteed per cent nutrient content:

Fertilizer Material	Nutrient %		
	N	P	K
1. Urea	46	—	—
2. Ammonium Sulphate	20.5	—	—
3. Calcium Ammonium Nitrate	24	—	—
4. Ammonium Sulphate Nitrate	26	—	—
5. Di-Ammonium Phosphate (DAP)	18	46	—
6. Nitrophos (NP)	23	23	—
7. Single Super Phosphate (SSP)	—	18	—
8. Triple Super Phosphate (TSP)	—	46	—
9. Potassium Sulphate	—	—	50

How to Apply the Fertilizer

To be effective, the fertilizer you use must be mixed well with the soil. This means you should apply it before the land is ploughed. For commercial fertilizer a good time to apply it is just before the last ploughing. In the case of urea, it should be mixed with the soil immediately after it is applied.

One exception to this time of application is when you top dress wheat with urea during the tillering stage of the wheat. Urea which is 46% nitrogen will improve the growth of wheat if properly applied. Ask your Agricultural Extension staff about the amount of urea to use on wheat and when and how to apply it.

TEST SEED FOR GERMINATION



A fact sheet for farmers

Summary

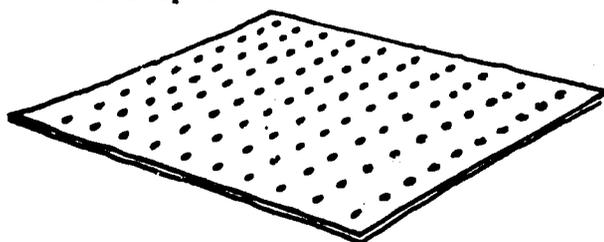
1. To have a good stand of any crop, the seed you sow must be viable, that is, it must grow.
2. You cannot tell by looking at seeds whether or not they will grow.
3. The viability (germination ability) of seeds may be tested in several ways.
4. Poor germination may be caused by different factors such as age of seed, disease, insect damage, storage conditions and others.
5. A germination test will tell you if your seed is suitable for planting.
6. A germination test will help you calculate the right amount of seed to plant.
7. Germination tests are not expensive and not difficult to do.

For testing the germination of wheat and the larger seeds like maize, the "ragdoll" or wet blotter method is good. For smaller seeds like grasses you could use a small plate.

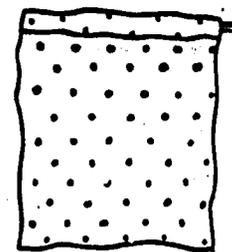
1. The "Ragdoll" Method

To use the "ragdoll" method, first count out 100 seeds at random from the whole lot. Don't take them all from one small part of the bag or bin. Do not choose only good looking seeds. The sample must be representative of the seed lot and contain all kinds of seed, good and bad.

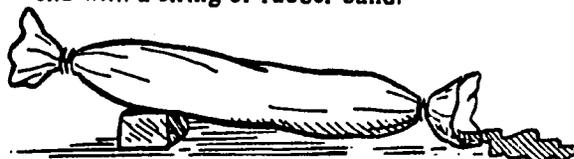
Soak two cloth rags about 12 inches (30 cm) square in water and squeeze out the excess water. Lay one cloth on a flat surface and spread out the second cloth on top of it.



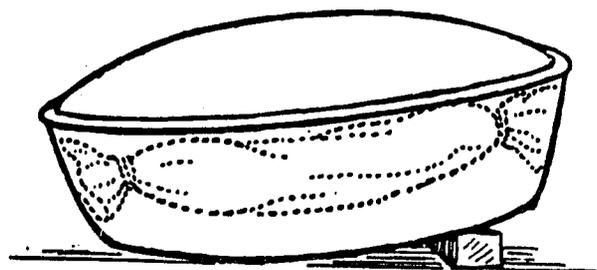
3. Distribute the 100 seeds evenly on the cloth in rows of ten each way as this drawing shows. Leave about one inch (2½ cm) border around the seed.
4. Wet another cloth and place it carefully on top of the seeds.
5. Place a light stick along the border of the cloth as this sketch shows.



6. Lay the edge of the cloth over the stick and carefully roll the cloth and stick together without disturbing the seed.
7. Secure the stick and cloth together by tying each end with a string or rubber band.



8. Using a soft pencil on a small piece of paper, write the variety or crop name, the number of seeds and date. Put this paper under the string at one end.
9. Now sprinkle water over your finished "ragdoll" until it is damp and then place it in a covered bowl or a plastic bag. Set it on a shelf in the house where the temperature is warm, that is, 20 to 25 degrees C.





10. After nine days, count the number of germinated seeds having shoots more than one inch long and having healthy looking roots. This number will be the percentage of germination of your seed.

If your seed tests below 60 percent germination, do not use it because you will get a poor stand.

If the germination is much below 100 percent, you will want to increase the rate of seeding proportionately. To do this, use the following method to calculate the amount of seed required:

Suppose the germination of your seed is 85 percent. If one maund (40 Kg) of seed is recommended to plant one acre of land, then you will need

$$\frac{40}{85} \times 100 = 47 \text{ Kg.}$$

This figure of 47 Kg. is the correct amount for one acre.

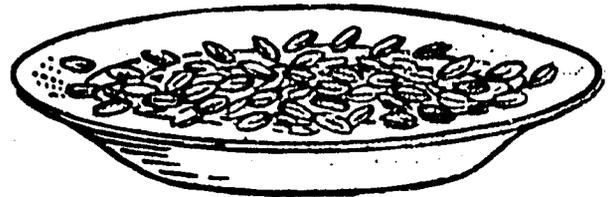
B. The Wet Blotter Method

This is similar to the "ragdoll" method just described except the hundred kernels of seed are placed between two pieces of blotting paper or cloth which is kept wet and at room temperature for about nine days. The papers or cloth can be put in a flat pan which must be kept moist.

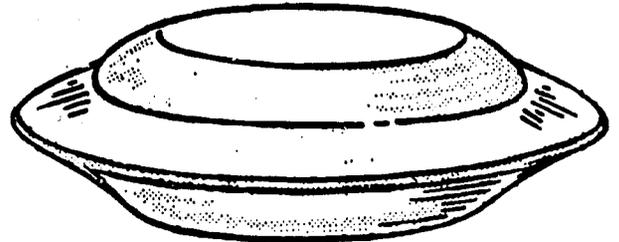
C. The Dish or Plate Method

This technique is generally used for testing smaller seeds such as grasses and clover seeds, although it can be used for the larger seeds also.

1. First count out 100 seeds selected at random from the lot of seed to be tested. Two or more test samples of 100 seeds each will give more accurate results than just one sample.
2. Label the bottom of the plate you will use as a cover with a grease pencil indicating the variety or kind of seed being tested and the date.
3. Place a piece of blotting paper or cloth in the bottom plate.
4. Add enough clean water to cover the bottom but not enough to make the seeds float.
5. Evenly distribute the 100 seeds on the wet paper. Do not add more water at this time because it may cause the seeds to float and group together.



6. Put the cover plate over the bottom one. Air should circulate between the plates.



7. Put the plates in a safe warm place (about 20 to 25 degrees C.) The paper in the plate should be kept moist during the germination period (listed below).
8. At the end of the germination period, count the seeds having normal shoots that are 2 cm or more in length and having normal roots.

D. Time Required for Germination

Most cereals and clovers	..	7 to 10 days
Most grasses	..	14 to 21 days

E. Recommendations

You should always test your seed for germination before you plant it because sometimes seeds that look viable will not germinate. Low germination may be the result of poor storage conditions, improper physiological development and other causes. You cannot improve the seed once it has been damaged.

Tests for germination should be carried out well before seeding time.

Seeds acceptable for planting should have 80 percent germination or more. Cereals (wheat, maize, sorghum, millet, etc) should preferably have a germination rate up towards 90 percent or above.

If germination is lower than 80 percent, but above 60, you should use a higher rate of seeding to compensate for poor germination.

If the germination rate is lower than 60 percent, do not use the seed for planting unless you have no alternative.

HARVEST AND THRESH WHEAT PROPERLY



A fact sheet for farmers

Summary

1. Timing is important when you harvest wheat.
2. Arrange for the labour you will need ahead of time so you can harvest quickly.
3. Wheat is usually ripe about 30 days after the heads are in bloom.
4. When wheat has 15 to 20 percent moisture, it is ready to harvest.
5. You can test for moisture content by rubbing the kernels between your hands.
6. Leave low spots or other unripe parts of the field and cut them later.
7. You can do a good job of threshing either with animals or with a machine.
8. As soon as the wheat is threshed, separate it from weeds, straw, dirt and insects.
9. The grain must be dry before it is stored.
10. Put the grain in clean bags and separate new grain from old.

Even though you raise a big crop of wheat, you will not get all the benefit if part of it is lost in harvesting and threshing. First, let us consider harvesting.

A. Harvesting

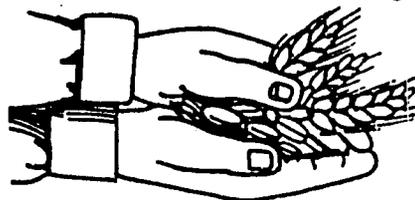
Proper timing is important in harvesting wheat because the yield is affected by stage of maturity, tendency to lodge and shatter, rainfall, humidity and temperature. In most Barani areas of Punjab wheat harvest begins from the middle of April and goes upto the end of May and in N.W.F.P. it starts from May and goes through June. The wheat crop usually ripens about 30 days after blooming of the florets (flowers). The kernels are completely filled when they reach the dough stage which follows the milk stage.

At the dough stage, the leaves, stalks and spikes lose green colour and become golden yellow. From this stage onward, the ripening process is a gradual loss of moisture in the kernels. When dried in the air, the kernels should have about 15 to 20 percent moisture



and can be stored safely without fear of molding. An easy test for moisture content of wheat at this stage is to rub a head of wheat between the palms of your hands.

If the kernels shell out and most of the central stems of the heads break, then the moisture content of the wheat is about right for threshing. The new semi-dwarf varieties usually mature and are ready to be harvested about two or three days earlier than the tall Desi varieties to prevent losses from skattering.

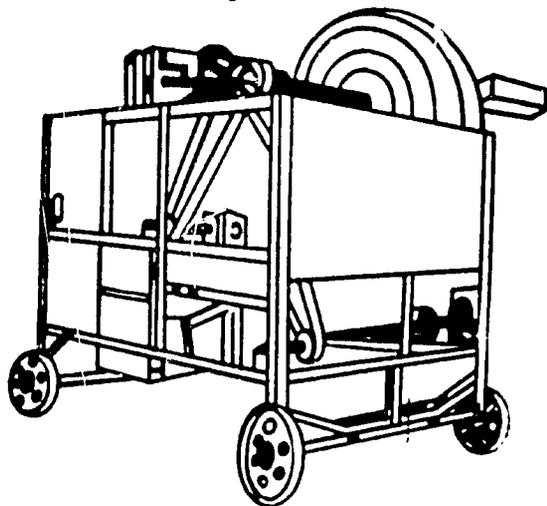


If damage from birds or storms threaten, the crop may be cut and tied in bundles as soon as it yellows. Then you may stack the bundles until drying is completed.

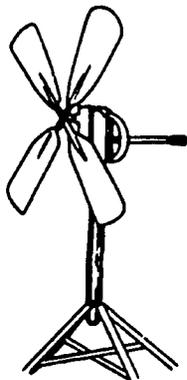
Since timing of the harvest is very important in your wheat crop, you may have to do it on short notice when the weather, stage of maturity, and other factors are just right. This may not allow you many days to do the job. Therefore, you should arrange for extra help to do the harvesting several weeks before the expected harvest date. This will enable you to take advantage of the most favourable harvesting conditions.

B. Threshing

Most Barani farmers thresh wheat with animals. In many areas, however, threshing machines are rapidly becoming popular. Either way, the farmer should avoid cracking the grain. Cracked kernels are spoiled quickly when in storage.



Separate all weeds, busa (straw), dirt and insects from the grain soon after threshing to reduce spoilage. Cleaning of the grain can be done by hand or with the help of mechanical equipment like is shown in this picture.

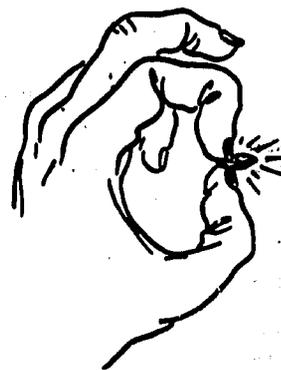


Storing the busa (straw) after threshing is also important so it will be protected from damage by weather or animals. Neatly built stacks (like this photograph shows) will protect the busa till you are ready to use it for feed or other purposes.



C. Storing the Grain

Your wheat must be dry before you put it in storage. An experienced farmer can tell if the grain is dry enough for storage by pressing the kernel with his thumbnail or by crushing it between his teeth. It will be quite firm but not hard as stone. Some people can tell if the grain is dry enough by smelling it or by rattling it in a tin can. Dry grain will have a sharper sound when shaken in a can than higher moisture grain will have. The grain is ready for storage when the kernels are dry enough so they are hard to break with your teeth, and when all dirt, stones, straw, chaff, broken kernels and insects have been separated from it.



The containers and room where you store the wheat should be cleaned and fumigated before putting wheat into it. The chemical you may use is 50% Malathion in either emulsion form or wettable powder. If you use the emulsion form, mix one quarter of a gallon (1.14 liter) in four gallons of water. If you use the wettable powder, use two and one half pounds (1.14 Kg) in four gallons of water as a spray. Apply this mixture with a pressure sprayer.



Always store your new grain separately from the old. When you use the grain, use the old grain first. See Fact Sheet Wheat No. 11 for more information on storing your wheat crop.

STORE YOUR WHEAT WELL



A fact sheet for farmers

Summary

1. You can prevent most grain storage losses if you take proper steps when you store your grain.
2. Good storage facilities can be built on your farm without great expense.
3. Wheat may be stored in either basket granaries or in bags.
4. Insecticides will help, prevent insect damage whichever way you store your wheat.
5. Keeping rats and mice out of the storage area will protect your wheat from serious damage.
6. Grain must not have high moisture or dirt content if it is to keep well.
7. The storage area must be kept clean.
8. When using bags for storage, stack them so air can circulate around them.
9. Inspect your stored grain at regular intervals to determine if there is any insect or rodent damage.

About three quarters of the wheat raised in Pakistan is stored in rural areas where it is grown. Dr. Abdul Quyyum, University of Agriculture, Faisalabad, reports that in Pakistan, farmers have substantial losses of wheat each year because of mold, insect damage and rodents. Much of this loss can be prevented, Dr. Abdul Quyyum says.

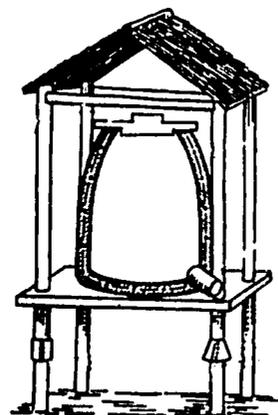
For Good Grain Storage, You Must Do These Things:

1. Store only dry grain and keep it dry in storage.
2. Keep stored grain cool to reduce the growth of mold and the danger of insect invasion. Keeping grain storage containers out of the direct heat of the sun will help lower the temperature.
3. Keep rats and mice out of stored grain. They eat a significant amount of grain, spoil much more, and spread disease.
4. Clean the grain storage area and container and then put only clean, healthy, dry grain in storage.

Storing Grain in Basket Granaries

One good way to store grain is in basket granaries.

1. Keep the basket on a platform which is off the ground and protected from the sun and rain.
2. Place rodent guards on the platform legs as this drawing shows.
3. Use a tin can with the ends cut out to make an emptying chute. Fit the can into the lower part of the basket. Close the opening of the can with a plastic or wooden plug as the drawing below shows. You won't have to take the top cover off each time you remove grain.



4. Plaster the baskets inside and out with mud or cow dung to make them more airtight. The cover should also be tight and sealed with mud or cow dung.
5. Place only clean, dry grain in storage. High moisture or dirty grain will heat and then quickly mold and rot.
6. Open the basket every two months to look for insects. If you find any, do these things:
 - (a) Winnow the grain and place it in the sun.
 - (b) Clean the basket granary.
 - (c) Put in insecticide, ashes or sand as described above.

- (d) Put the grain back in the basket and reseal the cover on it.

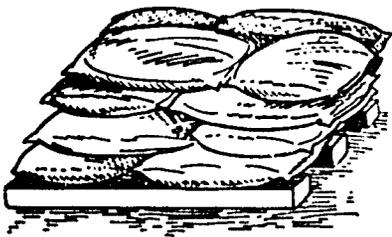
Storing Grain in Bags

You can store grain satisfactorily in bags if you follow these steps:

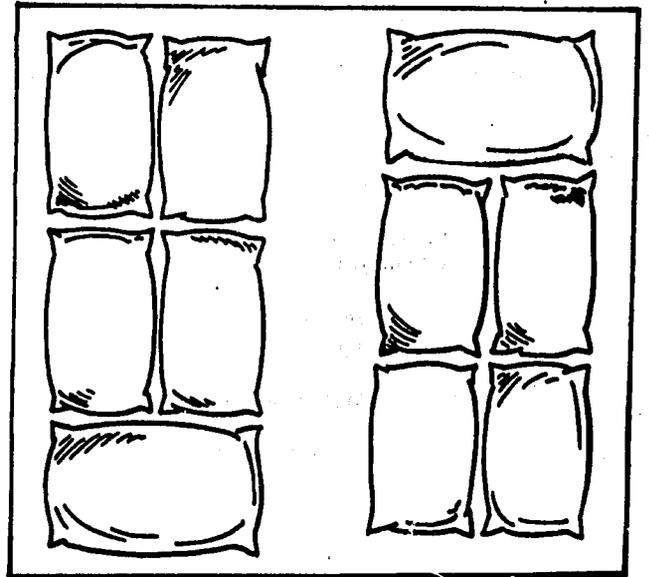
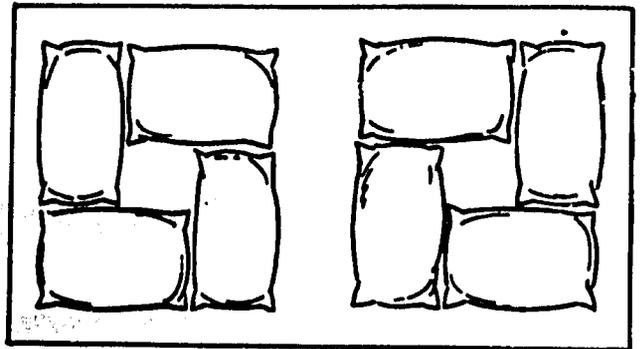
1. Dry the grain well before putting it in bags.
2. Paint the walls of your storage room with waterproof paint such as plastic emulsion dystemper paint. Clean the room and sweep out all dirt. Burn the insects. Use a smoky fire to drive out the insects you don't burn.



3. Dust or spray each bag of grain as you build the stack. Use 25 grams of 2% Malathion or .5% Lindane dust for each bag you store. Be extremely careful in the use of insecticides since they are poison. If you can't get an insecticide, clean the bags first by dipping them in boiling water and drying them in the sun.
4. Build a raised platform of wood or brick to keep the bags off the floor and keep the grain from absorbing moisture from the floor. When you get the stack built, spread a band of insecticide around the bottom of the pile to keep away crawling insects. Malathion is generally preferable for this purpose. Your raised platform will allow air to circulate around the bags and help keep them dry.



5. Stack the bags neatly leaving space between them for air movement. Two stacking methods are shown below. Note that both methods have space between the bags on the inside of the stack.



6. Check the stacks of grain every two weeks for signs of deterioration. Put your hand in a bag to see if the grain is heating. Check for mold by smelling and looking for dark kernels. If you find any of these signs, dump out the grain and dry it again.
7. Keep the area around the bags clean so rats and mice can't find food or shelter. Use poison bait or traps if there are any signs of rodents being there.
8. Dust the inside of your storage room with an insecticide such as Malathion or Pyrethrum to kill insects.
9. When you remove the grain for use, wash it before using it for food.

CHOOSING AND MEASURING LAND FOR GROUNDNUTS



A fact sheet for farmers

Summary

1. Groundnuts produce best on a loose sandy loam or other light soil.
2. Soil for groundnuts must be well aerated.
3. The soil must not be too damp.
4. Soil for groundnuts should have a balanced supply of nutrients.
5. It is important to measure your field so you know how much seed to plant and how much fertilizer to use.
6. Calculating the area of your field is not difficult.
7. It is easier to determine the area of your field if you mark the boundaries with square corners.
8. The field area is commonly expressed in acres or kanals, but it may be expressed in hectares.

A. Choosing the Best Kind of Soil

Your harvest of groundnuts will be greater if you choose a light soil which is well aerated and not too damp.

Why light soil? The fruits of the groundnut, that is, the pods, develop underground. The



pegs or needles from which the pods develop must penetrate the soil. Therefore, heavy soils or soils which harden after a rain create unfavourable conditions for the pegs to enter the soil.

If the soil sticks to your hands during the rainy season, and then forms clods which are hard to break up, it is not well suited to groundnuts.

If you choose a light soil which is a mixture of sand and clay, or has a sandy loam texture, the pods can develop more easily, you will have bigger nuts and the total yield will be larger.

It is also easier to dig nuts on this kind of soil and fewer will be left in the ground at harvest time.

Your soil should have a balanced supply of nutrients. On most Barani soils, you may have to apply fertilizer to have the proper nutrients. Fact sheet No. 4 (Groundnuts) tells you more about what fertilizers to use.

Groundnuts need water in order to form and develop their pods and nuts. But the water must move around in the soil and not remain too long. This is called aeration. Water moves more freely in sandy loam or sandy clay soil. Light soil permits better aeration. The pegs from fertilized groundnut flowers will penetrate well aerated soil more easily than they will soil that is hard and wet.



پان ریل چکن زمین میں فوراً جذب ہو جاتا ہے

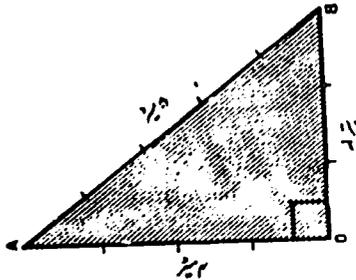
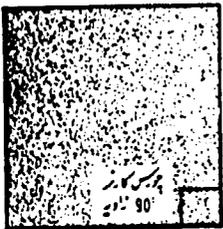


پانچون زمین میں آہستہ آہستہ جذب ہوتا ہے

B. Marking out the Field Boundaries

You must know the area of your field so you can decide how many maunds of groundnuts to plant and how much fertilizer to use.

In order to determine the area of your field, you must first mark out the boundaries. It is easier to find the area if you mark out your field so it is either square or rectangular. That is, its corners must be right angles like the drawing of the square field below.



Follow these steps to make a right angle at the corner.

1. Put a stake at figure "O" in the diagram above
2. Tie a string to the stake and extend the string along line "OB" until the free end is three metres from the stake.
3. Do the same thing with a string from "O" to "A" and make this distance four metres.
4. Now move the ends of the strings "A" and "B" until they touch and are five metres apart.

As the diagram above shows, the angle you have laid out at the corner of your field in this way is a right angle.

C. Calculating the Area of Your Field

If the four corners of your field are all right angles, it will be easy for you to calculate its area.

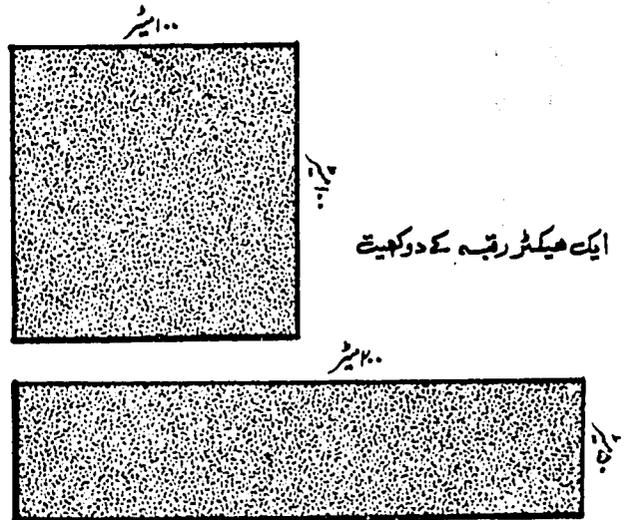
You just multiply the length of the field by its width.

Example 1.—A field is 100 metres long and 100 metres wide. Its area is 100×100 which equals 10,000 square metres (m^2). A square metre is a square measuring one metre in length and one metre in width. One hectare equals 10,000 square metres (m^2).

Example 2.—A field is 100 metres long and 50 metres wide. Its area is 100×50 which equals 5,000 m^2 . This is one half hectare.

Example 3.—A field is 71 metres long and 71 metres wide. 71×71 equals 5041 m^2 . This also is approximately one half hectare.

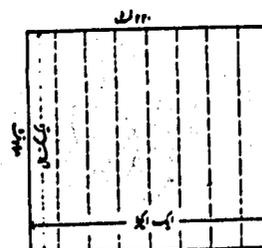
The next diagram shows you two fields each having an area of one hectare.



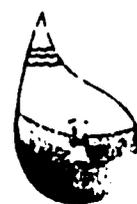
If you wish to express the area of your field in acres, you should know that a square field which is 209 feet on each side has an area of approximately one acre. If this is divided into eight equal parts, each part is one kanal. One acre has 43560 square feet in it.

One acre has 8 kanals and 43560 square feet.

If you know the area of your fields, you will be a modern farmer who can easily calculate how many groundnut plants you should have, how much fertilizer you should apply and whether your fields yield a good or a poor harvest.



CHOOSING AND TREATING GROUNDNUT SEED



A fact sheet for farmers

Summary

1. A big harvest of groundnuts requires good seed at planting time.
2. Use a variety that is recommended for your area.
3. Test your groundnut seed for germination before you plant it.
4. Treating the seed with a fungicide before planting will help control disease and insect damage.
5. The nuts should be shelled only a few days before planting; otherwise they will dry out.
6. When shelling the seeds for planting, save only plump, well shaped seeds that are free from insects and do not look diseased.
7. If you plant groundnuts where they have not been grown for three years, check with your Agricultural Extension Service about inoculating the seed.

Groundnut plants, like other crops, begin from plump, healthy, well shaped, disease free seeds. The groundnut variety should be adapted to your area and you may want to treat the seed with a fungicide to help prevalent disease.

How to Choose Good Seeds

Choose a variety adapted to your area. Number 334 is spreading variety. It produces high yields of medium sized pods. It is a disease resistant variety. Banki is a vertical growing variety of medium late maturity, although Banki is earlier than some other varieties grown in the Punjab.

Banki groundnuts have smaller pods than some varieties but they are well filled with seeds. Your Agricultural Extension staff can tell you which varieties are recommended for your area.

Plant only well shaped seeds that are not damaged by insects or disease. As you shell the nuts for planting, throw away the others, because most of them will not germinate anyway.



صاف ستھرا، بیماری اور کڑے کے حملہ سے پاک بیج:



صحت مند قابل کاشت بیج کے ڈالنے



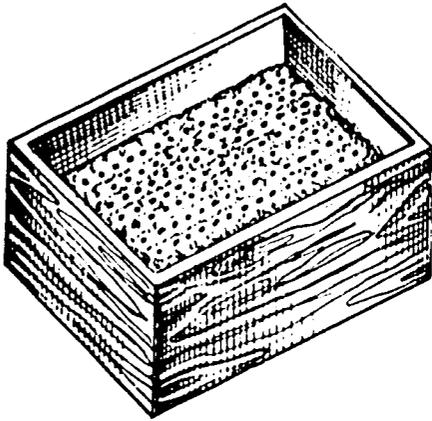
ناکارا اور ناقابل کاشت بیج کے ڈالنے

Seeds that are immature will not germinate well either. The best time to select good seed for planting is when the seeds are being shelled just before planting. If you shell them too long before you plant them, the seeds will dry out and will not germinate well. Be careful not to scratch,

skin or otherwise damage the nuts. Very dry groundnuts (less than 4% moisture) are skinned and broken easily during shelling. If the nuts have more moisture, (8% or more) the damage is usually much less. If you are not careful when you pour shelled groundnuts from one metal container to another, you may skin and break many nuts. Soil organisms can enter broken seed after planting and cause the seed to rot.

How to Know Whether Seeds are Good

You can determine the germination rate of your seed by making a simple germination test. Count out 100 seeds at random from your supply of seed and put them into a box of damp sand. Cover the damp sand with a cloth and put the box in a warm room for about six days. The sand must be kept moist during this time. At the end of six days (or perhaps seven), count the seeds that have begun to grow.



If 90 seeds or more have germinated, your germination rate is 90% or above and your seeds are all right to plant. Even if 85 seeds have germinated, your seed will probably give you a reasonably good stand. If the rate of germination is less than 85%, you should increase the rate of seeding or get some other seed to plant. One way to improve the germination rate of your seed is to store the groundnuts that you will plant in a clean dry place where rodents cannot get to them. You should also disinfect the storage area to kill insects which might damage the nuts.

Inoculating Your Seed

Since the groundnut is a legume, it will supply its own nitrogen about a month after planting if the proper bacteria are present in the soil.

Inoculation of the seed may be of value when groundnuts are planted on land where they have not been grown with inoculated seed in the last three years or where some other means of inoculating the soil has not been used.

Ask your Agricultural Extension Service field staff if you should inoculate your groundnut seed.

Treating Groundnut Seed With a Fungicide

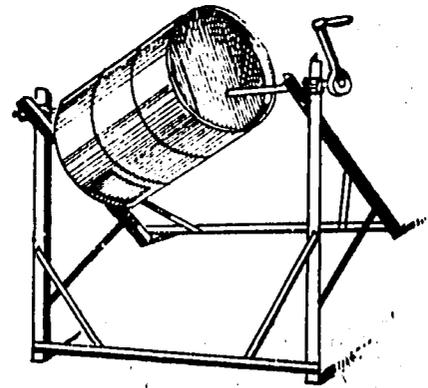
You should treat groundnut seed with fungicide before you put it. The chemical you use is a disinfectant and protects the seed against molds and insects.

Advantages in treating your seed are these:

- a. Insects will not eat the seeds.
- b. Seeds will not rot as quickly as untreated seeds.
- c. You will have a higher germination rate which will give you a better stand.
- d. You should have a higher yield at harvest time.

The recommended fungicide for treating groundnuts is DITHANE M-45. Use eight ounces for 65 pounds of seed. (one fourth Kg. for one maund). Mix the disinfectant thoroughly with the seeds so it covers them completely.

A drum type treater like this is easy to use for. There may be one in your village. When treating groundnut seed, always be careful so you do not break the skins. Nuts with broken skins will not germinate.



Since fungicides are poisonous, it is recommended that you wear plastic bags or gloves on your hands when treating seed. And be sure to wash your hands well after you finish working with the poison.

Never let humans or animals eat treated seed. Don't leave treated groundnut seed where children might get it.

Ask your agricultural Extension Field Staff about treating ground nut seed and how to do it.

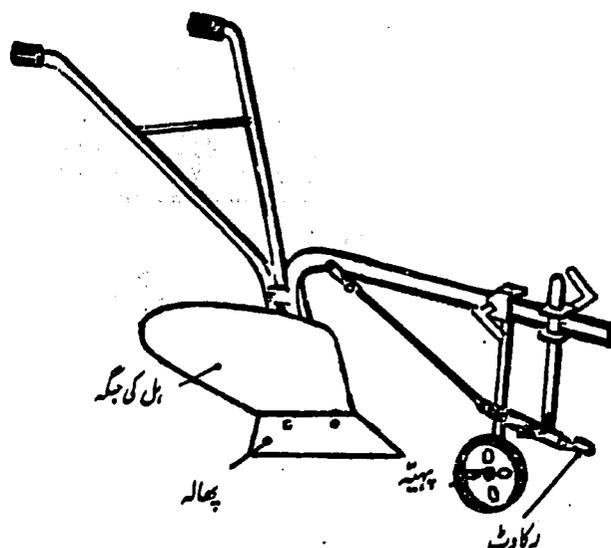
PREPARING THE SOIL FOR GROUNDNUTS



A fact sheet for farmers

Summary

1. You must have a well prepared seedbed to raise groundnuts successfully.
2. The seedbed should be smooth and uniform with no clods of soil.
3. The first ploughing should be six to eight inches deep (15 to 20 cm.)
4. Deep ploughing helps control weeds and insects.
5. Groundnut roots can penetrate the soil better if you plough deeply.
6. You may need three or four later ploughings to keep the weeds out and keep the surface loose.
7. Smooth out the soil with a harrow or some other implement just before you plant.

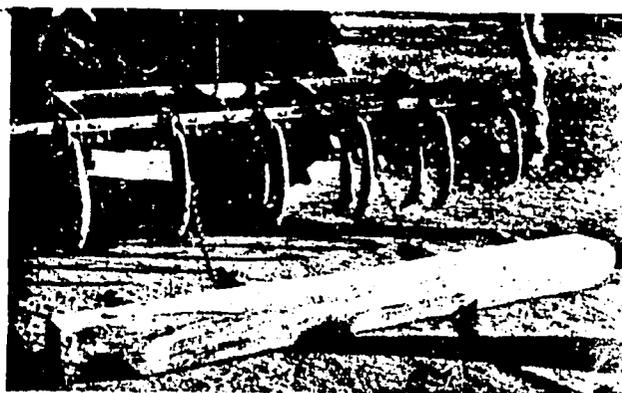


plough will do the work more quickly and easily than the desi plough but you will need more power to pull it. It is important that you do the first ploughing as soon as you can after the last crop is removed. Right after the first rain is a good time because it will loosen up the soil.

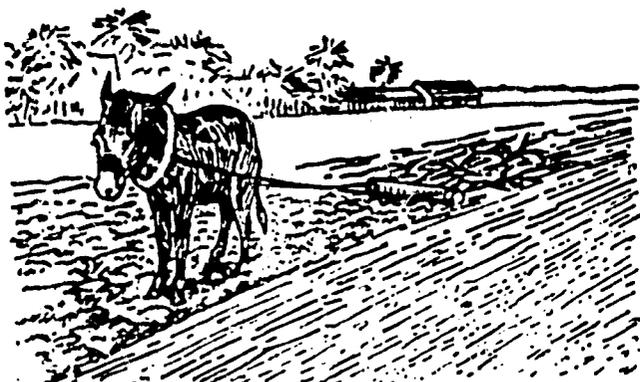


A smooth uniform seedbed like the above photo shows will help assure a good stand of groundnuts. The first ploughing should be six to eight inches deep and should be done early. Try to do the ploughing soon after the first rain of the season. This makes it possible for later rains to penetrate well into the soil and to sink, slowly into the subsoil water supply.

Ploughing, that is turning the soil over, can be done with bullocks and the traditional desi plough or can be done by hand with a spade or digging fork. You can turn the soil over more effectively with a steel plough like the one shown below. This



After the last ploughing and just before you plant the groundnuts, go over the field with a harrow or similar implement to smooth out the surface and break up large clods of soil. Two different types of harrow are shown below. These may be pulled with bullocks or with a tractor. If



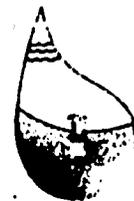
you don't have a harrow, or can't get one from someone in the village, you can have your bullock or donkey drag large tree branches over the field to make the soil surface smooth and break up large pieces of soil. See the next photograph.

Another way to smooth out the field is to have your bullocks pull a heavy plank over it just before you plant the groundnuts. You may have to go over the field twice—once in each direction—to get it smooth with a plank.



If your soil is well tilled there will be no large clods on top and the surface will be loose so air and water can get into it easily. Ploughing the soil early enables you to mix barnyard manure or other herbage with the soil and gives this organic matter time to rot before planting the groundnuts. As the organic matter rots, it makes humus which puts the soil in better condition to raise a good crop of groundnuts.

FERTILIZING AND SOWING GROUNDNUTS



A fact sheet for farmers

Summary

1. Groundnuts require fertilization on most Barani soils if they are to yield well.
2. Although groundnuts get most of their nitrogen from the air, they still need some to get started.
3. Fertilizer for groundnuts should include phosphorus.
4. If you fertilize with farmyard manure, apply it before the middle of February to avoid white ant damage.
5. Spreading and upright varieties of groundnuts require different spacings for the best yields.
6. Plant groundnut seeds two to three inches deep depending on soil moisture conditions.
7. Make a plan of the way you will plant your groundnuts in the field.
8. A spacing wheel or spacing plank will help you put the plants the right distance apart.
9. You will get the biggest yields if you have the right number of plants per acre or per hectare.

How to Fertilize Soil For Groundnuts

In the Barani areas, groundnuts do best on light sandy or lay loam soils which usually need fertilizers to produce the best yields. Fertilizers, alone, however will not guarantee a good crop of groundnuts. The soil must be well tilled, the weeds must be kept out and you must follow other good cultural practices.

You should broadcast the fertilizer before the last ploughing just before planting your crop.

The three plant food materials most needed in fertilizer for groundnuts are nitrogen, phosphorus and calcium. In the Northwest Frontier Province, these are the fertilizer recommendations: One bag of DAP plus 166 pounds of single superphosphate on each acre.

If you are in the Punjab, these are the recommendations: one bag of ammonium sulphate plus two and one half bags of single superphosphate or one bag of DAP.

If your field is laid out in hectares, use two and one half times as much fertilizer on each hectare.

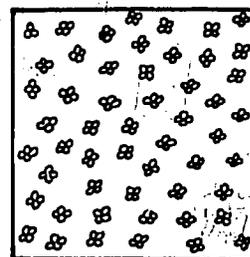
Farmyard manure is also good fertilizer but if you use it on groundnuts, apply it during January or the first half of February. If you put it on your soil later than that you may suffer from an attack of white ants.

In some parts of the Barani areas, where calcium content of the soil is low, it may be profitable for you to apply gypsum to your soil. Ask your Agricultural Extension Service staff about using gypsum for raising groundnuts.

When to Sow Groundnuts

The best time for planting groundnuts varies in different areas. For Northwest Frontier, usually from March 15 through April is best. In the Punjab from April 1st to the middle of May is usually recommended. The soil must be moist and warm when you plant. Air temperature should be about 21 degrees C. If sown when the weather is too cool, the groundnut seeds may be damaged by fungus growth on them.

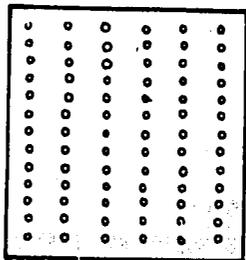
The groundnut seed should be in the soil about 30 to 40 days before the heaviest rains. That will give your plants time to be in the flowering stage and forming its fruits when the rains come. That is when the plants need most water.



How to Sow Groundnuts

Some farmers sow by broadcasting seeds like this drawing shows. This may save time but you

may not get the right number of plants per acre. Also weeding and harvesting is more difficult to do when you broadcast the seed.



By sowing in rows, like this drawing shows, you can calculate the number of plants needed more easily. You will also find it easier to keep the weeds out because an animal can walk between the rows pulling your cultivator. Harvesting is much more efficient when the groundnuts are in rows because you can see better where the plants are and aren't so likely to miss some.

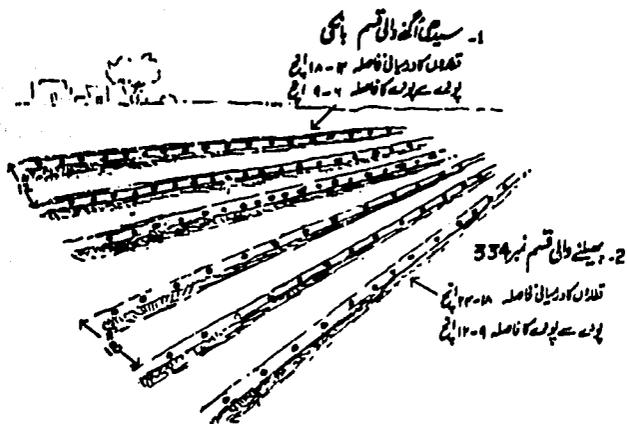
If you make a plan of your field, you can lay out the number of rows and spacing between plants in the rows. Recommended spacings differ spreading and upright varieties as the drawing below shows. Rows of No. 334 (spreading) groundnuts should be 18 to 24 inches apart. Rows of Banki variety should be 12 to 18 inches apart. The space between plants of No. 334 in the row should be 9 to 12 inches and the space between plants in a row of Banki should be 6 to 9 inches.

The seeds should be planted from two to three inches deep with one seed in each hole. Seed in dry soil should be deeper than seeds in moist soil. Sow all seeds at the same depth and cover them with soil so the sun will not dry them out.

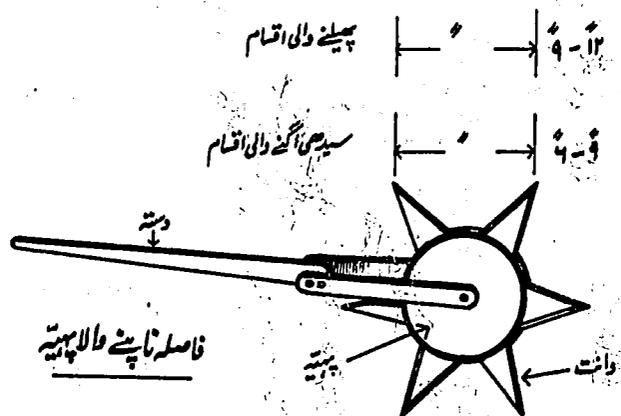
If your soil is sloping, lay out the rows across the slope to prevent soil erosion. If you find plants missing a week after you put the seed in the ground, replant them with new seed.

How to Space Plants in the Row

You can measure and mark by hand the distance for planting in each row or you can use a spacing wheel. The spacing wheel shown below



will make a hole every 6 inches or 9 inches or any other distance that you have between the points of the wheel. You can make the spacing wheel of wood or iron. Each tooth makes a hole in the soil as you push it. You put a seed in each hole and cover the seed with soil using a hoe or your foot.



With this mechanical spacing device you can easily plant the correct number of seeds per acre or hectare.

Good results have been obtained with Banki planted 75,000 per acre and with No. 334 planted 45,000 per acre. This would be 75 lbs. of Banki seed per acre and 60 lbs of No. 334 per acre.

A well laid out and well spaced field makes it easier to control weeds and will give you a bigger yield of groundnuts.

CULTIVATING AND HARVESTING GROUNDNUTS



A fact sheet for farmers

Summary

1. A good yield of high quality groundnuts comes from a field that has been well cultivated.
2. Cultivation will be much easier if you use implements that can be pulled by animals or a tractor.
3. You must cultivate at the proper stage of growth of your groundnut plants.
4. The time of harvesting is important if you are to get the highest quality groundnuts.
5. Mechanical groundnut lifters can make your work of harvesting easier than digging by hand.
6. Remove the pods from the plants and dry them in the sun immediately after digging.
7. Store your groundnuts in a clean bag or bin protected from insects and moisture.

Why Cultivate Groundnuts?

1. Weeds use water and soil nutrients that your plants need. You may have put some of these nutrients in the soil yourself with the fertilizer you applied.
2. Weeds cast shade so your groundnuts do not get full benefit from the sun.
3. Cultivation stirs the soil and lets air into it so the pods will find the underground air they need.
4. When the soil has been stirred, it remains more moist.
5. Cultivation helps make healthy plants which will reduce the danger of contamination with micotoxin.

How and When to Cultivate

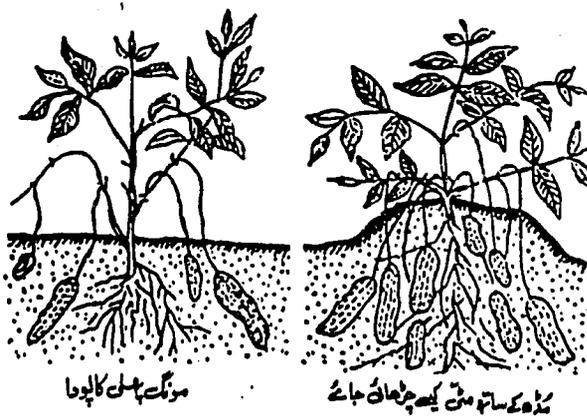
1. Cultivate either with a hand hoe or with an animal drawn cultivator or light plough.

It requires less labour if you have the plants in

rows so you can use animal or tractor drawn implements.

In any case, you should cut out the weeds between plants with a hoe or other hand tool.

2. If you had a well prepared seedbed with no weeds, you will not have so many weeds to remove when the groundnuts are growing. Whenever you see weeds, however, you should take them out. Cultivating the soil will loosen it so the pegs can enter it more easily.
3. When the plants are in the flowering stage, you should cultivate and build up a little earth around each plant to give the plants more soil in which to develop. The drawing below shows how to build up earth around the plants.



4. Three months after planting stop cultivating. By this time, the groundnut stems and leaves cover the soil quite well and can compete with weeds. Cultivation after this time might damage the pods.

Harvesting Groundnuts

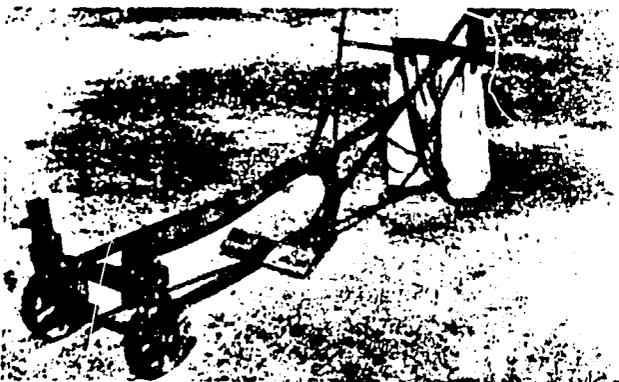
1. *When to harvest.*
 - a. groundnuts are ready to harvest when the inside of the shell shows dark veining. Dig a few plants with pods and count the mature pods with dark veining. You should commence harvesting when 75 to 80% of the pods are mature.

b. If you harvest too late, the dry leaves will drop making them of less value for animal feed. You also may have losses from insects, molds and diseases. If you harvest late, the soil may be very hard making it difficult to lift the pods. Then you may leave many pods in the ground.

c. If you harvest too early, the groundnuts will contain too much water and they may rot. They will not keep well in storage and they will not yield as much oil. If the pods contain too much water, they will be heavy and the shelling yield will be low. Groundnuts harvested too early will not make good seed because they are not mature.

2. How to harvest

a. You can dig the plant with the pods on it by hand but it is much quicker and easier to do it with an animal drawn lifting plough or groundnut lifter. Of course the plants must be in rows to use power implements effectively. You probably will leave fewer groundnuts in the ground if you use a groundnut lifter. Here are shown three kinds of lifters that are being used. There



may be a tractor mounted groundnut digger in your village also. Ask your Agricultural Extension Service staff about

power equipment to dig groundnuts. When you dig the groundnuts, do not remove the tops of the plants till after they are out of the soil. If you remove the tops before digging, you may leave many pods in the ground.

b. After you have the groundnuts out of the ground, remove the pods from the plants immediately. Then sun dry the pods for 10 to 15 days. Drying will retain kernel flavour and allow the pods to be stored safely. The pod moisture content at digging time may be as high as 40 to 50%. This moisture content must be reduced to 8 to 10% for the groundnuts to be put in storage. You can tell if the moisture is low enough by biting a kernel to see if it breaks easily.

c. Do not pile up the plants with pods on them because the pods may begin to rot. The pods may also lose their colour. After the pods have dried and before you store them, they should be winnowed to separate unripe, empty and rotten pods.

3. Storing and Marketing

You probably will sell part of your crop. You must have clean, well matured and dried groundnuts to bring you the top price. If you have done a good job growing, harvesting and drying your crop you will have a market like this photo shows.



You will also want to keep some of your crop to feed your family and to save some for seed for next year's crop.

Before putting the groundnuts into storage, clean the bin and other containers well. Do not shell the groundnuts because the shells protect against insects and too much drying. It is also a good idea to treat the storage area with an insecticide such as Malathion. Ask your Agricultural Extension Service staff about insecticides for storage areas.

SELECTING MAIZE SEED



A fact sheet for farmers

Summary

1. As with other farm crops, good maize seed is one of the requirements for a big yield.
2. The seed you plant should be of a pure variety and there should be no weed seed in it.
3. Your seed should have a germination rate of 85% or above.
4. The maize kernels should be plump, healthy, and free from insect pests.
5. Do not plant shrivelled and broken seed.
6. The moisture content of your seed should be below 15%.
7. The seed you plant should be adapted to your locality.

If there are insects in your seed, it is easy to see them and the damage they have done. Insects will make holes in the kernels as this photo shows. Any kernel with a hole in it



کیرے کا مادہ اور شہتہ خوردگی

will not germinate. Broken kernels in your seed will not germinate either and your stand will be poor as a result. If the maize is threshed with the help of a stick or a rod, many of the kernels will be broken. These broken kernels will not germinate. If some of your maize seeds are shrivelled or broken, do not, plant them.

Pure, Clean Seed

1. The variety should not be mixed with others. If there are other varieties mixed with your seed, the crop will mature at different times. Cultivation and harvesting will be difficult and you probably will have more damage by birds.
2. If you save your own seed from a synthetic variety, select good healthy cobs (ears) from the center of the field. These cobs are not likely to be contaminated by pollen from a maize crop grown by a neighbouring farmer.
3. Kernels should be plump which means they are well filled out and there should be no mold or other signs of disease on them. This photo shows the kind of seed you want to get.



4. There should be no weed seeds in your maize seed. The weeds will grow and use moisture and nutrients from the soil which your maize plants should be using.
5. The kernels should not be small and shrivelled which indicates that the maize was not harvested at the proper stage of maturity or was not dried well after harvesting. If your seed was well dried in the sun, it will have less than 15% moisture. Don't plant seed with more moisture than this because it may be attacked by a fungus and will not germinate. You can judge the moisture by biting a kernel between your teeth. If the seed is hard to bite, and gives a cracking sound, it probably has less than 15% moisture.

Store Your Maize Seed Well

Your seed should be stored in a clean, dry room. If the room is damp or dirty, your maize seed may be attacked by the grain moth which will affect its germination. To protect the seed from insects, you can treat the storage area with an insecticide such as 50% Malathion before putting your seed in it.



Seed Should Be Adapted to Your Area

If the seed is adapted to the climate and soil conditions of your area, it will be on the Agricultural Extension Service list. Here are the recommendations for the Northwest Frontier and Punjab Provinces:

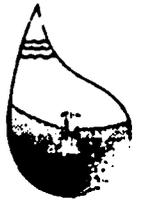
Seed rates and number of plants are given in Table 1 for one acre. If you wish to change these figures to the amounts per hectare, multiply them by 2.5.

TABLE 1
Recommended Varieties Developed by M.M.R.I. Pirsabak (Nowshera).

Variety	Sowing time	Area of adaptation	Seed Rate per acre	Maturity Range
NORTHWEST FRONTIER				
1. Shaheen W	May, Early June	High Mountain Valleys Swat and Upper Hazara.	17 Kg.	80-85 days.
2. Changez	June July Early Aug:	Swat and Upper Hazara. Peshawar, Mardan, Kohat, Bannu, Lower Hazara. D.I. Khan.	15 Kg.	90-95 days.
3. Zia	June	Swat	17 Kg.	90-95 days.
4. Khyber W	May Early June June-July Mid - July.	Upper Hazara. Lower Swat. Peshawar, Mardan. D.I. Khan.	14 Kg.	110 days.
5. Sarhad Y	May Early June June-July Mid-July	Upper Hazara. Lower Swat. Peshawar, Mardan. D.I. Khan.	14 Kg.	110 days.
PUNJAB				
Agaiti-72 (Y)	July	Sialkot, Potohar	90-100 12	30,000
Syn 551 (Y)	July	Sialkot, Potohar	90-100 12	30,000
Changez (W)	June Late July.	Murree Hills. Potohar, Sialkot.	1-105 13	30,000
Sean (W)	Early June. Mid-July	Murree Hills. Attock.	100-110 12	25,000
Sadaf	Early to Mid-	Attock.	100-110 12	20,000

W — White grain.
Y — Yellow grain.

MAIZE CULTIVATION



A fact sheet for farmers

Summary

1. Maize can be grown on a variety of soils, but does best on well drained and aerated deep loam soil.
2. A well prepared seedbed is essential for a good crop of maize.
3. Maize seed should be planted in rows however it can be planted by broadcasting. There are many advantages in having it in rows.
4. Intercultivation is an important step in getting a good yield.
5. You must have the correct number of plants per acre or per hectare to get maximum yield.
6. Maize should be properly matured before it is harvested.
7. Maize cobs should be dried well and stored in a clean dry place to prevent damage by molds and insects.

Although maize can be grown on a wide variety of soils it does best on well drained and aerated deep loam soil. Maize is a heavy feeding plant and therefore needs soil that is adequately supplied with plant nutrients, particularly nitrogen and phosphorus. It can be grown on slightly acid or alkaline soils but the optimum range is a pH of 6.0 to 7.0.

Seedbed Preparation

Maize seed requires soil that is warm, moist, well supplied with air, and fine enough to give good contact between the seed and surrounding soil particles. Plough the land twice immediately after the harvest of the previous crop. The land should be ploughed deep (about 15 to 20 cm) the first time. This will prevent runoff of rain that may fall. Ploughing will cover vegetation and any farmyard manure that you may have applied. Ploughing will also provide aeration of the soil and stimulate bacterial activities which release plant nutrients.

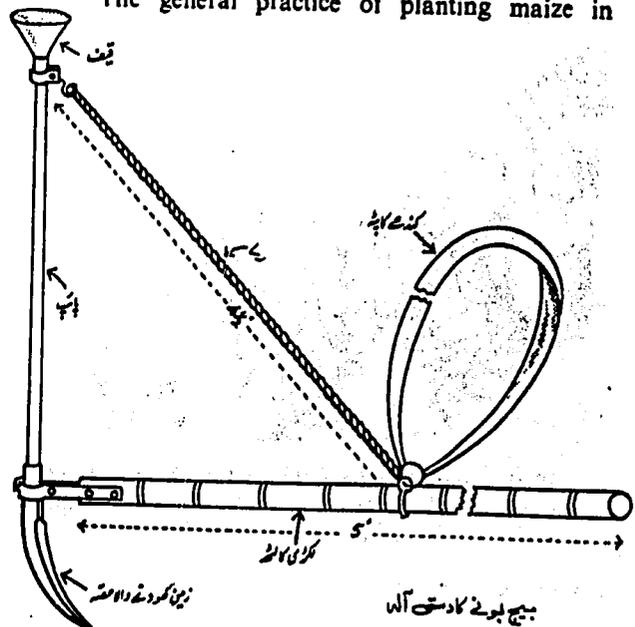


The top soil surface should be in a loose relatively smooth condition so it will retain moisture and discourage the growth of weeds. This will also destroy insects and their eggs larvae and breeding places. Soil prepared in this manner will be less subject to wind erosion.

Just before planting time, plough the land once more so it will be soft and granulated. Then go over it with a plank (sohaga) immediately after ploughing to preserve soil moisture. The land should now be ready for planting.

Sowing the Maize

The general practice of planting maize in



Pakistan is to plant the maize for grain behind the country plough by "kera" system and to broadcast the seed when a fodder crop is wanted. The planting of maize in rows (lines) has many advantages. The use of a hand planter or bullock pulled planter will enable you to plant the seed in a short time and to get it in the ground accurately. There are several types of planters available for planting maize. Two are shown here. There may be one available in your village. Your Agricultural Extension Service staff may be able to help you find a suitable mechanical planter for your maize.



For early maturing varieties, a good spacing between rows is 30 inches (75 cm) and a plant-to-plant distance of 6 to 8 inches (15 to 20 cm.) Later maturing varieties require a little more plant-to-plant distance. Eight to ten inches (20 to 25 cm.) is recommended.

Thinning

It is important that you have the correct number of maize plants per acre. Either too few or too many plants will reduce the yield. Many farmers plant too thickly planning to thin the crop and use the fodder as animal feed. They often thin the crop too late with the result that many plants are barren (with no cob) or the cobs are very small. If the crop is planted in lines (rows) as mentioned earlier, then the excess and damaged plants can be removed by hand very easily. The healthy plants left in the rows should be 15 to 20 cm. apart in case of early maturing varieties and 25 to 30 cm. apart in the late maturing varieties.



If the crop has been treated with insecticide granules, the plants that are removed at thinning time must not be fed to animals.

Interculture and Weed Control

The main reason for intercultivating the maize crop is to remove weeds which compete with the maize plants for moisture, light, space and nutrients from the soil. Cultivation also helps to aerate the soil. If the maize is in rows, cultivation can be

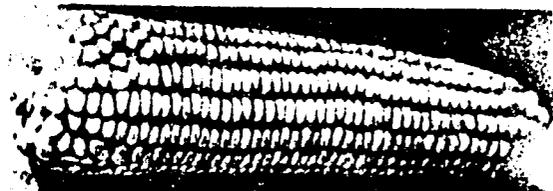


done with a bullock-drawn "sarderi" cultivator which is efficient and economical. This cultivator can be conveniently used in the 30 inch (75 cm) spaced rows. Within the row itself, weeding should be done by hand with the "khourpa". Usually two weedings will be enough to keep the weeds out. The first weeding generally should be done 20 to 25 days after sowing the maize. Do the second weeding just before the plants are three feet (one meter) high. After that, it is not practical to enter the field with a bullock. Some weeding with the "khourpa" may still be done by hand.

Harvesting, Drying and Storage

Harvest the maize crop when it is properly matured and the grains are quite hard. There are three ways the crop can be examined to determine whether it is ready for harvesting.

1. Crush the grains between your teeth. When the kernels are tough to crack the maize is mature and ready to harvest.
2. When the husk leaves on the cobs are dry, most varieties raised in this country are ready for harvest.
3. When the maize is at physiological maturity, a "black layer" forms at the bottom of each grain. After this stage of development, no more growth occurs in the grain. However, harvesting should be delayed for a few days after formation of the "black layer" so some drying of the stalks can take place.



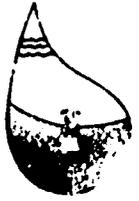
After the maize is harvested, dry the cobs in a clean place to get the percentage of moisture down which will lessen the chances of insect and fungal damage while the maize is in storage. High moisture in the grain may result in fungal and insect damage and will lower the seed quality of the grain.

When the cobs have dried thoroughly, they should be shelled and the grain stored in a clean dry place which is protected from rodents.

Before the grain is put in storage, you should treat the walls and floor of the room with a chemical such as 50% malathion in either emulsion or wettable powder form. Ask your Agricultural Extension Service staff about using these chemicals to protect your storage area.

BARANI AGRICULTURAL DEVELOPMENT PROJECT

PEST MANAGEMENT IN MAIZE



A fact sheet for farmers

Summary

1. About 4.4 lakh acres of maize are grown in the Barani areas of Punjab and North-west Frontier Provinces.
2. The yield of maize is low in Pakistan in spite of favourable soil and climatic conditions.
3. From 20 to 35% of the maize crop in Barani areas is damaged each year by insects and diseases.
4. Seed treatment will help control diseases.
5. Damage caused by the maize stem borer can be reduced by using insecticides.
6. Good cultural practices are important if you are to control insect and disease damage.

- Furadan-3G.....
- Ekalux-5G.....
- Diazinon-10G.....
- Lebaycide-5G.....
- Sevin-20G.....

- 30 lbs per acre or 27 Kg per hectare
- 20 lbs per acre or 18 Kg per hectare
- 20 lbs per acre or 18 Kg per hectare
- 40 lbs per acre or 36 Kg per hectare
- 20 lbs per acre or 18 Kg per hectare

Half of the dose should be put on with the seed at sowing time. Then put half of the remaining portion in the whorls of the plants as this drawing shows. Do this about 15 to 20 days after sowing the maize. This is when the plants are about 20



دائے داروں کے ڈالنے کا طریقہ

While maize is not a major crop in the Barani areas, more than 4 lakh acres (about 2 lakh hectares) are raised each year. Soil and climatic conditions are favourable for much more maize to be grown. The yield of maize in Pakistan is low, however, compared to yields in other countries. One method of increasing the yield is to control damage done by insects and diseases. Because of these losses, farmers often become discouraged and reduce their acreage of maize even further.

Control of Insects

The insect which causes most damage to maize is the maize stem borer. This insect can be controlled with insecticides now available. Any of the five listed below will be effective.



سہنہ



پڑوانہ

مکے کے تنے کے سہنہ اور پڑوانہ

to 25 cm high and are in the 5 to 6 leaf stage. At the end of another 10 to 15 days, apply the balance of the chemicals to the whorls of the plants. You should not wait till you see the maize stem borer damage before applying the granules of chemical. Use it at the proper intervals before any damage is evident. These chemicals may be available in granule or powder form. Granular form is more commonly used.

Control of Diseases

Diseases are generally not as serious and don't do as much damage as the insect pests. However, seed rot and seedling blight may be severe in cold

mountainous areas. These fungal and soil borne diseases can be controlled by treating the seed before planting with Ceresun or Arasan. You can use a seed treater like the one shown here or there may be a larger one in your village. Ask your Agricultural Extension Service staff about the amount of chemical to use and where to get the treating equipment.

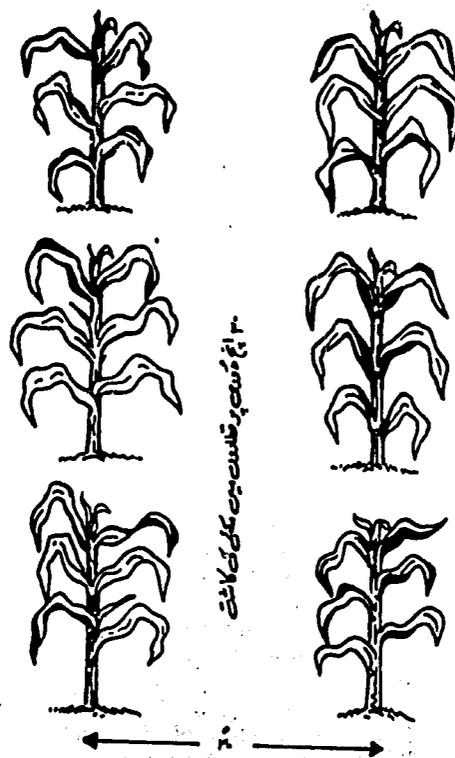


While you are treating your maize seed for disease, you can also treat it with Furadan-3WP to help control insect damage. This chemical will considerably reduce damage by the maize stem borer. Furadan-3WP is new and may not be available everywhere. However, Furadan-3G is readily available for applying separately to control insects.

Good Cultural Practices

Planting the maize in rows (lines) 30 inches or 75 cm. apart makes it easier to cultivate and keep the weeds out. By keeping the weeds out, the maize will be healthier and better able to withstand insects and disease. Keeping the top soil loose provides better aeration in the soil and prevents excess evaporation of moisture from the soil. The application of chemical granules to control the maize stem borer also is much easier if the maize is planted in rows. You should sow from two to four seeds per foot and cover them immediately.

There are many advantages in planting maize in rows about 30 inches apart.



The date of planting affects the amount of damage done by the stem borer. If chemical control is not practical, or for some other reasons cannot be done, you can minimize the amount of damage the borers will do by planting when the number of borers is low. You can determine the best time for planting by noting what time in the season the borers are fewest in number and delaying planting till the number is lowest.

After harvesting your maize crop, all the stubble and remaining stalks should be burned or ploughed deeply under the ground. If the stubble is not burned, be sure to bury it deeply because the borer hibernates in the stubble and comes back again to attack the crop in the next season.

You should do the ploughing just after maize harvest. This not only buries the insects but also gets your ground ready to plant your next crop.

FERTILIZING MAIZE



A fact sheet for farmers

Summary

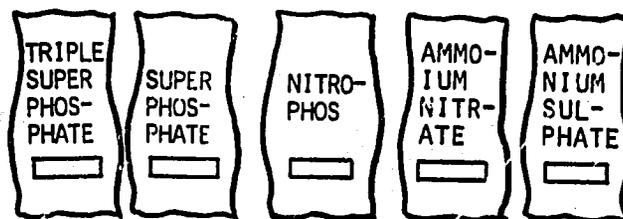
1. The maize crop is a heavy user of nutrients from the soil.
2. Maize responds well to the use of fertilizers although the response varies from area to area.
3. If farmyard manure is available, it should be used but you should supplement it with chemical fertilizer.
4. Nitrogen is badly needed by crops on most Barani soils.
5. Phosphorus deficiency is noticeable in many Barani areas but the need is not so great as for nitrogen.
6. In the dry Barani areas, a combination of fertilizers with the elements 40-20-0 is recommended.
7. In the good Barani areas, the recommendation is for 60-30-0.
8. In most of the Barani areas, the fertilizer should all be applied and mixed well with the soil at the time of planting the maize.

Since maize is a heavy user of both nitrogen and phosphorus, it responds well to the application of fertilizers containing these elements. Experiments conducted by MMRI indicate a general deficiency of nitrogen in Barani area soils. Phosphorus is also lacking in some of these soils. Farmyard manure is a good fertilizer for maize but is not available in sufficient quantities and it needs to be supplemented with chemical fertilizers.

Type of Fertilizer to Apply

Fertilizers that are readily available in Barani areas are Urea (46-0-0) which contains nitrogen only, and DAP which contains nitrogen and phosphate with a composition of 18-46-0. Other fertilizers on the market are Nitrophos, Ammonium nitrate, Ammonium sulphate, Super phosphate and Triple superphosphate. These are equally effective if the dose is calculated on a nutrient

basis. See Fact Sheet Wheat Number 7 for method of calculating amount of fertilizer needed. A slide rule calculator for figuring fertilizer amounts is also available from the Barani Agricultural Development Offices in the Punjab and Northwest Frontier Provinces.



Rate of Application

As a general rule, the Pakistan Agricultural Research Council (ARC) makes the following recommendations for fertilizer applications to maize:

Dry Barani areas	..	40-20-0
Good Barani areas	..	60-30-0

For the dry Barani areas, this means 1/2 bag of DAP and 3/4 bag of Urea per acre. On the good Barani areas, you would need 3/4 bag of DAP and 1 bag of Urea per acre. To find the amounts of fertilizer per hectare needed, multiply these figures by 2-1/2.



These recommendations assume that an improved variety of maize is sown and improved cultural practices are followed. These cultural practices include good seedbed preparation, insect and disease control, good cultivation, thinning, line sowing and proper seeding rate.

If farmyard manure is available, use it at the rate of 10 to 15 donkey loads per acre but supplement it with the chemical fertilizers specified above.

In Barani areas, all of the nitrogen and phosphate fertilizers should be applied before planting the maize. Broadcast the fertilizer on the soil and immediately mix it well into the soil by ploughing as you prepare the seedbed.

The nitrogen applied at planting time tends to stimulate weed growth if rains are heavy. This means that you must practice good weed control.

Side dressing of maize in the dryland areas is generally not recommended unless you can time the application with rains. If you do sidedress the maize in anticipation of rain, it is better to apply calcium ammonium nitrate (CAN) or any of the nitrate fertilizers instead of Urea. In case rains do fall, all of the nitrate fertilizers except Urea will work equally well. If the rainfall is not

sufficient to wash the fertilizer into the soil immediately, less nitrogen is lost in the atmosphere than when you use Urea.

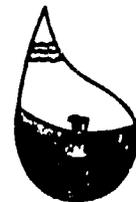
Although it is recommended that all the fertilizer be applied before planting maize in the Barani areas, if you have an excellent stand and an above average amount of rainfall, then it will be profitable for you to use a sidedressing of fertilizer.

The recommended varieties of maize will respond well to the use of fertilizer. If you plant these varieties, and follow good management practices, you will maximize the yields and get the best return of profit from the money you invest in fertilizer. Your Agricultural Extension Service staff can recommend varieties and management practices that will help you do this.

RODENT AND BIRD CONTROL-1
KILL RODENTS THAT
DAMAGE CROPS

BARANI AGRICULTURAL DEVELOPMENT PROJECT

KILL RODENTS THAT DAMAGE CROPS



A fact sheet for farmers

Summary

1. Rats and other rodents cause serious losses to farmers.
2. Rats generally like and eat the same food that humans do.
3. When food and living conditions are good, rats multiply fast.
4. Rodents eat both growing grain and stored crops.
5. Keeping your farm and house free from garbage will discourage rodents.
6. Although you cannot eliminate rodents completely, you can keep their numbers to a minimum and reduce damage.
7. Poison bait is an effective control measure in barani areas.
8. Rodents have different living habits and therefore must be controlled in different ways.

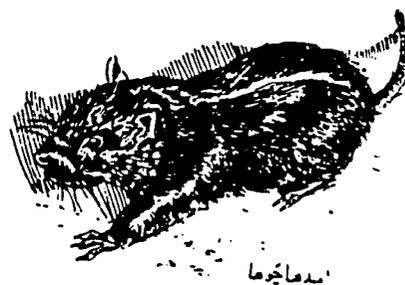
Rodents and Man

For thousands of years, rats and mice have lived in the same areas as man. Rodents live in our houses, in the fields, and wherever food is stored. Since rats have food and taste preferences almost identical to man, the best crops are damaged first. They eat the growing roots and stems of wheat and other plants and they eat the grain after it is threshed. We should raise food for people—not for rates.

Three Rodents Serious in barani areas

In the barani areas, the sand rat (*Meriones hurrianae*), the Indian gerbil (*Tatera indica*), and the mole rat (*Nesokia indica*) do most of the damage to crops.

They are desert animals and burrow in the soil. They need no supply of drinking water because they get their moisture requirements from their food which can be dry seeds, grain and roots.



They also obtain water from green vegetation if it is available. These three rodents can live near man and among his crops and will cause serious losses.

The sand rat and India gerbil both live in the same areas but have different ways of life. The sand rat is out in the daytime and feeds on crops. It is yellowish-brown sand coloured with small ears, and fur covered tail. All four legs are about the same length. Many of these rats live in burrows near each other in colonies. It prefers loose, sandy soil.

The Indian gerbil has different habits. It comes out only at night and does not live near other rats in colonies like the sand rat does. There is only one Indian gerbil in each burrow.

The fur of the Indian gerbil is a dark golden brown on top and snow white underneath. Its tail is longer than its body and is fur covered with a black tuft of hair on the end. This rat has large eyes, prominent ears, and the hind legs are much longer than the front ones.

The mole rat does not come out during the day or night. It lives all its life underground in tunnels that it digs. The mole rat has small eyes and ears, a hairless tail, a blunt nose and prominent orange front teeth.

Its fur is dark brown. It burrows in bunds, ditch banks and in fields, leaving many piles of dirt that it pushes out while digging its tunnels. There is one rat per burrow system which may be 40 feet long. It is a root feeder but will pull plants into its burrows.

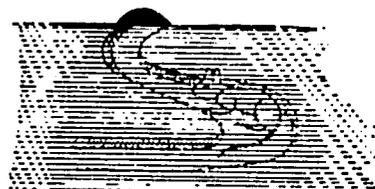
Other night-time Rodents



دن کے وقت ریگات چرھا



رات کے وقت حرن چرھا



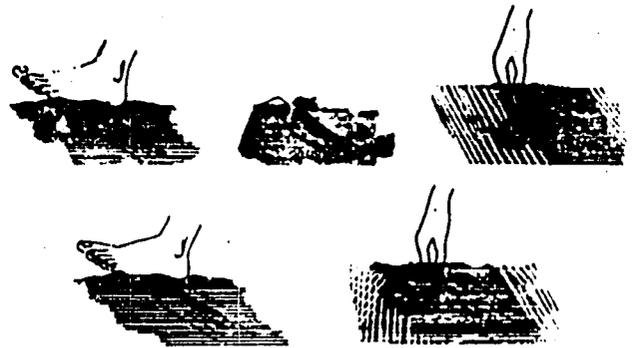
اندھا چرھا اپنے پل سے

Two other rodents that cause damage are the roof rat (*Rattus rattus*) and house mouse (*Mus musculus*). The roof rat is brownish-grey and at times it has a white stomach. It has a long hairless tail, large ears and eyes, and does its work at night. The house mouse, when full grown is about the size of your thumb. It has soft fur which may be brownish-gold, brown or greyish. At times it is white underneath. Mice, like rats damage more food than they eat. They contaminate food with droppings, urine, and dirt which may spread food poisoning and diseases to humans. These two rodents are usually found only in shops, homes and Godowns.

How Can Rodents be Controlled?

To control rodents that damage crops, timing is very important. The best time to get them is when they are few in number which is shortly after

the crop is planted. In houses or godowns, control should be practised any time rats or mice are suspected. In houses, rats and mice breed the year round so they are a continual problem.



When the crop is small, you should inspect fields and nearby areas for open rat holes or mounds of dirt. Rats will travel long distances to feed on your crops. Fill in and smooth over all rat holes and dirt mounds. Check under and around shrubs, bushes and grass clumps as well field edges. Wait two days and then recheck for burrows and mounds. All reopened holes or new dirt mounds indicate that a rat is present.

Then place bait well into the hole but do not fill in the hole. Wait two to four days and again cover up the holes and smooth out the mounds. Again wait two days and rebait any newly reopened holes. This procedure should kill 90 percent of the rats if a proper bait has been used. Ask your Agricultural Extension Service fieldman for information on making baits.

A good practice is to always carry a small bag of rat bait when visiting your fields for any purpose. If you bait open rat holes whenever you see them, rats will never be a problem.

Cooperate with other farmers

If all the farmers with adjacent fields join together in a common rat control programme, the cost for each farmer will be less and the level of rat control will be greater. A group control programme benefits everyone.



MAKING BAIT TO CONTROL RODENTS



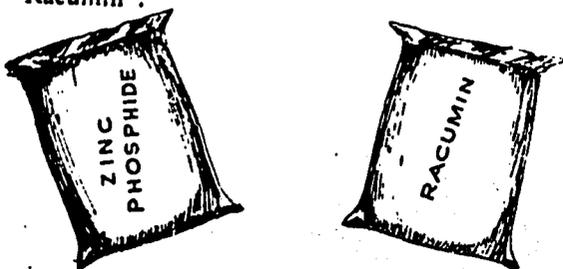
A fact sheet for farmers

Summary

1. Using poison bait is a more effective way to kill rodents in barani areas than using gas.
2. Zinc phosphide bait made into small cakes is a good bait.
3. "Racumin" bait mixed with grain and put in bags is slower than zinc phosphide but is a good rat killer.
4. Timing is important when using baits to kill rats. You must use the bait before damage is done.
5. Fresh bait is more effective than old bait in killing rats. Some bait deteriorates quickly.
6. Bait must be mixed carefully according to a formula.
7. Since bait is a poison, handle it with care and wash your hands after mixing it.
8. Store the bait in a safe place away from children and animals.

Comparing poison baits.

Zinc phosphide is a quick poison, but dangerous, while "Racumin" is slow but safer and more thorough. Rats may become shy of zinc phosphide after a time but they seldom become shy of "Racumin".



Using gas to kill rats in barani areas is not very effective because of the dry porous soil.

A good bait should be:

1. Made of local materials.
2. Easy to make by farmers.
3. Economical.
4. Easy to use.

How to make zinc phosphide (2%) bait.

A. Small cakes.

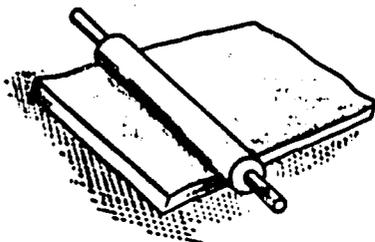
First select grain that is common in the area and that rats like. For example wheat in a wheat area and maize where maize is grown. Dusty or dirty grain will not make a good bait so be sure the grain is reasonably clean. The grain must not be sour or spoiled or the rats will not eat it. Do not use grain heavily infested with insects. Grains such as wheat or maize must be crushed or cracked before mixing.

Materials needed:

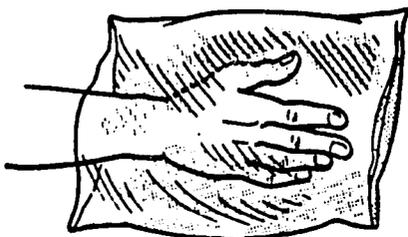
- 2.5 Kg flour (atta of wheat or maize)
- 2.5 Kg crushed wheat or maize or broken rice
- 100 grams cooking oil (about 1/2 cupful)
- 100 grams zinc phosphide
- Enough water to make a stiff dough.

Preparation:

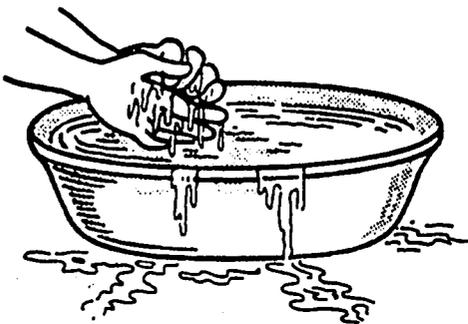
1. In a clean bucket or other container, place the flour and grain and mix well. Never use a container in which there has been insecticides or other chemicals.
2. Add the zinc phosphide which is a grey-black powder and stir till the mixture is a uniform grey colour.
3. Add the cooking oil and mix well.
4. Slowly add the water and mix until a stiff batter is formed.
5. Place the bait on a smooth surface such as cardboard or a news-paper, and roll flat till it is about one third inch or one centimeter thick. A piece of pipe or round wood can be used to get a uniform thickness.



6. Then using a knife, cut the flattened bait into squares about the size of a five paisa coin.
7. Place the bait in the shade with good air circulation to dry for two or three days. Turn it occasionally and don't let it get wet from dew or rain.
8. Store the bait in a plastic bag in a cool dry place till it is used. Use the bait as soon as possible because it deteriorates over a period of months
9. When handling zinc phosphide, never touch it with bare hands. Use a plastic bag to cover your hands and a wooden paddle or stick to mix the cake.



10. Wash all tools and containers and wash your hands after mixing bait. Do not eat or smoke till you have washed.



The sequence of mixing is very important because zinc phosphide reacts with water to release a poison gas. By following the steps in the correct order, the oil coats particles of the chemical and reduces the contact of the water and the chemical. Use just enough water to give a stiff but not a sticky batter suitable for easy handling, and quick drying.

Zinc phosphide gradually becomes less toxic as it ages so it is better to make small batches instead of one large batch. Fresh dried bait is more attractive and kills more rats.

B. Loose grain zinc phosphide bait.

You will need the following:

5Kg crushed wheat, maize or broken rice.
100 grams zinc phosphide.
Enough cooking oil to lightly coat the grain, i.e., about half a cupful.

In a clean dry container, mix the grain and half of the oil. Then slowly add the zinc phosphide and mix until it is an even grey colour. Store the bait in a well sealed plastic bag.

How to mix "Racumin" bait.

Place 19 parts by weight of clean crushed wheat broken rice or maize in a clean container. Then add just enough cooking oil to lightly coat the grain. When the two are mixed, continue stirring and slowly add one part by weight of the "Racumin" master-mix which is a light blue powder. Mix again until the grain is evenly coated. The bait is now ready for use. For ease of storage and use, 100 grams of the bait can be sealed in small plastic bags for later use in the field.

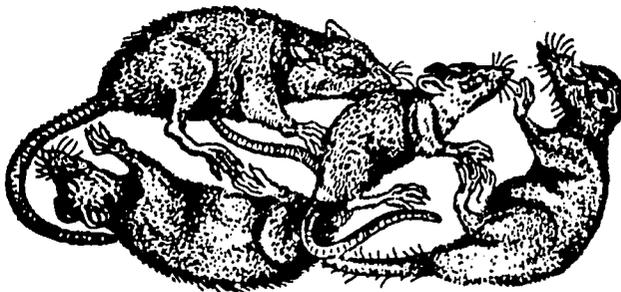
How to use bait

First, locate all open rat holes by field inspection. Where mole rats are present, smooth over all dirt mounds, and for the other rats, seal all open holes. Two days later place bait in all open holes and open all burrows made by mole rats under new dirt mounds. Put bait in these holes, too. Then wait two days and rebait all new holes and new mounds. Repeat these steps as often as necessary when new holes or mounds are seen.

When using rat cakes, place one piece well into each hole. When using loose grain zinc phosphide bait, put one spoonful in each open burrow. When using "Racumin" for baiting burrows, place 100 grams of the "Racumin" bait in a small sealed plastic bag and put this bag well into the hole. After cutting it open with a razor blade. Repeat the "Racumin" baiting in one week. Then wait one week and check for newly opened rat holes. Repeat as necessary following these same steps.

Be sure to wash your hands after you have been placing the poison bait in rat burrows.

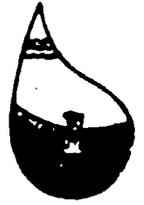
Cooperation among farmers is important in a good rodent control programme. Bait mixed at a central village station can be less expensive and the control of rodents can be more complete if everyone works together at the same time.



The only good rats are dead ones

BARANI AGRICULTURAL DEVELOPMENT PROJECT

DON'T LET BIRDS EAT YOUR GRAIN



A fact sheet for farmers

Summary

1. Birds cause an annual loss of 305,000 tons of grain and cereal crops in Pakistan.
2. House sparrows alone cause standing wheat losses of more than 170,000 tons of grain annually.
3. Barani as well as irrigated areas are affected by wheat losses caused by birds.
4. The common House Sparrow is the most destructive bird pest but the Rose-ringed Parakeet and others also cause damage.
5. Information as to the kinds of birds, the crops damaged, and environmental factors is necessary if there is to be an effective control programme.
6. Good control depends on using a combination of methods including manual, mechanical (trapping) and chemical.
7. The cooperation of farmers and everyone in villages is essential if a control programme is to be successful.

Losses Caused by Birds is High

Estimates of sparrow damage to both irrigated and barani wheat crops ranges up to 60 percent in some areas of Pakistan. Heavy damage is also inflicted by birds on maize, sorghum sunflower, rapeseeds, millet and other crops.

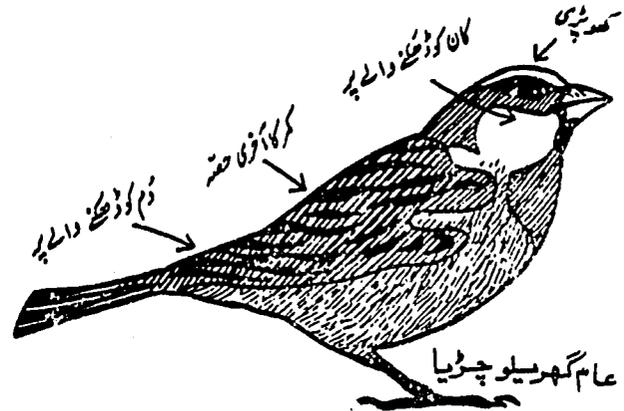
Applying control methods after bird problems develop is seldom successful. A good control programme must be an all year operation based on knowledge of the birds habits and methods of controlling the birds. Equally important is that your control procedures are justified on a cost-benefit basis. Some methods of control do not have to be expensive.

In addition to the House Sparrow, the migrant Sparrow, Common Weaver, Rose-ringed Parakeet, Red-vented Bulbul and others cause damage. Since the House Sparrow (*Passer domesticus*) causes most damage, this information sheet will be limited to it.

Fact Sheet number 4 in this series will discuss methods of building traps and using chemicals to control birds.

Appearance, and Living Habits of the House Sparrow.

The House Sparrow is a resident bird about six inches in length. These birds are widespread over agricultural and rural areas in Pakistan. Its crown, rump and tail coverts are grey. Ear coverts are white and the throat and breast bears a black patch on the male birds. In the females, the underparts are grey-brown with black streaks on the back and without any black patch on the throat and center of the breast.



Breeding takes place throughout the year, particularly from February to July. Two or three broods are likely to be raised each year.



The house sparrow is a serious pest of standing wheat during the grain formation stage from February to April or May depending on the variety

and the date of ripening. Damage is relatively heavy and localized around the edges of the fields which are close to roosting trees. The birds feed intermittently throughout the day and tend to move in small flocks. They feed by perching on the standing wheat ears, removing the entire grain and leaving the bracts untouched. You can recognize bird damage done by birds from that done by insects because insects will cut the surrounding bracts level with the grain.

House Sparrows build their nests in holes in mud walls and between roof beams in thatches and other buildings in the countryside.

Sparrow damage occurs over a period of about five to seven weeks during the ripening stage of the standing wheat. Feeding starts as soon as the milk stage of the grain is reached. The sparrows seem to prefer full sized milky kernels with doughy contents. As the ears reach maturity, the birds move from the edges of the field in toward the center.

The problem of controlling sparrows is difficult because of the large acreage of wheat raised, availability of water and roosting trees, and the huge number of villages scattered over the country providing ideal living conditions for scattered resident population of this bird pest

Bird Surveys Necessary for Control

You cannot control birds successfully until you know the following facts about them:

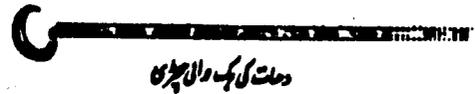
1. What bird species are doing the damage to your crops? What are their feeding, breeding and roosting habits? How many birds are there and what are their group movements?
2. To which crops and at what stage of development does the damage occur? Is the damage to crops localized or is it widespread? What is the estimated percent of loss to the crops?
3. What is the season of damage and what is the food that the birds prefer at that time? What is the practicability of applying different control techniques?

How to Control the Birds

Four steps in control strategy are recommended for the Barani areas. These may be modified by the bird survey just described.

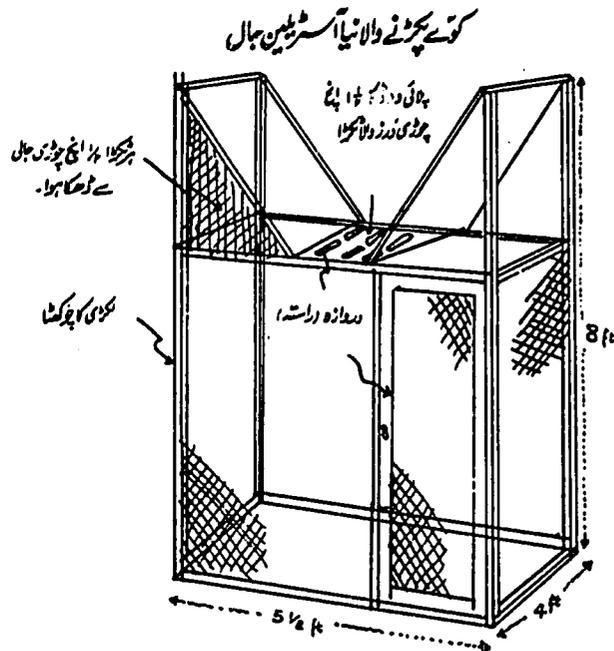
1. Destruction of nests and nest contents during breeding season.
2. Live trapping in the field and villages.
3. Use of chemical repellants.

In a systematic way, family members including children can destroy the nests and their contents at



any time of the day. This is important from March to July during breeding season. A long wooden stick with a metal hook at the end is effective for pulling out the nests. You can cut the bird population drastically by this one technique alone.

Live trapping can be done using the Modified Australian Crow Trap described in Fact Sheet number 4. This trap is made of wood covered with wire netting and can be made easily in your village.



House sparrows may also be caught by using a mist net which is also described in Fact Sheet number 4. These nets are made of very fine black terylene or nylon and are hung between two poles.

Controlling birds with chemicals and the use of attractant strips along the field will be discussed in the next fact sheet in this series. Your field assistant in the Agricultural Extension Service will have more information on controlling birds.

For further advice please contact:-

Vertebrate Pest Control Centre
P.O. Box 8401
KARACHI-32.

KILLING BIRDS THAT EAT YOUR GRAIN



A fact sheet for farmers

Summary

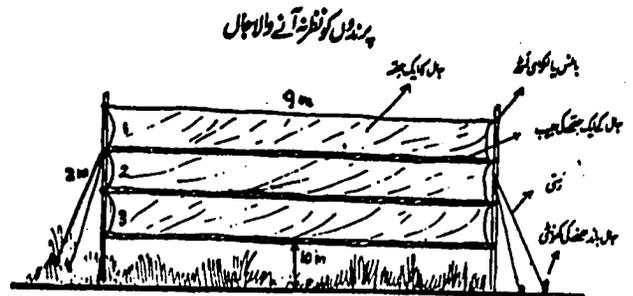
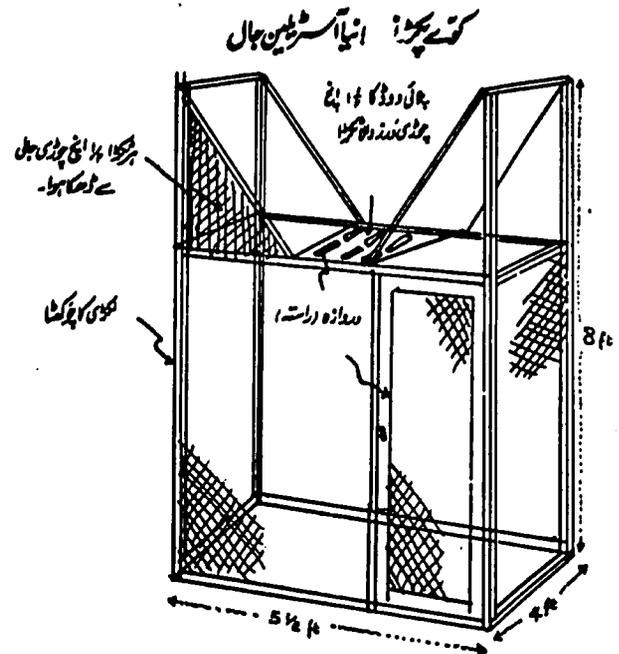
1. Well placed traps will reduce the bird population significantly.
2. The Modified Australian Crow Trap can be built easily in your village and is not expensive.
3. The trap must be watched carefully, be kept baited and trapped birds removed daily.
4. Mist nets can be made locally and if well placed will catch many birds.
5. Nets can be positioned most effectively by watching the behaviour of the birds to see where they congregate.
6. Several different chemical have been used successfully to control birds. Check with an expert in the use of these chemicals before using them.
7. The planting of an attractant crop around the edges of your fields might protect your grain crop. Ask your field assistant for advice on this.

The Modified Australian Crow Trap is made entirely of wood and covered with 1/2 x 2 inch wire mesh as this drawing shows.

Two traps per village and one trap per field of 15 acres would be a good number to start with. You should relocate the traps periodically to the locality of damaged areas of grain. The trap must be provided with decoy birds and food and water. You should check the trap every day and release beneficial birds and of course, remove the birds you will destroy. Some people eat the sparrows which are caught in traps and they say the birds are delicious food.

House sparrows may also be caught with mist nets which are made of very fine black nylon or terylene netting hung vertically between two poles as shown on this drawing.

Birds which fall into the almost invisible net get caught in the pockets of loose netting below the shelf strings and can't get out. The shelf



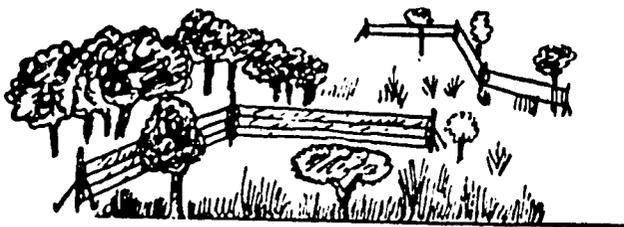
strings between the posts must be of strong material and stretched tightly. To catch house sparrows and similar sized birds, use a mesh net of 1-1/4 or 1-1/2 inches in size. The nets normally have four shelves or strings between the posts.

You can make the nets anywhere from 10 to 20 metres in length and about three metres high. The shorter nets may be used in narrow valley or other confined places. If the nets are too tall, they may be inefficient because they are too visible to the birds. The poles at the ends may be of bamboo, or light wood or metal. The most convenient poles to carry are made of light metal cut into 1.5 metre lengths so they can be joined together as needed.

Each end pole should be supported by two guy wires or ropes so the poles will be firm and hold the net tight. The horizontal strings should be quite tight and the vertical ones, loose.

Place the bottom of the net about 10 inches above the ground. The strings between the poles are uniformly spaced from top to bottom. The exact positioning of the strings can be determined by watching the birds' behaviour from a distance and adjusting it accordingly.

پستان کے پستانوں کے ساتھ ساتھ



An array of mist nets located near a bird roost arranged as in the above drawing is an effective way to catch many sparrows.

Removing the birds from the net may be a bit difficult till you have had some practice doing it. The bird must be taken out from the side it entered. First the feet are cleared of the netting and held by one hand to prevent the birds from gripping the net. Then the loose netting around the bird is peeled forward over the wings and body, and finally over the Head.

The net can be easily dismantled and taken to another location. The way to do this is for two persons to work together. One person feeds the net into a bag and the other holds the net up off the ground as shown in the drawing below. It is generally recommended that the net be taken down at night to prevent large animals from walking into it.



Using Chemicals to Control Birds

Chemicals that may be used on birds include repellants, contact avicides (killers) and poison baits.

Among the repellants are Methiocarb and Mesuroi which affect the birds' digestive system and discourages them from going near the crops which are treated.

Contact avicides such as Queletox are directly applied to the birds in their roosting or nesting sites.

Poison baits like Tergitol can be used near the roosting or nesting area but must be handled carefully so other animals that are beneficial do not become affected.

The field staff of your Agricultural Extension Service can help you decide whether to use chemicals to control birds in your area. He will tell you what chemicals to use and where to get them.

Using Bird Attractant-trap Crops

Since house sparrows feed at the edges of the field first, it is possible to draw their attention to a crop growing around the perimeter of your field. Sparrows seem to have a preference for certain crops. The attractant crop should be planted so it will reach the milk stage before the crop to be protected does, early sum 'BATRA' can be used to protect maize or superior yielding varieties of SORGHUM.

Attractant crops for controlling birds should be used only to supplement other methods of control—not as the sole effort to prevent bird damage to your crops. Your Agricultural Extension Service Staff can advise you on how to use this method of bird control.

For further guidance or advice please contact:-

Vertebrate Pest Control Centre
P.O. Box 8401
KARACHI-32.

TWO POSTERS
(REDUCED SIZE)

آئیے جدید کاشتکاری ایٹائیں

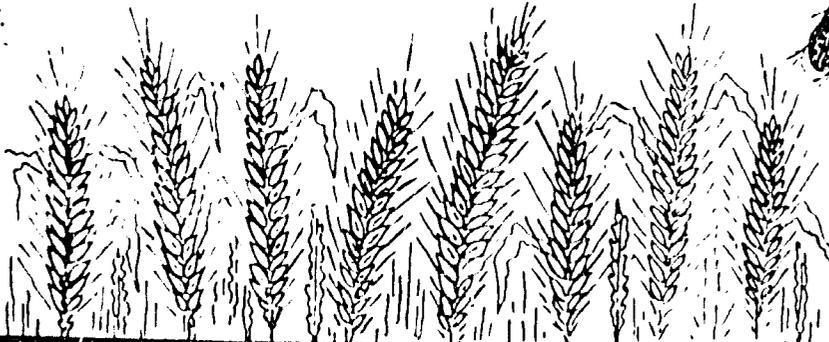


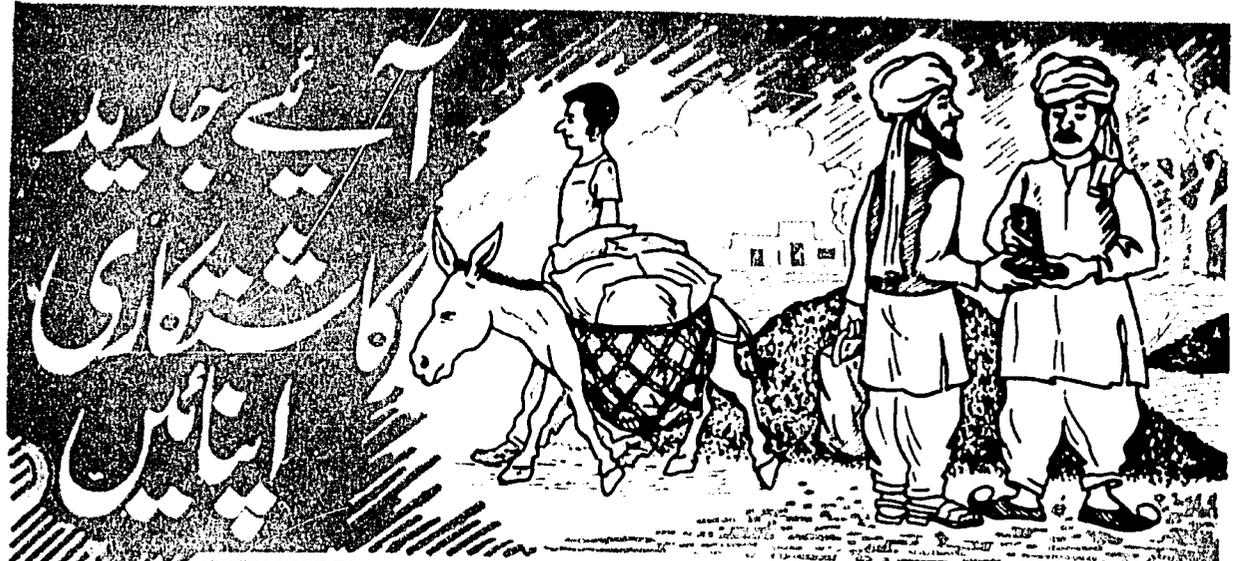
چوہ مارنے کیلئے نہریلا طغمنہ بنانا

- ۱۔ بارانی علاقوں میں چوہوں کو مارنے کے لئے نہریلے طغمنہ کا استعمال گیس سے زیادہ موثر ہے۔
- ۲۔ زنک فاسفائیڈ یا کالی دوئی سے بنایا ہوا طغمنہ چوہوں کے لئے ایک مفید طغمنہ ہے۔
- ۳۔ راکومن اور لانج (گندم یا چاول یا مکئی) سے بنایا ہوا طغمنہ چوہوں کو بہتر طور پر مارتا ہے مگر زنک فاسفائیڈ کی نسبت آہستہ اثر کرتا ہے۔
- ۴۔ طغمنہ استعمال کرنے کیلئے مناسب وقت بہت اہم ہے نقصان ہونے سے قبل اس کا استعمال کرنا ضروری ہے۔
- ۵۔ تازہ بنایا ہوا طغمنہ نسبت پرانے زیادہ موثر ہوتا ہے۔ طغمنہ کی کپا قلم جلدی خراب ہو جاتی ہیں۔
- ۶۔ طغمنہ کو ترکیب کے مطابق بنانا چاہیئے۔
- ۷۔ چونکہ طغمنہ نہریلا ہوتا ہے اس لئے اس کے بنانے میں احتیاط ضروری ہے اس کو تیار کرنے کے بعد اپنے ہاتھوں کو اچھی طرح دھو ڈالیں۔
- ۸۔ طغمنہ کو بچوں اور جانوروں سے دور رکھیئے اور مناسب جگہ سٹور کریں۔

RODENT AND BIRD CONTROL-2
MAKING BAITS TO
CONTROL RODENTS

اپنے حلقہ کے زرعی توسیع کارکن یا دیہی ترقیاتی مرکز کے حلقہ سے ملیں





مونگ پھلی کی گوڈھی اور برداشت

- ۱۔ مونگ پھلی کی اچھی اور میاری پیداوار حاصل کرنے کے لئے فصل میں گوڈھی کرنا نہایت ضروری ہے۔
- ۲۔ بیلوں سے یا ٹریکٹرز سے کھینچنے جانے والے زرعی آلات سے بھی آپ آسانی سے گوڈھی کر سکتے ہیں۔
- ۳۔ گوڈھی کے عمل کو مناسب وقت پر انجام دینا چاہیے۔
- ۴۔ مونگ پھلی کی زیادہ اور میاری پیداوار حاصل کرنے کے لئے اس کی وقت پر برداشت بھی بڑی ضروری ہے۔
- ۵۔ مونگ پھلی اگھانے کے کامل ہاتھوں سے کرنے کی نسبت مونگ پھلی اگھانے والے ہل سے جلدی اور آسانی سے کیا جاسکتا ہے۔
- ۶۔ پودے اگھانے کے فوراً بعد ان سے پھلیاں عملیہ کریں اور ان کو پھلیوں کو مٹھوپ میں لگا کر خشک کریں۔
- ۷۔ پیداوار کو صاف ستھری خشک بولیوں اور کیڑوں سے پاک کمروں میں سٹور کریں۔

GRC INDNUTS - 5
CULTIVATING AND
HARVESTING GROUNDNUTS

اپنے خلقہ کے زرعی توسیع کارکن یا دیہی ترقیاتی مرکز کے حوالہ سے ملیں



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RADIO SCRIPTS

RADIO SCRIPTS

For Radio Pakistan
Rawalpindi, Peshawar and Lahore

To Program Producer

For use with Barani Agricultural Development Project
Fact Sheets on wheat, maize, groundnuts, and
control of rodents and birds.

This is a series of radio scripts ready to use in agricultural radio broadcasts. It will take from five to eight minutes to read each script. The material in each radio script is based on subject matter in a fact sheet for farmers with the same title and number as the radio script.

The fact sheets have been given to field assistants in the Agricultural Extension Service who will make them available to farmers in each field assistant's work area.

Use of the fact sheets by field assistants will be closely related to the progress of the crop season. Field assistants will be giving the fact sheets to farmers in training meetings at appropriate times as the crop season progresses. Exact dates when the farmers will get the fact sheets will depend on weather and soil moisture conditions in each particular area of the province.

When these scripts are used in radio programs, they should be timed to match the period during which the fact sheets are being distributed to farmers by field assistants. The Office of Deputy Director of Agriculture in each province should be able to provide information to radio stations regarding appropriate dates for using the radio scripts in their radio programs.

The subject matter in these radio scripts is of a general nature and therefore, should be usable more than one year. However, the radio station program producer should check with the Agricultural Extension Service to be sure grain varieties have been brought up to date or else make the necessary changes in the recommended lists. Changes may also have to be made in fertilizer and pest control recommendations from those given in the scripts.

With these changes, the scripts should be usable for several years. The radio scripts, as well as the fact sheets, posters, and slide sets that accompany them have been prepared by the staff of Experience, Incorporated, Minneapolis, Minnesota, USA. This is part of a contract with the United States Agency for International Development for work in the Punjab and Northwest Frontier provinces in Pakistan.

Wheat Number 1

RADIO SCRIPT

PLANT GOOD WHEAT SEED

Farmers who raise wheat can increase their yields considerably if they plant good wheat seed. This is the advice of Nisar Ahmad Barula, Director of the Punjab Barani Agricultural Development Project. Increased wheat yields are important at this time, since the Pakistan Government is asking farmers to help meet the country's food shortages.

Good seed is pure, free from weed seeds, has a high germination rate, and is a variety that does well in your area. It is a variety that will resist diseases.

Pure seed means that it is one variety and not mixed with other crop seeds such as oats, barley, gram, etc. If you must use a mixture in order to have enough seed to plant, be sure to use varieties that have the same maturity. Pure seed has no broken or damaged kernels, no weed seed, and no straw or other foreign matter mixed with it.

Your seed should have a high germination rate. Eighty percent or more of the kernels should be viable. That means at least 80 kernels out of every 100 should grow when you plant them. A low rate of germination means a poor stand of wheat.

There are several ways you can test your grain for germination. One way is to put 100 kernels between two pieces of cloth about 12 inches square and roll this up on a stick. You must keep it moist and warm for about nine days. This is called the "rag doll" test for germination. If the percentage of germination is much less than 100 percent, you will need to increase the amount of seed you plant per acre.

Wheat Number 1

Page 2

Your Agricultural Extension Service field assistant has an information sheet that will tell you more about the "rag doll" test and other ways to test your seed for germination. He can show you how to do the tests.

Your wheat seed should be heavy. The kernels should be plump, bright, and free from insect damage. The kernels should not be shrivelled or broken. The seed you plant should be free from disease and should be from fields that are not infected with disease. You can treat the seed with a fungicide to protect it from seed-borne and soil-borne diseases.

If you produce your own seed, select a variety that is adapted to your area. Your Agricultural Extension Service staff has a list of varieties that are recommended for your area. Be sure that you plant your wheat at the recommended time.

If you are saving your own seed, watch the wheat while it is growing to see that your field is free from leaf rust and flag smut. Select a part of your field from which you will save seed and pull out all the weeds and other crops that may be growing in that part of the field.

When you harvest the wheat, choose only heads with plump kernels. Avoid small, shrivelled, or insect-damaged kernels.

When you thresh the wheat you plan to save for seed, clean the thresher thoroughly before you begin to thresh. Be sure the wheat is dry when you thresh it so it will not mold. Then store it in clean bags or a clean bin. Your storage place should be dry and protected from rats and mice. Before you plant the seed in the next Rabi season, clean the seed again and treat it with a fungicide.

Wheat Number 1

Page 3

If you buy your seed wheat from someone, find out if he has followed the same steps we have just discussed.

This program has been brought to you by the Barani Agricultural Development Project which is interested in helping you increase your crop yields.

Wheat Number 2

RADIO SCRIPT

TREAT SEED WITH A FUNGICIDE

Treating your seed wheat with a fungicide will help prevent disease and increase your yield at harvest time, according to Dr. Homer Hepworth of the Pakistan Agricultural Research Council.

A fungicide is a chemical poison that protects seed against diseases that may be present on the seed or in the soil. The fungicide may increase the germination rate of your wheat, giving you a better stand.

Since a fungicide is a poison, it should be handled carefully. You should put plastic bags or gloves on your hands and have a mask or cloth over your nose so you do not breathe the dust from the poison.

Never allow people or animals to eat grain treated with a fungicide because it may kill them.

There are several fungicides on the market that you can buy to treat your seed. The four most common ones are: Vitavax, Granosan, Agrosan, and Arasan. You can use any of these that are available in your local market, since most of them will prevent seed-borne and soil-borne diseases. Vitavax is called a systematic fungicide because it is absorbed by the seed and distributed to the seedling tissue, therefore preventing seedling blights.

The other three fungicides -- Granosan, Agrosan, and Arasan -- are called seed protectants and will prevent disease injury to young plants which may be caused by either seed-borne or soil-borne organisms.

Wheat Number 2

Page 2

If you use Vitavax, you will need 2 ounces for every 30 kilograms of grain you treat. That is about two large spoonfuls of poison for each maund of grain. When using Agrosan or Arasan, use 2 ounces for 30 kilograms of grain, the same as with Vitavax. If you use Granosan, however, you should use only one-fourth as much of the chemical for each maund of grain you treat. Your Agricultural Extension Service field staff can advise you on where to get the fungicide and how much to use.

The first step in treating your seed is to select a container that is the right size for the amount of seed you plan to treat. You may use a clean, empty paraffin can or a clean bag. You may also use a barrel treater or a commercially made treater for large amounts of grain.

If you don't have any of these, you can make a clean place on a smooth floor where it is protected from the wind and put the grain in a small pile to mix the fungicide with it.

You can mix the fungicide more uniformly with the wheat if you first mix it thoroughly with about ten parts of dry powdered clay. This will give you a larger quantity of material to mix with the grain.

Wheat Number 2

Page 3

The barrel treater or one of the commercially made ones that are on the market will treat larger amounts of seed very easily and quickly. There may be one in your village that you can use. Treating your seed can be made easier and less expensive if several people in the village cooperate and do the work together.

When you have finished treating your seed, put it in a clean bag and label it with the variety or kind of seed and the date you treated it. Store it in a clean, dry place and be sure to keep children and animals away from it.

This program has been brought to you by the Barani Agricultural Development Project which is interested in helping you increase your crop yields.

RADIO SCRIPTPREPARE A GOOD SEEDBED

A good seedbed is important if you want a big crop of wheat. This is the recommendation of the Pakistan Agricultural Research Council in Islamabad. All farmers in Pakistan who raise wheat are urged to increase their yields to help meet the country's goal of 10 million bushels of wheat. One important step in meeting this goal is to prepare a good seedbed for your wheat.

Your field should be plowed early; that is, late August or September, and the first plowing should be deep. Plow at least six inches (15 cm.) deep. If you have two healthy bullocks or four small ones, or a tractor, you can plow six inches deep easily. If you have only one bullock, just plow as deep as you can.

Later tillage of your field may be done four inches (10 cm.) deep every two or three weeks as necessary to control weeds and to maintain a loose soil mulch on top of the soil.

Most soil in the baran! areas has a low level of fertility. Therefore, an application of nitrogen and phosphorous fertilizer is normally required to produce a good crop of wheat. Usually, the best time to apply the fertilizer is just before the last tillage operation before you plant the wheat. This will mix the fertilizer in the soil where the roots of your wheat plants will be. If you broadcast the fertilizer by hand, cover only as much land as you can plow in one day. This is very important if you use urea fertilizer because the nitrogen in the fertilizer will be lost rapidly in the air, until it is mixed with the soil.

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The fertilizer should be near the seed but not touching the seed. If you can get a seed drill with a fertilizer attachment, the fertilizer will be placed just to one side and a little below the seed. If you use a plow, or plant by broadcasting, then put the fertilizer on your soil before the last tillage operation.

Phosphorous fertilizer stimulates root growth and early plant vigor so it is important that the phosphorous fertilizer be applied before or at seeding time. Then it will be available to the young seedling plant.

Nitrogen fertilizer stimulates vegetative growth and it increases the yield and protein content of the grain. Usually, it is recommended that you apply most, but not all, of the nitrogen fertilizer before or at planting time. Save part of your nitrogen fertilizer to put on the wheat as a top dressing when the wheat plants are at the tillering stage. The tillering stage is just before the main stem begins to shoot up. The amount of top dressing you use should be determined by how much moisture is in the soil when the wheat is at the tillering stage.

You should apply top dressing fertilizer only when the leaves are dry. If dew is on the leaves, or if it has just rained, the nitrogen in the fertilizer will burn the leaves.

Your Agricultural Extension Service field staff will help you decide the kind and amount of fertilizer and when to use it for your wheat and other crops.

This program has been brought to you by the Barani Agricultural Development Project which is interested in helping you increase your crop yields.

RADIO SCRIPTPLANTING WHEAT PROPERLY

A good seedbed is an important step in having a big yield of wheat at harvest time. According to Dr. Homer Hepworth, Research Scientist at the Pakistan Agricultural Research Council in Islamabad, a poorly prepared seedbed will result in a low yield even though some other factors are good.

Wheat seed requires the right soil temperature and moisture, as well as a firm seedbed. Although you cannot control these conditions, you can select a time to plant when the conditions are best.

The best soil temperature is 4 to 15 degrees Centigrade and an air temperature of 15 to 20 degrees. Higher temperatures promote fungus diseases and insect pests. Therefore, delay your seeding till the hot weather has passed.

The wheat seed must be in close contact with the soil, says Dr. Hepworth. This means that you should have a loose top soil but firm seedbed below the top mulch. If you plow early and at least six inches deep, the soil should be in good condition. An ideal seedbed is one where the seed is in firm, moist soil with a layer of loose soil above it.

Wheat does best if planted about 1 1/2 to 3 inches (4 to 7 1/2 cm.) deep. Seed that is planted deeper than 8 cm. will be slow to emerge and the number of plants will be reduced. If you leave wheat seed on the surface or too close to the surface, it will dry out and rodents and birds may take much of it.

It will pay for you to use fertilizer on your wheat but try to place the fertilizer properly. If you broadcast the fertilizer by hand, do the broadcasting just before the last ploughing and then mix it well with the soil. If you use a mechanical seeder with a fertilizer attachment, the fertilizer should be placed a little below and just to one side of the wheat seed.

The proper rate of seeding wheat is also important. Fact Sheet Number 1, which your Agricultural Extension Service staff has, tells you how many bushels to sow per acre for the common recommended varieties of wheat. You should have enough plants evenly spaced to fully utilize all growth conditions -- moisture, fertility, and sunlight. Usually this number is 275 to 300 seeds per square meter. Some varieties will need more space because of greater tillering habits. Later plantings require more seed than early plantings and broadcasting requires more seed than drilling with mechanical equipment. You can also use higher rates of seeding in areas of high rainfall -- over 500 mm.

If you plant your wheat in rows or lines, the best row spacing is 6 to 8 inches (15 to 20 cm.). If your rows are more than 20 cm. apart, weeds may be a problem. If the spacing is more than 35 cm., you will probably have a lower yield. Your late seedings should be in narrower rows than the early seedings.

When you broadcast the seed, it is difficult to spread it evenly and to cover it uniformly. You should walk at a constant speed and try to cover a strip about three meters wide. As soon as you have finished seeding, go over the field with a plank to cover the seed and smooth out the top soil.

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If you seed with a drill, keep the speed constant at about 4 to 8 km. per hour. Press wheels at the back of the drill, or some other mechanism behind the drill should firm the soil over the wheat and insure good contact with it.

When you use mechanical seeders, be sure you keep them in good operating condition. Read the operator's manual to find out how to oil the working parts and how to adjust the seeding rate mechanism.

The seeding rate of your drill is affected by size, shape, and density of the seed in the seedbox. The size of the opening through which the seeds must pass also will affect the rate of seeding.

To be sure that your drill is seeding accurately, calibrate it before you use it. Your operator's manual will tell you how to do this. Your Agricultural Extension Service field staff can also help you calibrate your drill.

When you have finished using the drill, clean the grain box and the fertilizer box. Then it will be ready for using when you sow your next field.

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Wheat Number 5

RADIO SCRIPT

CONTROL THE WEEDS IN YOUR WHEAT

Farmers who keep weeds out of their wheat get bigger yields at harvest time. Nisar Ahmad Barula, Director of the Barani Project in the Punjab, urges farmers to increase their wheat yields by eliminating weeds from the wheat while the weeds are small. This is important now since the Pakistan Government is making an effort to have farmers raise enough wheat to meet the country's needs.

Weeds are plants that grow where they are not wanted. They cause lowered wheat yields by competing with the wheat for water, soil nutrients, sunlight, and space. When weeds are young, they develop a rapidly spreading deep root system which gives them an advantage in obtaining water and nutrients.

Weeds provide a home for insects and plant diseases, which also lower crop yields. Weeds increase the cost of harvesting and threshing, and some weeds are poisonous to livestock and humans.

The two most important methods of weed control are cultural and chemical. Cultural weed control means preventing the weeds from growing by careful handling of the soil and of the seed you plant, or removing the weeds from the crop by khurpi or other mechanical tools. Cultural weed control also includes reducing weed infestation by proper seedbed preparation and planting clean wheat free from weed seeds. Chemical weed control means using a herbicide that will kill the young weeds chemically. The herbicide is selective which means it will kill certain weeds but does not injure the crop you are growing.

First, you must recognize the weeds that cause most damage to your crops. The field staff of your Agricultural Extension Service can help you identify the worst weeds.

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When you buy wheat seed to plant, look at it carefully to see that there are no weed seeds in it. If you raise your own seed wheat, clean it before you plant it.

The best way to fight weeds is to have a thick stand of vigorously growing wheat. If you have good, healthy wheat plants, they will compete well with the weeds. By having a good seedbed, planting at the right time, and using fertilizer, your wheat will fight the weeds successfully.

A good way to get rid of weeds is to kill them before you plant your crop. Let the weeds germinate and then kill them with shallow tillage just before seeding. Small weeds are easier to kill than big ones, and they have not taken much moisture or nutrients yet from the soil when they are small.

When you use herbicides, the weeds are killed by chemicals. These chemicals are sprayed on the crop with a hand sprayer or with power machinery. The power sprayers are useful on large fields. You must use the proper chemicals and apply them at the correct time and rate, and they must be spread uniformly over the field. Your field must be sprayed when the weeds are at the right stage of growth if they are to be killed easily with chemicals.

You must be careful when spraying fields to not let the spray blow on you neighbor's crops. Your Agricultural Extension Service field staff can give you more information on how to select and use herbicides to kill weeds.

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RADIO SCRIPTCONTROLLING DISEASES IN WHEAT

Each year diseases of wheat cause serious losses in yields for Pakistan farmers. Dr. Homer Hepworth, Research Scientist at the Pakistan Agricultural Research Council, says that much of this loss could be prevented by using modern methods of raising wheat.

The most common diseases that attack wheat are the rust, smut, and bunt. Most diseases of wheat are caused by fungi, although some are caused by bacteria and viruses. The fungus which causes these diseases is a tiny, living organism which develops from microscopic seed-like structures called spores. These spores get inside a wheat seedling or an adult plant or in the seeds and make a home there.

If temperature and moisture conditions are favorable, the organism feeds on the plant and increases in size. The plant is damaged and symptoms of the disease begin to show on it. The diseased areas become covered with spores which look like a powder. The diseased areas are yellow, brown, or black, depending upon which rust or smut disease has infected the plant.

If the wheat plant is healthy and strong, it may resist the organism growing in its tissues. If the plant is weak or susceptible to the organism, it will get the disease and finally will die.

The three major rusts which affect wheat in Pakistan are black rust (stem rust), brown rust (leaf rust), and yellow (stripe rust). Spores of these fungi which infect the wheat plants are so small

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and light that they may be carried by the wind for hundreds of kilometers. The spores may be carried by water, insects, or animals. People also may carry the spores by moving plant materials, seeds, or farm machinery from place to place.

Weather conditions have a strong effect on the diseases of wheat, too. Warm, humid conditions favor rust development. Hot, dry weather may decrease rust infection. However, if the plants are already badly infected by rust, then hot, dry weather may increase losses caused by the disease.

The most successful way to control rust and reduce losses from it is to plant seed from varieties that are resistant to rust diseases. You should never use seed of varieties that you know are susceptible to rust. The organisms that cause rust of wheat will change over a period of time and affect plants that were formerly resistant to rust. Therefore, plant breeders are constantly working to produce new varieties which are resistant to prevalent rust strains.

Agricultural scientists are now able to breed different characteristics into plants which will cause the plants to react to disease organisms in specific ways. For example, the new wheat plants may resist a particular new strain of rust. It requires years to do this, however. The strains of rust often change so plant breeders must work continually to meet this challenge.

In some cases fungicides can be sprayed on a field to help control rust. This requires special equipment and is practical only when used on large areas. It must be done by specially trained people.

Planting date also affects the probability of rust attacking wheat. Early seedings may escape the disease. Late seedings are more susceptible to attack by black (stem) rust and brown (leaf) rust. With stripe rust, late plantings may be damaged less because hot weather retards the disease.

Improving soil and plant growth conditions that will produce healthier and more rapidly growing plants will help keep rust damage to a minimum. Destroying weeds will also make healthier plants that are better able to withstand disease.

Another disease control measure is to rotate your crops. That means to change crops on the same piece of land from year to year. In this way, you may plant your wheat on land that does not have the disease causing organisms in it. If your cropping system will permit, plant your wheat on land that has not had wheat on it for the past few years.

Bunt and smut are diseases that also affect wheat but they are not so serious as the wheat rusts. Both bunt and smut are best controlled by using resistant varieties and by using seed that is known to be free from the disease.

Seed treatment, which is described in a fact sheet that your Agricultural Extension Service staff has, will help control some of the seed-borne and soil-borne diseases. Your field assistants can tell you more about treating your seed.

There are other diseases which affect wheat, also. Mildews, root rots, and stem rots are not so serious as rust and generally can be controlled with seed treatment and the use of resistant varieties.

By persistent efforts you can control the diseases which cause the loss of many bushels of wheat each year.

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RADIO SCRIPTUSING FERTILIZERS FOR WHEAT

Take good care of your soil and it will take care of you. That is the advice of Dr. Nurullah, Wheat Botanist at the Pakistan Agricultural Research Institute. He says that if you till your soil well and supply it with the correct amount of plant food nutrients, it will provide you with the maximum profits.

Most soils in the barani areas are lacking in one or more of the commonly needed nutrient elements. The amount of fertilizer you apply to meet these needs should be determined not only by the cost of the fertilizer but by the extra crop yields you can expect and also by the results of a soil test. The soil test will tell you which elements your soil needs most for the crop you are growing.

Even though you have ample water, sunlight, air and warmth, these basic necessities cannot be utilized fully by the plants if your soil is lacking in plant food nutrients.

The amount and kinds of fertilizer recommended for crops in your area are given periodically by the Soil Fertility Survey and Soil Testing Institute. Malik Dost, Director of the Soil Testing Institute in Lahore, will send you a copy of their latest recommendations if you write to him. Your Agricultural Extension Service staff also should be able to supply you with a copy of the recommendations.

The two common sources of plant food nutrients that can be added to your soil are farmyard manure and commercial (chemical) fertilizers.

Farmyard manure is an excellent source of organic matter. However, as a source of mineral nutrients, it is quite low when

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compared to chemical fertilizers. When properly stored, spread, and mixed into the soil, it has more influence on crop production than you might think. This is because farmyard manure increases the soil's water holding capacity and improves the soil structure. This reduces soil erosion and the amount of crusting of the soil.

To get the best use of farmyard manure on most barani fields, you should spread at least 570 kilograms of manure per kanal of land. That is about ten donkey loads on each kanal.

One problem with farmyard manure is that its nutrient content is not well balanced. To correct this, you can uniformly spread 4 kilograms of DAP (diammonium phosphate) over the 570 kilograms of farmyard manure you apply on each kanal of land. This will add more value to your farmyard manure than the DAP costs. The full value of your farmyard manure will not be realized unless you add the chemical fertilizer to it.

You also must use good seedbed preparation, weed control, and soil erosion control practices if you are to get full value from your fertilizers.

At least 13 different plant food or nutrient elements are essential for plant growth. Three of these that are used in greatest quantities are: nitrogen, phosphoric acid (usually called phosphorous), and potash. These three are generally referred to as N, P, K in that order. They are called the commercial fertilizer elements.

All commercial fertilizers must carry a guarantee showing the content of these three elements on each bag. For example, a bag of diammonium phosphate (DAP) commonly carries a guarantee of 18-46-0. This means that it contains 18 percent total nitrogen,

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46 percent available phosphoric acid, and 0 percent water soluble potash. It is important to know this because a 50 kilogram bag of DAP would then contain 9 kilograms of nitrogen, 23 kilograms of phosphoric acid, and no potash. You get these total figures by multiplying the total bag weight by the percentage of each element it contains. You can see that by adding the 9 and 23 kilograms of plant nutrients you will get a total of 32, which leaves 18 kilograms of filler in the bag. This filler, which is sometimes called conditioner, helps improve the physical condition of the fertilizer and prevents caking or hardening. The conditioner has no value for your crop but does add to the transportation and storage costs when you buy the fertilizer. The conditioner is quite often ground maize cobs or cocoa shells. These materials take up space in the bag and must be transported and stored along with the active ingredients of the fertilizer. This is why high analysis fertilizer gives you most for your money.

You can get a fertilizer slide rule calculator to determine how much fertilizer you will need to meet the recommended requirements for your field and your particular crop. The Barani Agricultural Development offices have these slide rules, and your Agricultural Extension Service staff also have them for you to use.

In addition to DAP and urea, which are the two most commonly used fertilizers in the barani areas, there are several more on the market. Not all of these are available in every market or at any time when you might want them. The more common ones are: ammonium sulphate, calcium ammonium nitrate, ammonium sulphate nitrate, nitrophos, single superphosphate, triple superphosphate, and potassium sulphate. Any of them could be used on your fields.

To be effective, the fertilizer you use must be mixed well with the soil. This means you should apply it before the land is

ploughed. For commercial fertilizer, a good time to apply it is just before the last ploughing. In the case of urea, it should be mixed with the soil immediately after it is applied or you will lose much of it into the air.

One exception to this time of application is when you topdress wheat with urea during the tillering stage of wheat. This stage is just before the wheat has started to joint or produce stems. Late October and November rains usually give wheat a good start and get it in the tillering stage ready for topdressing.

If your soil moisture is good and if you applied one bag or less of urea before planting, it will be profitable for you to topdress your wheat at this stage. The amount of urea you should apply depends somewhat on the rainfall area you are in. Dr. Nurullah suggests that in a high rainfall area you should use one bag of urea per acre or about two and one-half bags per hectare. In the low rainfall areas, you should use one-half bag of urea per acre or one bag per hectare.

Be sure to distribute the fertilizer uniformly over the field. A good way is to divide the amount of urea you plan to use in two parts. Broadcast half of it by walking one way across the field. Then broadcast the other half by walking at right angles to your first direction.

The topdressing fertilizer should be put on when your wheat plants are dry. Afternoon is the best time. If urea is put on the plants soon after a rain or in the morning when the plants are covered with dew, the plant leaves will be burned by the nitrogen in the fertilizer.

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Wheat Number 9

RADIO SCRIPT

TEST YOUR SEED FOR GERMINATION

A good stand of wheat is necessary for you to have a big yield. And to have a good stand, you must have seed with a high percentage of germination. Mohammad Tahir, Wheat Coordinator at the Pakistan Agricultural Research Council, recommends that all farmers who raise wheat should test their seed for germination before planting it.

He says that you cannot tell by looking at the seeds whether or not they will grow. The only way to determine the viability of your seed (whether or not it will grow) is to test it. There are several ways to do this. One easy way is to use the "rag doll" test.

To use the rag doll method, first count out 100 seeds at random from your seed bag or bin. Don't take them from one small part of the bag. Do not choose only good looking seeds. The sample you pick must be representative of the seed lot and contain all kinds of seeds, good and bad.

Then soak two cloth rags about 12 inches (30 cm.) square in water and squeeze out the excess water. Lay one cloth on a flat surface and spread out the second cloth on top of it. Distribute the 100 seeds evenly on the cloth in rows of 10 each way. Leave about one inch (2 1/2 cm.) border around the seed on the cloth. Wet another cloth and place it carefully on top of the seeds.

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After this, place a small stick along the top border of the cloth and carefully roll the cloth around the stick without disturbing the seed. Secure the cloth and stick together with a string or rubber band. Using a soft pencil on a small piece of paper, write the variety or crop name, the number of seeds, and date. Put this paper under the string at one end.

When you have finished this, sprinkle water over your finished "rag doll" until it is damp and then place it in a covered bowl or a plastic bag. Set it on a shelf in the house where the temperature is warm; that is, 20 to 25 degrees Centigrade.

Keep the rag doll moist for nine days and then open it and count the number of germinated seeds having shoots more than one inch long and having healthy looking roots. This number will be the percentage of germination of your seed.

If your seed tests below 60 percent germination, do not use it because you will get a poor stand. If the germination is between 60 and 100 percent, you will want to increase the rate of seeding accordingly. For example, if one maund (40 kg.) of seed is recommended, and your seed tests 80 percent, you will want to plant about 50 kg. of wheat to get a good stand.

Another method of testing your seed is to use the wet blotter method. This is similar to the rag doll test except that you use two pieces of blotting paper instead of the cloth. This paper is then put on a flat dish and kept moist for nine days. The number of viable seeds are then counted to determine the germination percentage.

You can also take ordinary newspaper and place it in the bottom of a flat plate which is kept wet. Count out 100 seeds as you would with other testing methods and lay them on the paper. Cover the plate by putting another plate on top and place it in a warm room for nine days. The plate must be kept damp during this period for the seeds to germinate. On the ninth day you can count the viable seeds and determine the germination percentage.

You may use these same methods of germination testing for other seeds such as grasses and other cereals like maize, sorghum, and the millets. Most grass seeds, however, require a longer time for germination. The usual germination period is 14 to 21 days for most grasses.

In testing any seeds, if the percentage is less than 60, you should look for other seed to plant. If the percentage is between 60 and 80, increase your rate of seeding considerably. If the percentage is between 80 and 100 you will want to increase the rate somewhat but the seed is perfectly all right to plant.

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RADIO SCRIPTHARVEST AND THRESH WHEAT PROPERLY

Increased yields of wheat are important in Pakistan if farmers are to produce enough wheat to feed the nation. The Barani Agricultural Development Office warns, however, that the benefit of bigger yields will be lost if the wheat is not harvested and threshed properly.

Proper timing is critical in harvesting wheat because the yield is affected by stage of maturity, tendency to lodge and shatter, rainfall, humidity, and temperature. In most barani areas, wheat harvest begins in May and goes through June. The wheat crop usually ripens about 30 days after blooming of the florets (flowers). The kernels are completely filled when they reach the dough stage which follows the milk stage

At the dough stage, the leaves, stalks, and spikes lose green color and become golden yellow. From this stage onward, the ripening process is a gradual loss of moisture in the kernels. When dried in the air, the kernels should have about 10 to 12 percent moisture and can be stored safely without fear of molding. An easy test for moisture content of wheat at this stage is to rub a head or spike of wheat between the palms of your hands.

If the kernels shell out and most of the central stems of the heads break, then the moisture content of the wheat is about right for threshing. The new semi-dwarf varieties usually mature and are ready to be harvested about two or three days earlier than the tall desi varieties. Harvesting them at this point in their maturing will prevent losses from shattering.

If damage from birds or storms threatens, the crop may be cut and tied in bundles as soon as it yellows. Then you may stack the bundles until drying is completed.

Since timing of the harvest is very important in your wheat crop, you may have to do it on short notice when the weather, stage of maturity, and other factors are just right. This may not allow you many days to do the job. Therefore, you should arrange for extra help to do the harvesting several weeks before the expected harvest date. This will enable you to take advantage of the most favorable harvesting conditions.

Most barani farmers thresh wheat by hand. In many areas, however, threshing machines are rapidly becoming popular. Regardless of how you thresh your grain, try to avoid cracking the kernels of wheat. Cracked kernels spoil quickly when in storage.

Separate all weeds, straw (busa), dirt, and insects from the grain as soon after threshing as possible to reduce spoilage. Cleaning of the grain can be done by hand or with the help of mechanical equipment such as a motor-driven fan.

Storing the straw (busa) after threshing is also important so it will be protected from damage by weather and animals. Neatly built stacks will keep it dry and in good shape until you are ready to use it for feed or other purposes.

Your wheat must be dry before you put it in storage or it will heat. An experienced farmer can tell you if the grain is dry enough for storage by pressing a kernel with his thumbnail or by crushing it between his teeth. It will be quite firm but not

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hard as stone. Some people can tell if the grain is dry enough by smelling it or by rattling it in a tin can. Dry grain will have a sharper sound when shaken in a tin can than higher moisture grain will have. The grain is ready for storage when the kernels are dry enough so they are hard to break with your teeth, and when all stones, straw, chaff, broken kernels, and insects have been separated from it.

The containers and the room where you store the wheat should be cleaned and fumigated before putting wheat into it. The chemical you may use for this is 50 percent Malathion in either emulsion form or wettable powder. If you use the emulsion form, mix one quart of it in four gallons of water. If you use the wettable powder, use two-and-one-half pounds in four gallons of water as a spray. Apply this mixture with a pressure sprayer.

Always store your new grain separately from the old. Then, when you use the grain, use the old grain first.

Your Agricultural Extension Service staff will be glad to help you get the chemical to treat your storage area and will show you how to do it.

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RADIO SCRIPTSTORE YOUR WHEAT WELL

About three-fourths of the wheat raised in Pakistan is stored in rural areas where it is grown. Dr. Abdul Quyyum, University of Agriculture at Faisalabad, reports that in Pakistan farmers have substantial lossess of wheat each year because of mold, insect damage, and rodents while the grain is in storage. Much of this loss can be prevented, according to Dr. Abdul Quyyum.

There are several things you can do to prevent losses of wheat during storage. First, store only dry grain and keep it dry while in storage. Keep stored grain cool to reduce the growth of mold and the danger of insect invasion. Keeping grain storage containers out of the direct heat of the sun will help lower the temperature.

You should keep rats and mice out of stored grain. They eat a significant amount of grain and spoil some more as well as spread disease. Clean the storage area and any containers you use before you put grain in them. Then store only clean, healthy, dry grain.

One good way to store grain is in basket granaries. Keep the basket on a platform which is off the ground and is protected from the sun and the rain. You should put rodent guards made of metal around the legs of the basket so rats cannot get up to the basket. You can make a spout or emptying chute for the basket out of an old tin can. Close the end of the spout with a wooden or plastic plug so you can remove grain from the basket when you wish without having to take the basket cover off.

The basket should be plastered inside and out with mud or cow dung to make it more nearly airtight. You should also seal the cover with mud and cow dung.

If you put grain with a high moisture content or containing a large amount of dirt in storage, the grain will heat and then quickly mold and rot.

You should open the basket every two months to look for insect or other damage. If you find any insects, winnow the grain again and then clean the basket granary before putting grain back in it. When you do put grain in the basket, be sure to reseal it as you did the first time.

You can also successfully store your grain in bags if you follow a few important steps. First, dry the grain well before putting it in bags. And be sure the bags are clean before you put any wheat in them. Dust or spray each bag before you start to stack them up. Use 25 grams (a small pinch) of 2 percent Malathion or 0.5 percent Lindane dust for each bag you store. If you cannot get one of these insecticides, clean the bags first by dipping them in boiling water and drying them thoroughly in the sun.

Build a raised platform of wood or brick to keep the bags off the floor. This will keep them from absorbing moisture from the floor. When you get the stack built, spread a band of insecticide around the bottom of the pile to keep crawling insects away. Malathion is generally the preferred insecticide for this purpose. Your raised platform will allow air to circulate around the bags and help keep them dry.

Stack the bags neatly, leaving space around them for air movement. There are different ways to stack the bags, but in every case, you should put the top layer at right angles to the layer immediately below. This will strengthen your stack and prevent the bags from sliding off.

You should check the stacks of bags every two weeks for signs of deterioration. Put your hand in one or two of the bags to see if the grain is heating. Check for mold by smelling and looking for dark kernels. If you find any of these signs, dump out the grain and dry it again before putting it back in the bags.

Keep the area around the bags clean so rats and mice cannot find food or shelter. Use poison bait or traps if there are any signs of rodents being there. Your Agricultural Extension Service staff can help you get the correct bait for rats and will show you how to use it.

Dust the inside of your storage room with an insecticide such as Malathion or Pyrethrum to kill insects. You can also mix the grain with a low percent Malathion or Lindane dust if you are careful to follow directions. Remember that these chemicals are poisons and you must use them correctly or they will be dangerous to humans.

When you remove the grain for use, be sure to wash it before you use it for human food.

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RADIO SCRIPTCHOOSING AND MEASURING LAND
FOR GROUNDNUTS

If you want a good crop of groundnuts, you should plant the seed on the right kind of soil. This is the advice of Lal Mohammad Khan, Director of the Barani Development Project in Peshawar. Groundnuts like a light soil which is well aerated and not too damp. Why a light soil? The pods which contain the groundnuts develop underground and the pegs or needles from which the pods develop must penetrate the soil. Therefore, heavy soils and those soils which harden after a rain create unfavorable conditions for the pegs to enter the soil.

If the soil sticks to your hands during the rainy season, and then forms clods which are hard to break up, it is not well suited to raising groundnuts. If you choose a light soil which is a mixture of sand and clay, or a soil that has a sandy loam texture, the pods can develop more easily. You will have bigger groundnuts to harvest and your total yield will be greater.

It is also easier to dig the groundnuts on a light sandy loam soil and fewer nuts will be left in the ground at harvest time.

Your soil should have a balanced supply of nutrients. On most barani soils, you will have to apply fertilizer to have the proper nutrients. Your Agricultural Extension Service staff has a list of recommended fertilizers for groundnuts and can tell you how to apply them. Since groundnuts provide a good source of extra cash income, it will pay for you to choose well adapted soil and apply the right kind and amount of fertilizers.

Groundnuts need adequate moisture to form and develop their pods and nuts. But the water must move around in the soil and not remain in one place too long. This water movement is called aeration.

Water moves more freely in sandy loam or sandy clay soil. This light soil permits better aeration. The pegs from fertilized groundnut flowers will penetrate well-aerated soil more easily than they will penetrate soil that is hard and wet.

Another step you should take after choosing the soil but before planting your groundnuts is to mark out the field boundaries and determine the area of your field. You must know the area in order to decide how many maunds of groundnuts to plant and how much fertilizer to use.

It is easier to determine the area if you first mark out the field boundaries. Try to make the field either square or rectangular. This means that the corners should all be right angles. You can mark out right angles by putting a stake at a corner first and then measuring three meters straight ahead and four meters to your right or left. The two points which you have just located should be five meters apart. Move one of the points till it is exactly five meters from the other one. Then the two lines which you have just formed will be the sides of a right angle. Do this with the other corners of the field and you will have either a square or a rectangular field.

If the four corners of your field are all right angles, it will be easy for you to calculate the area of the field. Just multiply the length of the field by its width. For example, if a

field is 100 meters long and 100 meters wide, the area is 100 times 100 which equals 10,000 square meters or one hectare. A square meter measures one meter on each side.

In another case, if a field is 50 meters wide and 100 meters long, the field would have 50 times 100 or 5,000 square meters in it. This is one-half hectare.

If you wish to express the area of your field in acres, you should know that a square field which is 209 feet on each side contains approximately one acre. If you divide this acre into eight equal parts, each part will be one kanal. Each kanal contains 5,445 square feet.

If you know the area of your fields, you will be a modern farmer who can easily calculate how many groundnut plants you should have, how much fertilizer to apply, and whether you have a good or a poor harvest.

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RADIO SCRIPTCHOOSING AND TREATINGGROUNDNUT SEED

When you sow groundnut seed, be sure you have a variety that is adapted to your area. This is the recommendation of the Barani Agricultural Development Office in Peshawar (Rawalpindi). Your variety should have the right maturity for your location and should be resistant to the common diseases which affect groundnuts.

There are several recommended varieties from which you may choose. Two of the most popular are number 334 and Banki. Number 334 is a spreading variety that produces high yields of medium-sized pods. It is relatively disease resistant. Banki is a vertical or upright growing variety of medium late maturity. There are other later maturing varieties, especially in the Punjab Province. Banki groundnuts have smaller pods than some varieties but they are well filled with seeds. Your Agricultural Extension Service staff can tell you which varieties are recommended for your particular area.

Plant only well shaped seeds that are not damaged by insects or disease. As you are shelling the nuts to plant, throw away all damaged seeds because most of them will not grow anyway. Immature seeds will not germinate, either. Don't shell the seeds too long before planting, because they will dry out and will not germinate well. And be careful not to scratch, skin, or otherwise damage the nuts. If the nuts are very dry when you shell them, they will break and skin easily. Nuts with a little more moisture (8 percent or more) will not be damaged so easily. Be particularly careful if you pour shelled nuts from one metal container to another. Soil

organisms will enter the nuts wherever they are broken or scratched and will cause the seed to rot.

You can determine the germination percentage of the seed by making a simple germination test. First, count out 100 seeds at random from your supply of seed and put them in a box of damp sand. Cover the damp sand with a cloth and put the box in a warm room for about six days. The temperature should be from 20 to 25 degrees Centigrade. The sand must be kept moist during this time. At the end of six days (or perhaps seven), count the seeds that have begun to grow. If 90 or more seeds have good strong sprouts, your germination rate is 90 percent or above and the seed is all right to plant. Even if 85 of the seeds germinated, your seed will probably give you a reasonably good stand. If the rate of germination is less than 85 percent you should increase the rate of seeding. If the germination is far below 85 percent, you should get some other seed to plant.

One way to improve the germination rate of your seed is to store the groundnuts that you will plant in a clean dry place where rodents and insects cannot get to them. You should disinfect the storage area to kill insects and put out poison to kill rodents in your storage area.

Since the groundnut is a legume, it will supply its own nitrogen about a month after planting. This will be true if the proper bacteria are present in the soil. Inoculating the seed means putting the proper bacteria on the seed. Inoculating is necessary only when groundnuts are planted on soil where groundnuts have not been grown with inoculated seed in the last

three years, or where some other means of inoculating the soil has not been used. In other words, if you have never raised groundnuts on your field, you might want to investigate the need for inoculating your seed. Your Agricultural Extension Service staff can advise you about inoculating seed and help you get the materials if necessary.

You should also ask your Extension representative about treating the groundnut seed to prevent disease. The fungicide you use will help protect the seed against certain diseases, molds, and some insects. Treated seed will not rot as quickly as untreated seed and will usually have a higher germination rate. This should result in a higher yield at harvest time.

The recommended fungicide for treating groundnut seed is DITHANE M-45. Use ten ounces for one maund of seed (about one-fourth kilogram per maund). The disinfectant must be mixed thoroughly with the seeds so it covers them completely.

If you use a drum-type seed treater, be careful so you do not break or skin any of the nuts. Broken nuts will not germinate. Since fungicides are poisonous, you should wear gloves or put plastic bags over your hands. And be sure to wash your hands well after you have finished treating the seed. Never let humans or animals eat treated seed. Don't leave treated seed around where children might get it.

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RADIO SCRIPT

PREPARING THE SOIL
FOR GROUNDNUTS

A well-prepared seedbed is necessary if you are to have a big yield of groundnuts. The Barani Agricultural Development Office of Peshawar (Rawalpindi) suggests that a field which has been ploughed early, six to eight inches deep, should make a good seedbed for groundnuts.

It is best to do the ploughing soon after the first rain of the season. This makes it possible for later rains to penetrate into the soil and to sink slowly into the subsoil water supply. Turning the soil over, or ploughing it, can be done with bullocks and the traditional desi plough or can be done by hand with a spade or digging fork. You can turn the soil over more effectively, however, with a steel plough pulled by bullocks or a tractor.

It is important that you do the first ploughing as soon as you can after the previous crop is removed. Ploughing right after the first rain is a good time because it will loosen up the soil. After the last ploughing and just before you plant the groundnuts, go over the field with a harrow or similar implement to smooth out the surface and break up large clods of soil. If you don't have a harrow, you can use a heavy plank pulled by bullocks or a tractor, or you can even drag large tree branches over the field to make it smooth and break up the lumps of soil. You may have to go over the field in two directions at right angles to each other in order to get it smooth.

If your soil is well tilled, there will be no large clods on top and the surface will be loose so air can get into it easily. Ploughing the soil early enables you to mix farmyard manure or other herbage (green manure) with the soil. Doing this early gives the organic matter time to rot and become part of the soil before you plant the groundnuts. As the organic matter decays, it makes humus which puts the soil in better condition to raise a good crop of groundnuts.

Groundnuts provide a good cash crop for Pakistan farmers. Your cash income will be greatest if you have a good seedbed and follow other recommended practices. Your Agricultural Extension Service staff can help you answer questions about the kind of seedbed you need and other steps you might take to increase your yield of groundnuts.

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RADIO SCRIPTFERTILIZING AND SOWING GROUNDNUTS

Farmers in both Punjab and Northwest Frontier Province have found that it pays to fertilize groundnuts. Soils in the barani areas of both provinces are usually lacking in the phosphorus needed to produce a good crop of groundnuts. Although groundnuts are legumes and therefore get most of their nitrogen from the air, they still need some nitrogen to get started.

The Barani Agricultural Development Office in Rawalpindi (Peshawar) says that fertilizers alone, however, will not guarantee a good crop. You must have well-tilled soil, keep the weeds out, and follow other good cultural practices. In the barani areas, groundnuts do best on light sandy or clay loam soils. You should plough early and at a depth of at least six inches. The fertilizer you use should be applied by broadcasting just before the last ploughing before planting the crop.

The three plant food materials that groundnuts need most are nitrogen, phosphorus, and calcium. The first two of these, nitrogen and phosphorus, will be supplied if you apply one bag of DAP and 166 pounds of single superphosphate on each acre. This is the recommendation for the Northwest Frontier Province. If you are in the Punjab, use one bag of DAP and about 100 pounds of single superphosphate on each acre. If your field is laid out in hectares, use two-and-one-half times as much fertilizer on each hectare as is recommended for each acre.

In some barani areas, where the calcium content of the soil is low, it may be profitable for you to apply gypsum to the soil also.

Ask your Agricultural Extension Service staff about using gypsum for groundnuts. By making a soil test, they can determine whether it will pay for you to apply phosphorus.

Farmyard manure is also a good fertilizer but if you use it on groundnuts, apply it during January or the first half of February. If you apply farmyard manure later than that, you may suffer from attacks of white ants.

The best time to sow groundnuts varies in different areas. In Northwest Frontier, usually from March 15 through April 1 is best. In the Punjab, from April 1 to the middle of May is usually recommended. The soil must be warm and moist when you plant. Air temperature should be about 21 degrees Centigrade. If you sow when the weather is too cool, the groundnut seeds may be damaged by fungus which will grow on them.

The groundnut seeds should be in the soil about 30 to 40 days before the heaviest rains. That will give the plants time to be in the flowering stage and forming their fruits when the rains come. This is the time when the plants need most water.

Some farmers like to sow groundnuts by broadcasting the seed. This may save time but you may not get the right number of plants per acre. Also, weeding and harvesting are more difficult when you broadcast the seed. If you sow in rows or lines, you can calculate the number of plants you have on each acre more easily. You will also find it easier to keep the weeds out because an animal can walk between the rows and pull your cultivator. Harvesting is easier when the plants are in rows because you can see better where the groundnuts are located, and you are not so likely to miss some of them.

If you make a plan of your field, you can lay out the number of rows and the spacing of plants in each row. Recommended spacings are different for upright and spreading varieties. If your variety is 334, which is a spreading variety, you should have the rows 18 to 24 inches apart. The space between plants in each row of 334 should be 6 to 9 inches. If you have the Banki variety, which is an upright variety, the rows should be 12 to 18 inches apart and the plants about 4 to 6 inches apart in the row. This will give you more plants per acre with the upright variety.

Groundnut seed should be planted two to three inches deep with one seed in each hole. In dry soil, plant the seeds deeper than in moist soil. Cover the seeds well so the sun will not dry them out and birds will not get them.

If your soil is sloping, lay out the rows across the slope to prevent the soil from washing away with the rains. If there are plants missing a week after you put the seed in the ground, replant them with new seed.

A spacing wheel or spacing plank will help you mark out the field and get the right number of groundnut plants in your field. Your Agricultural Extension Service staff can help you make a spacing tool and show you how to use it. If you are in Northwest Frontier and are raising Banki groundnuts, you might want about 130,000 plants per acre. If you are raising 334 variety in the Northwest Frontier, you might want 60,000 to 70,000 Banki plants per acre and about 45,000 of the number 334 plants per acre. In the Punjab, this would be 75 pounds of Banki seed and 40 pounds of number 334 seed per acre.

A well laid out field makes it easier for you to get the right number of seeds per acre or per hectare. It also makes cultivating and harvesting easier.

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RADIO SCRIPTCULTIVATING, HARVESTING AND STORING GROUNDNUTS

The Barani Agricultural Development Office in Peshawar (Rawalpindi) recommends that groundnuts be cultivated carefully at the proper times in order to get the largest yields. Agricultural scientists in the Barani office say that by keeping weeds out you will conserve water and soil nutrients that the groundnuts need. Weeds also cast shade on your groundnut plants so they don't get full benefit from the sun. Cultivation stirs the soil and lets air in so the pods will find the underground air they need. Stirring the soil helps to keep it more moist. Cultivation also helps make healthy plants which are better able to withstand contamination with micotoxin.

You can cultivate with a hand tool, an animal-drawn cultivator or light plough. It will be easier for you if the plants are in rows so you can use animal or tractor-drawn implements to keep the weeds out. With either method of cultivation, you should always cut the weeds out between the plants with a khurpa or other hand tool.

If your seedbed is well prepared, there will be fewer weeds to remove after the plants are growing. A firm seedbed with a loose soil mulch on top is ideal for groundnuts.

When the plants are in the flowering stage, you should cultivate and build up a small amount of earth around each plant to give the plants more soil in which to develop.

Three months after planting, stop cultivating. By this time, the groundnut stems and leaves cover the soil quite well and can compete with weeds. Cultivation after this time might damage the pods.

Groundnuts are ready to harvest when the inside of the shell shows dark veining. Dig a few plants with pods and count the mature pods with dark veining. You should commence harvesting when 75 to 80 percent of the pods are mature. If you harvest too late, the dry leaves will drop off, making them of less value for animal feed. You also may have losses from insects, molds, and diseases. If you harvest late, the soil may be very hard, making it difficult to lift the pods. Then you may leave many pods in the ground.

If you harvest too early, the groundnuts will contain a large amount of water and they may rot. They will not keep very well in storage and they will not yield as much oil. If the pods contain too much water, they will be heavy and the shelling yield will be low. Groundnuts harvested too early will not make good seed because they are not mature.

You can dig the plant with the pods on it with hand tools, but you will find it much easier and quicker to dig them with an animal-drawn groundnut lifter. The plants, of course, must be in rows to use power-drawn implements. You will probably leave fewer groundnuts in the soil if you use a mechanical power-drawn groundnut lifter. There may be a tractor-drawn groundnut lifter in your village. Ask your Agricultural Extension Service staff where the nearest power-drawn groundnut lifter is located. They will help you find one and show you how to use it.

When you dig the groundnuts, do not remove the tops of plants until after they are out of the soil. If you remove the tops before digging, you may leave many of the pods in the ground. After you have the groundnuts out of the ground, remove the pods from the plants immediately. Then dry them in the sun for 10 to

15 days. Drying will retain kernel flavor and allow the pods to be stored safely. The pod moisture content at digging time may be as high as 40 to 50 percent. This moisture content must be reduced to 8 to 10 percent for the groundnuts to be safely put in storage. You can tell if the moisture content is low enough by biting a kernel to see if it breaks easily.

Do not pile up the plants with pods on them because the pods may begin to rot, and will also lose their color. After the pods have dried but before you store them, they should be winnowed to separate unripe, empty and rotten pods from the rest.

If you sell part of your crop, you must have clean, well-matured, and dried groundnuts to bring you the top price. You will also want to keep some of your crop to feed your family and to save some for seed for next year's crop. Before putting your groundnuts in storage, clean the bin and other containers well. Do not shell the groundnuts when you put them in storage. The shells will protect the nuts against insects and too much drying. It is also a good idea to treat the storage area with an insecticide such as Malathion. Ask your Agricultural Extension Service staff about which insecticides to use and how to apply them.

If you have done a good job of growing, harvesting, and drying your crop of groundnuts, you will find a ready market for them and you will be well paid for your work.

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Maize Number 1

RADIO SCRIPT

SELECTING MAIZE SEED

A good crop of maize must start with well selected seed, according to Muhammad Chatha, Maize Coordinator with the Pakistan Agricultural Research Council in Islamabad.

Chatha says that you should use pure, clean seed, which means your seed should not be mixed with other maize seed or with different crops. If other varieties of maize are mixed with your seed, the crop will mature at different times. Cultivating and harvesting will be more difficult and you may have more damage by birds.

If you save your own seed from a synthetic variety, select good healthy cobs (ears) from the center of the field. Cobs from the center of the field are not likely to be contaminated by pollen from a maize crop grown by a neighboring farmer. Plant only kernels that are plump and show no signs of being shrivelled up. There should be no signs of mold or other disease on them.

If your seed has been damaged by insects, you will see holes in the kernels and other damage they have done. Do not plant this seed because a kernel with a hole in it will not germinate. Broken kernels will not germinate, either, and you will have a poor stand if you plant broken or insect damaged seed.

Be sure there are no weed seeds in the maize seed that you plant. The weeds will grow faster than the maize and will use the moisture and nutrients from the soil which your maize plants should be using. If the kernels are small and shrivelled up, this means that your seed was not mature when it was

harvested, or was not dried well after harvesting. Immature seed will not germinate well. If your seed was well dried in the sun at harvest time, it will have less than 15 percent moisture. Don't plant seed with more moisture than this because it may be attacked by a fungus and suffer from disease.

You can judge the moisture content by biting a kernel with your teeth. If the seed is hard to bite and gives a cracking sound, it probably has less than 15 percent moisture.

The seed you plant should be stored in a clean, dry room. If the room is damp or dirty, your maize seed may be attacked by the grain moth which will lower its percentage of germination. To protect the seed from insects, you can treat the storage area with an insecticide such as 50 percent Malathion before putting the seed into it. Ask your Agricultural Extension Service staff about chemicals to use and how to apply them to protect your maize seed.

The variety of seed you select should be adapted to the soil and climatic conditions of your area. Your Agricultural Extension Service will have a current list of maize varieties that are recommended for the area where you live. This list changes from one year to the next so be sure you have the latest list of varieties.

Among the varieties recommended for the Northwest Frontier are Shaheen, Agaiti-72, Zia, Changez, Khyber, and Sarhad. They range in maturity days from 80 days for Shaheen to 110 days for Sarhad. The shorter maturing varieties require about 17 kilograms of seed per acre while the longer maturing ones need 14 kilograms of seed per acre.

Maize Number 1

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In the Punjab, these varieties are on the recommended list: Agaiti-72, Syn-551, Changez, Sean, and Sadaf.

For all varieties except Sarhad and Sadaf you should have about 25,000 to 30,000 plants per acre. If you plant Sarhad or Sadaf, 20,000 plants is the correct number of plants per acre.

Some of these varieties of maize are yellow and some are white. The yellow grain and white grain are very similar in feed value and yields.

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RADIO SCRIPTMAIZE CULTIVATION

Almost five lakh acres of maize are grown in barani areas of the Punjab and Northwest Frontier provinces. This is an important crop in Pakistan, according to Muhammad Chatha, Maize Coordinator with the Pakistan Agricultural Research Council in Islamabad. Although maize can be grown on a wide variety of soils in the barani areas, it does best on well drained and well aerated deep loam soil.

Maize is a heavy feeding plant and therefore needs soil that is adequately supplied with plant nutrients, particularly nitrogen and phosphorous. It can be grown on slightly acid or alkaline soils but the optimum range is a pH of 6.0 or 7.0.

A good seedbed for maize is essential. Maize requires soil that is warm, moist, well supplied with air, and fine enough to give good contact between the seed and surrounding soil particles. You should plough the land twice immediately after harvesting the previous crop. Plough it deep the first time; that is, six to eight inches (15 to 20 cm.). This will prevent runoff of rain that may fall. Deep ploughing will also cover vegetation and any farmyard manure that you may have applied. Deep ploughing will provide aeration of the soil and stimulate bacterial activities which release nutrients.

The top soil surface should be in a loose and relatively smooth condition so it will retain moisture and discourage the growth of weeds. The loose top soil mulch will also destroy insects and their eggs and larvae and their breeding places. Soil prepared in this manner will be less subject to wind erosion.

Maize Number 2

Page 2

Just before planting time, plough the land once more so it will be soft and granulated. Then, go over it with a plank (sohaga) immediately after ploughing to preserve soil moisture. If you follow these steps, you will have a well prepared seedbed for your maize seed.

The general practice of planting maize in Pakistan is to plant the seed that is intended for grain behind the country plough by the "kera" system and to broadcast the seed when a fodder crop is wanted. Planting maize in rows (lines) has many advantages. You can use a hand planter or a bullock-pulled planter and get the seed in the ground accurately in rows. Several types of mechanical planters for maize are available in Pakistan. Ask your Agricultural Extension Service staff where you can find a suitable planter and how to use it. This will save you much time and you will have a better field of maize.

For early maturing varieties of maize, a good spacing between rows is 30 inches (75 cm.). A recommended plant-to-plant distance within the row is six to eight inches (15 to 20 cm.). Later maturing varieties require a little more plant-to-plant distance. Eight to ten inches (20 to 25 cm.) are recommended.

It is important that you have the correct number of maize plants per acre. Either too few or too many plants will reduce the yield. Many farmers plant too thickly, planning to thin the crop too late, with the result that many plants are barren (with no cob) or the cobs are very small. If the crop is planted in lines (rows), as mentioned earlier, then the excess and damaged plants can be removed by hand very easily. The healthy plants which are left in the rows should be 15 to 20 cm. apart in the case of early maturing varieties and 25 to 30 cm. apart in the

late maturing varieties. If the crop has been treated with insecticide granules, plants that are removed at thinning time must not be fed to animals. These plants are poisonous.

The main reason for intercultivating the maize crop is to remove weeds which compete with the maize plants for moisture, light, space and nutrients from the soil. Cultivation also helps to aerate the soil. If the maize is in rows, cultivation can be done with a bullock-drawn "sarderi". This cultivator does a good job and is economical. This cultivator can be conveniently used in the 30-inch (75 cm.) spaced rows. Within the row itself, weeding should be done with a hand tool such as the "kharpa". Usually, two weedings will be enough to keep the weeds out. The first weeding generally should be done 20 to 25 days after sowing the maize. Do the second weeding just before the plants are three feet (one meter) high. After that, it is not practical to enter the field with a bullock. Some weeding with a kharpa may still be done by hand.

Harvest the maize crop when it is properly matured and the grains are quite hard. There are three ways the crop can be examined to determine whether it is ready for harvesting. You may crush the grains between your teeth. When the kernels are tough to crack, the maize is mature and ready to harvest. Another check is to look at the husk leaves. When the husk leaves on the cob are dry, most varieties are ready for harvest. A third test is to look for a so-called black layer at the bottom of each grain. A few days after the black layer appears, the maize should be ready for harvest.

After the maize is harvested, dry the cobs in a clean place to get the percentage of moisture down. This will lessen the chances of insect and fungal damage while the maize is in storage. High moisture in the grain at the time of storage will lower the seed quality of the maize.

When the cobs have dried thoroughly, they should be shelled and the grain stored in a clean, dry place which is protected from rodents.

Before the grain is put in storage, you should treat the walls and floor of the room with a chemical such as 50 percent Malathion in either emulsion or wettable powder form. Ask your Agricultural Extension Service staff about which chemicals to use for this and how to use them to protect your storage area.

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RADIO SCRIPTPEST MANAGEMENT FOR MAIZE

Maize yields in the barani areas of Northwest Frontier and the Punjab would be much higher if it were not for the losses caused by pests such as insects and diseases. Rashid Anwar, maize researcher with the Pakistan Agricultural Research Council, says that some of these losses can be prevented if farmers would use insecticides and seed treatment in their maize program.

Because of losses from insects and diseases, Pakistan farmers frequently become discouraged with their maize crops and cut down their acreage of it or stop growing it altogether. This is unfortunate because maize is an easy crop to grow and produces a large amount of food for humans and for animals if the crop is raised properly.

Rashid Anwar says that from 20 to 35 percent of the maize crop is damaged each year by insects and disease. Much of this damage is done by the maize stem borer. Several insecticides are now available which will effectively control the stem borer. These include: Furadan-3G, Ekalux-5G, Diazanon-10G, Lebaycide-5G, and Seven-20G.

If you use Furadan-3G, you should apply 30 pounds per acre or 27 kilograms per hectare. If you use Lebaycide-5G you should apply 40 pounds per acre or 36 kilograms per hectare. With any of the other three insecticides, you may use 20 pounds per acre or 18 kilograms per hectare. Any of the five insecticides just mentioned will control the stem borer if they are properly applied. Choose the chemical that is easiest and cheapest for you to get. Your Agricultural Extension Service staff can help you find suitable insecticides and tell you how to use them.

When using these chemicals on maize, you should put on half of the dose with the seed at sowing time. Then, put half of the remaining portion in the whorls of the plants when the maize is about 8 to 10 inches (20 to 25 centimeters) high. This will be about 15 to 20 days after sowing the maize. The whorl of the plant is the top part where the leaves begin to branch off from the main stem of the plant. This is the place where the stem borer will start its work of destroying the plant. The plant will be at the five to six leaf stage when you should put the insecticide on it.

After 10 to 15 more days, apply the balance of the chemical you have allocated for the maize. This should also be put in the whorls of the plants. The applications of insecticide to the maize plants can be done easily by hand with a small metal container which has small holes punched in its top.

Do not wait until you see the stem borer damage before you begin using the granules of chemical to control the borers. You should use the chemical at proper intervals before any damage is evident. The chemicals may be available in granular or powder form. Granular form is more commonly used.

Diseases are generally not as serious in raising maize and do not do as much damage as insect pests. However, seed rot and seedling blight may be severe in the cold mountainous areas. These fungal and seed-borne diseases can be controlled by treating the seed with Arasan or Ceresan before planting. You can use a barrel treater or you can mix the fungicide with the seed with a small shovel on a clean place on the floor of a storage room. There may be a barrel seed treater in your village. Your Agricultural Extension Service staff can help you find a treater and show you how to use it.

If past experience indicates that you may suffer loss from one of the maize diseases, you should not fail to use a fungicide on the seed before planting. While treating the seed to control disease, you could also use Furadan 3WP, which will reduce damage from the maize stem borer. This is a new chemical and may not be available everywhere. Its advantage is that you can mix it with the seed at the time that you are mixing the disease controlling fungicide with the seed.

None of the chemical treatments for insects and disease will be effective if you don't follow good cultural practices in other ways with your maize crop. For example, you should plant your maize in rows (lines) 30 inches or 75 centimeters apart so you can cultivate it easily and keep the weeds out. Keeping the weeds out will assure more healthy maize plants that are better able to withstand attacks of insects and disease. Also, keeping the top soil loose provides better aeration in the soil and prevents excess evaporation of moisture which the plants need. The application of insecticide granules is much easier when the maize is planted in rows.

The date of planting your maize affects the amount of damage done by the stem borer. If chemical control is not practical for you, or for some other reason cannot be done, you can minimize the amount of damage likely to be done by the borer by planting when the number of borers is low. You can determine the best time for planting by noting what time in the season the borers are fewest in number and delaying planting until that time.

After harvesting your maize crop, all of the stubble and remaining stalks should be burned or ploughed deeply under the ground. If the stubble is not burned, be sure to bury it deeply because the borer hibernates in the stubble and comes back again to attack the crop in the next season.

You should do the first ploughing just after the maize is harvested. This not only buries the insects but also gets your ground ready to plant your next crop.

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RADIO SCRIPTFERTILIZING MAIZE

Since maize requires much nitrogen and phosphorous as it is growing, you will find it profitable to apply fertilizer containing these elements. This is the advice of Muhammad Chatha, Maize Coordinator with the Pakistan Agricultural Research Council in Islamabad. Experiments conducted at the Millet and Maize Research Institute in Peshawar indicate a general deficiency of nitrogen in most barani area soils. Their research also indicates that phosphorous is lacking in some barani soils.

Farmyard manure is a good fertilizer for maize but usually is not available in sufficient quantities for most farmers to use on maize. If you do use farmyard manure, it should be supplemented with chemical fertilizers.

Fertilizers that are readily available in barani areas are urea, with a formula of 46-0-0, which contains nitrogen only; and DAP, with a formula of 18-46-0, which contains some nitrogen but a larger quantity of phosphorous. The three figures in a fertilizer formula mean the percent of active ingredients -- nitrogen, phosphorous, and potassium -- in that order.

Other fertilizers on the market in Pakistan are: nitrophos, ammonium nitrate, ammonium sulphate, superphosphate, and triple superphosphate. These fertilizers are all equally effective to use on maize if you calculate the required dose on a nutrient basis. Some of these fertilizers may not be available at a store near you but you should be able to find at least one of them.

You can calculate the amount of fertilizer you need for the recommended dose by using a slide rule calculator available from the Barani Agricultural Development offices in Peshawar and Rawalpindi. Your Agricultural Extension Service staff has these slide rule calculators and will show you how to use them.

As a general rule, the Pakistan Agricultural Research Council recommends a 40-20-0 fertilizer for the dry barani areas and fertilizer with the formula 60-30-0 for the barani areas with more moisture. For the dry barani areas, this means 1/2 bag of DAP and 3/4 bag of urea per acre. On the barani areas with more moisture, you would need 3/4 bag of DAP and 1 bag of urea per acre. To find the amounts of fertilizer needed per hectare, multiply these amounts by 2-1/2.

These recommendations are made assuming that you sow an improved variety of maize and that you follow good cultural practices. These cultural practices include good seedbed preparation, insect and disease control, good cultivation, thinning, line sowing, and proper seeding rate.

If farmyard manure is available, use it at the rate of 10 to 15 donkey loads per acre. You should supplement it, however, by adding 3/4 bag of DAP, because the farmyard manure is deficient in some of the plant food elements.

In barani areas, you should apply all of the nitrogen and phosphate fertilizers you plan to use on your maize crop just before seeding. Broadcast the fertilizer on the soil and immediately mix it well into the soil by ploughing as you are preparing the seedbed. The nitrogen applied just before planting time tends to stimulate weed growth if the rains happen to be heavy. Because of this, you must do a good job of weed control.

Side dressing of maize in the dryland areas is generally not recommended unless you can time the application with rains. If you do side dress the maize in anticipation of rain, it is better to use calcium ammonium nitrate (CAN) or any of the other nitrogen fertilizers rather than urea. In case rains do fall, all of the nitrate fertilizers except urea will work equally well. If the rainfall is light and not sufficient to wash the fertilizer into the soil immediately, less nitrogen is lost into the atmosphere than when you use urea.

Although it is recommended that all fertilizer be applied before planting maize in the barani areas, if you have an excellent stand and an above average amount of rainfall, then it will be profitable for you to use a side dressing of fertilizer.

The recommended varieties of maize will respond best to the use of fertilizer. If you plant these varieties, and follow good management practices, you will maximize the yields and get the best return of profit from the money you invest in fertilizer. Your Agricultural Extension Service staff can recommend varieties and management practices that will help you do this.

This program has been brought to you by the Barani Agricultural Development Project which is interested in helping you increase your crop yields.

RADIO SCRIPT

KILL RODENTS THAT DAMAGE GRAIN

Rats and other rodents cause damage to thousands of bushels of wheat and other grains in Pakistan each year, according to William R. Smythe, Vertebrate Pest Control Officer for the Food and Agriculture Organization of the United Nations. This is a serious loss at a time when farmers are being urged to produce more wheat to meet the country's food needs.

These rodents eat the standing wheat as well as the stored grain. In addition to the wheat that these rodents eat, they also spoil many bushels of it so the wheat is not fit for humans or animals to eat. Rats and mice also spread food poisoning and diseases such as Leptospirosis which affects the liver of humans.

In the barani areas of Pakistan, the three field rodents that do most damage to crops are the sand rat (*Meriones hurrianae*), the Indian gerbil (*Tatra indica*), and the mole rat (*Nesokia indica*). All three rats dig burrows and live in the soil. They all can be controlled if proper methods are used.

Rats reproduce rapidly when food is plentiful and growing conditions for crops are good. These rodents have food and taste preferences similar to those of man and therefore, live in cultivated fields near settled areas where there are many people.

Mr. Smythe says that timing of control efforts is very important if you want to get good control at a reasonable cost. Working together with others in a village is necessary because if some people don't kill the rats, those rats that continue to live will reproduce and come back to your house and fields. And

if many people cooperate, the cost of mixing rat killing bait will be less than if each farmer mixes it himself. However, a farmer working alone and using the correct methods can protect his own crops if he has to do it.

The best time to strike at the rats is when they are fewest in number. This is shortly after the crop is planted. In the case of wheat, the months of December and January in the barani areas of Pakistan would be a good time to kill them.

When the crop is small, you should inspect your fields and nearby areas for rat burrows and other signs of rat activity. Look at waste areas within 100 meters of your fields because rats travel long distances to feed on your crops.

Within this area in your fields and field edges, fill in and smooth over all rat holes you find. Be sure to look under and around shrubs, bushes, and grass clumps as well as roadsides. Then wait two days and recheck the burrows you filled in. All newly opened holes indicate that a rat is present.

At that time, place a piece of bait well into the hole. Wait two to four days and again cover up the holes. If no new holes appear after two more days, you probably have killed all the rats. If you do find some new holes, rebait the opened holes. These steps should kill 90 percent of your rats if you use the proper bait.

Removing your crop as soon as you can and storing it in rat-proof containers will help you control rats because it reduces their food supply.

The field staff of your Agricultural Extension Service will have an information sheet telling you how to make bait to kill

rats. This radio station will have another program soon telling you how to mix the bait, also.

This program has been brought to you by the Barani Agricultural Development Project which is interested in helping you increase your crop yields.

RADIO SCRIPTMAKING BAIT TO KILL RODENTS

Since rats and other rodents damage many bushels of grain in Pakistan, you will want to have poison bait on hand to kill them. Mr. William R. Smythe, Vertebrate Pest Control Officer in the Food and Agriculture Organization of the United Nations, says that using poison bait is the best method of keeping rat population to a minimum.

However, additional methods of control, such as keeping premises clean and having grain stored safely away from rats, should also be used, according to Mr. Smythe.

There are two poisons commonly used for mixing baits for rodents in the barani areas. Zinc phosphide is a quick acting, but dangerous poison. The other common poison is "Racumin", which is slower acting and relatively safe to handle and use. Rats may become shy of zinc phosphide after a time, but they seldom become shy of "Racumin".

Using gas to kill rats in the barani areas is not very effective because of dry porous soils. Unless the soil is damp and packed tightly, the gas will escape into the soil instead of killing rats.

Zinc phosphide can be made into small cakes about the size of a five paisa coin.

To make the rat cake bait, first select a grain that is common in your area -- wheat in the barani areas, for example. The grain should be clean and free from musty odors and insects. Grains, such as wheat and maize, should be crushed before mixing with the zinc phosphide poison, according to Mr. Smythe of F.A.O.

To make one batch of rat poison, you will need two and one-half kilograms of flour (Atta), two and one-half kilograms of crushed wheat or maize, about a cupful of cooking oil, and 100 grams of zinc phosphide. You will also need enough water to make a stiff dough.

Using a clean container, mix the flour and crushed grain and then add the zinc phosphide. Mix until it is all a uniform color. Then add the cooking oil and mix it well. After this, slowly add the water and mix until a stiff batter is formed. Place the mixture on a flat surface and roll it into a sheet about 1/3 inch or one centimeter thick. Then cut it into small pieces about the size of a five paisa coin.

Mr. Smythe says to let the mixture dry in the shade with good air circulation for two or three days and then store the pieces of bait in a plastic bag which you keep in a cool, dry place. The bait is now ready for you to use.

Since this poison is dangerous to humans, be sure to wash your hands and all equipment you have used as soon as you have finished mixing, or after using the bait.

"Racumin" bait costs about Rs. 3.5 per kilo compared to Rs. 3 for the zinc phosphide. If you want to use "Racumin" bait, you must begin with clean crushed wheat or maize as with zinc phosphide. First, place 19 parts by weight of the grain in a clean container for mixing. Add just enough cooking oil to lightly coat the grain. When the two are mixed, continue stirring and slowly add one part by weight of the "Racumin" mastermix which is a light blue powder. Mix this until the grain is evenly coated. The bait is now ready for use. For ease of distribution, you can seal 100 grams of the "Racumin" bait in small plastic bags for use in the field.

The Vertebrate Pest Control Centre in Karachi is a research laboratory devoted to finding the best methods of controlling the vertebrate pests in Pakistan such as rats, birds, wild boar, and porcupines. Control methods have been or are being developed for some of these pests. Information about these control methods is being given to those concerned through publications and field training programs.

The Control Centre is jointly sponsored by the Pakistan Agricultural Research Council and the Food and Agriculture Organization under the direction of the United Nations Development Program in Pakistan.

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RADIO SCRIPTDON'T LET BIRDS EAT YOUR GRAIN

Birds cause an annual loss of more than 300,000 tons of grain and other cereal crops in Pakistan, according to Abdul Aziz Khan of the Vertebrate Pest Control Centre in Karachi. More than half of this loss is caused by the common house sparrow which eats or destroys 170,000 tons of grain each year. Aziz Khan says that much of this loss could be prevented if farmers would use proper control measures.

Although the house sparrow is the worst offender in destroying crops, the migrant sparrow, common weaver, rose-ringed parakeet, red vented bulbul, and others also cause considerable damage.

The house sparrow is a resident bird about six inches in length. These birds are widespread in agricultural and other rural areas of Pakistan. The crown, rump, and tail coverts are grey. Its ear coverts are white. The throat and breast of the male bird has a black patch. Females have underparts of grey-brown with black streaks on the back. The females do not have a black patch on the throat or breast.

Breeding takes place throughout the year but is particularly heavy from February to July. The house sparrows are likely to raise two or three broods each year.

The house sparrow is a serious pest of standing wheat during the grain formation stage from February to April or May, depending on the variety and the date of ripening. Damage is quite heavy and is localized around the edges of the fields which are close to roosting trees of the birds. The birds feed intermittently throughout the day and tend to move

in small flocks. They eat the grain by perching on the standing wheat ears or heads and removing the entire kernel of grain. They leave the bracts untouched. You can recognize damage done by the birds because of the bracts they leave. Insects will cut the bracts level with the grain.

Sparrow damage occurs over a period of about five to seven weeks during the ripening stage of the standing wheat. The birds start feeding as soon as the milk stage of the grain is reached. The sparrows seem to prefer full-sized milky kernels with doughy contents. As the ears or heads reach maturity, the birds move from the edges of the field in toward the center.

House sparrows build their nests in holes in mud walls and between roof beams in thatches and other buildings in the countryside. The problem of controlling sparrows is difficult because of the large acreage of wheat raised and availability of water and roosting trees. Difficulty of control is increased also by the large number of villages scattered over the country which provide ideal living conditions for scattered resident populations of this bird pest.

If you are to control birds successfully, there are certain facts you must know about them. You must know what birds are doing the damage and what their feeding, breeding, and roosting habits are. You should know which crops they attack and at what stage of crop development the damage occurs. Is the damage to the crops localized or is it widespread? You should know what percent of loss to the crops the birds are causing. Your survey should tell you which is the season that the birds do most of their damage. You will also want to consider the relative costs of various control methods and the practicability of applying different control techniques.

After you have determined some of these facts about the bird damage, there are three steps which Mr. Aziz of the Pest Control Centre suggests. The first is destruction of nests and nest contents during the breeding season. Second, he suggests live trapping of birds in the fields and villages. And third, there is the possibility of using chemical repellents to control them.

Family members, including children, can in a systematic way destroy many of the nests at any time of the day. This is important from March to July during the breeding season. A long wooden stick with a metal hook at one end is effective for pulling out the nests. You can cut the bird population drastically by this one technique alone.

Live trapping can also be done by using the Modified Australian Crow Trap. Your Agricultural Extension Service staff has a plan showing how to make the Modified Australian Bird Trap. The trap is made of wood and is covered with wire netting. It can be made easily in your village.

House sparrows can be trapped by using a mist net in their roosting areas. The mist nets are made of a very fine terylene or nylon material and hung between two poles. Your Extension Service can help you make a mist net, and they will have a fact sheet that will tell you how to use chemicals to cut down the bird population.

This program has been brought to you by the Barani Agricultural Development Project which is interested in helping you increase your crop yields.

RADIO SCRIPT

KILLING BIRDS THAT EAT YOUR GRAIN

Trapping the common house sparrow is an effective way to reduce the damage they do to wheat raised by Pakistan farmers, according to Abdul Aziz Khan of the Vertebrate Pest Control Centre in Karachi. You can trap the sparrows in a Modified Australian Crow Trap or with a mist net. Both of these traps can be made easily in your village, says Aziz Khan. He says that there are also chemical repellents and killers available for you to use. Your Agricultural Extension Service staff will have complete information on these materials and techniques and can help you make and use them.

The crow trap, originally made and used in Australia, has been modified to use in Pakistan for trapping house sparrows. It is made with a wooden frame which is covered with 1/2 by 2 inch wire mesh. Food and a few live sparrows are put in the bottom of the trap to attract the sparrows which fly in the top of the trap. Once inside the trap, the sparrows are unable to get out. You may catch up to 100 sparrows a day in one of these traps if it is placed in a strategic location.

Two traps per village and one trap per field of fifteen acres would be a good number to start with. You should relocate the traps periodically to the places where most of the damage to the grain is occurring. It is important that you have food and water and some decoy birds in the traps to attract the sparrows. You should check the trap every day and release the beneficial birds that may have been caught. And, of course, remove the birds that you plan to destroy. Some people eat the birds that are caught in the traps. Although the birds are small, some people say they are delicious food.

Much of the damage to wheat is done by birds in March, April, and May, so the traps should be in place by the beginning of March if they are to be effective at the start of the season.

House sparrows may also be caught with mist nets which are made of very fine terylene or nylon netting hung vertically between two poles placed in the roosting areas of the birds. The birds fly into the almost invisible net and get trapped in the pockets of loose netting which hang below the shelf strings that hold the netting in place. The shelf strings stretched between the posts must be kept tight. Usually there should be four shelves or strings between the posts.

To catch house sparrows and similar sized birds, you should use a mesh net with holes about 1-1/4 or 1-1/2 inches in size.

The mist nets can be anywhere from 10 to 20 meters in length and about 3 meters high. If the nets are too tall, they may be too obvious to the birds which will then avoid the nets. The poles at the end should be of bamboo or light metal so they are easy to move from place to place. Both end poles should be supported by guy wires or ropes so the poles will be firm and hold the net tight. Horizontal strings must be kept tight but the vertical ones can be loose.

Place the bottom of the net about 10 inches above the ground. The strings above the bottom are evenly spaced. Their exact position can be determined by watching the birds' behavior from a distance and adjusting the strings accordingly.

Removing birds from the net may be a bit difficult until you have had some practice doing it. The birds must be taken out from the same side of the net from which they entered. The mist nets can easily be dismantled and moved to another location if you find that the birds tend to congregate in a different part of the field.

Your Agricultural Extension Service staff has plans for making mist nets and can help you choose a location to use them.

Chemicals that may be used to control birds include repellents, contact avicides, and poison baits. Among the repellents are Methiocarb and Mesural, which affect the birds' digestive systems and discourage them from going near the crops which are treated.

Contact avicides, which actually kill the birds, are directly applied to the birds in their roosting or nesting places. Queletox is one contact avicide which is often used to kill birds.

Poison baits, such as Tergitol, can be used near the roosting or nesting area but must be handled carefully because other animals that are beneficial may eat them.

Your Agricultural Extension Service staff can give you advice on what chemicals to use and how to use them for effective control of birds. They will have fact sheets with information on building traps and on using chemicals.

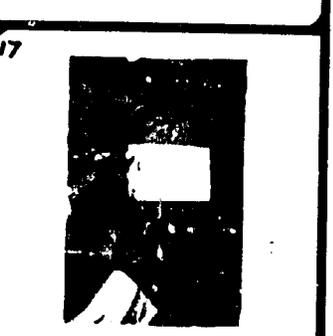
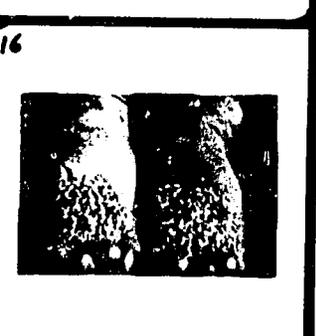
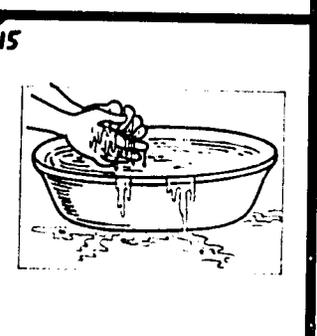
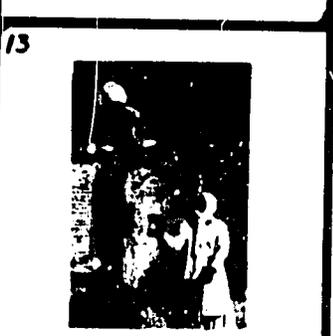
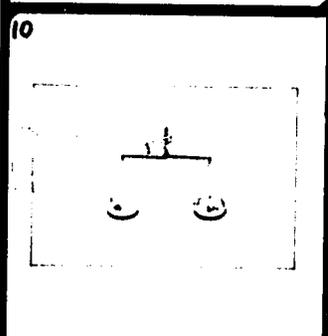
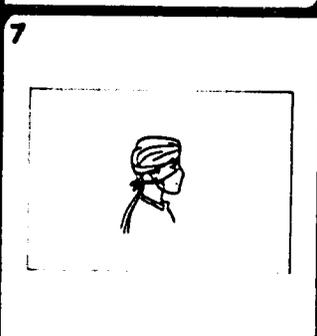
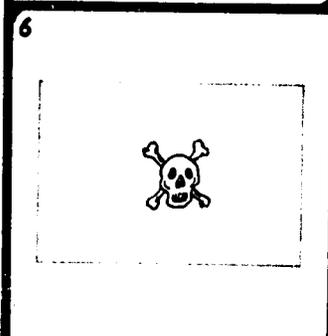
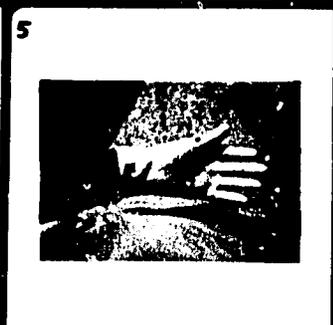
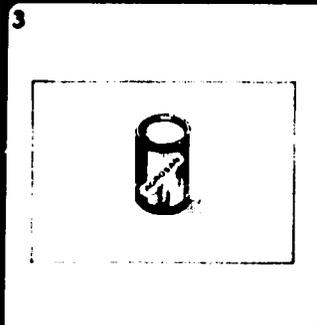
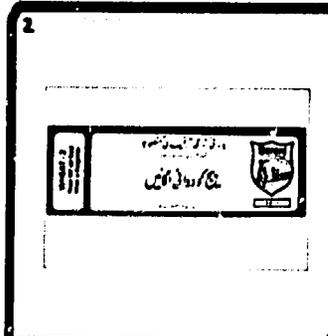
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EXAMPLE OF
SLIDE SET

Slide Set

Wheat No. 2

TREAT SEED
WITH FUNGICIDE



APPENDIX D

PROGRESS RECORD REPORT
OF PRINTED MATERIALS

PROGRESS RECORD REPORT
OF PRINTED MATERIALS

Progress reports on the following two pages show the steps that were taken in sequence to produce the printed materials. A number of fact sheets and posters were in process at any given time but the same pattern of production was followed for all in getting them through the final stage of printing.

Delay in any one of the steps, such as translation or calligraphy, meant that the whole process was held up until that step was completed. Many people with expertise in different fields were involved in the total process. These included author, artist, translator, interpreter (for interviewing farmers), calligrapher, photographer, printer, proofreader, and editor-coordinator, who gave overall supervision.

Pages D-2 and D-3 suggest how the talents of the various people involved were organized on a sequential basis and how the day-to-day progress of the work was monitored and recorded.

Progress Record on Writing and Printing Fact Sheets in English and Printing Posters

	Fact sheet: Approved for printing	Delivered to printer	Layout Approved	Final proof Approved	Fact sheet completed	Poster copy Delivered to printer	Printing Approved	Poster job Completed	Printer paid - \$	Printer paid - \$
WHEAT #1 -Plant Good Seed Wheat	12/31	1/4	1/9			1/10	1/12	f		
#2 -Treat Seed With a Fungicide	12/31	1/2	1/3			1/12	1/15	f		
#3 -Prepare a Good Seedbed	12/31	1/2	1/3			1/12	1/15	f		
#4 -Plant Wheat Properly	12/31	1/9	1/9			1/12	1/15	f		
#5 -Control Weeds in Wheat	12/31	1/10	1/15			1/15	1/20	f		
#6 -Control Diseases in Wheat	1/10	1/15				1/15	1/20			
#7 -Using Fertilizers for Wheat	1/20	1/21								
#9 -Test Seed for Germination	1/4	1/4								f
#10-Harvest Wheat Properly										f
#11-Store Your Wheat Well										
RODENTS AND BIRDS										
#1 -Kill Rodents that Damage Grain	1/4									f
#2 -Making Baits to Control Rodents	1/6									f
#3 -Don't Let Birds Eat Your Grain	1/10									f
#4 -Killing Birds That Eat Grain	1/10									f
GROUNDNUTS										
#1 -Choosing and Measuring Land for Groundnuts	1/7					1/9	1/10			f
#2 -Choosing and Treating Groundnut Seed	1/7					1/9	1/10			f
#3 -Preparing the Soil for Groundnuts	1/9					1/9	1/10			f
#4 -Sowing and Fertilizing Groundnuts	1/21					1/15	1/16			f
#5 -Cultivating, Harvesting and Storing Groundnuts	1/21					1/15	1/16			f
MAIZE										
#1 -Selecting Maize Seed	1/15									
#2 -Plant Maize Properly	1/15									
#3 -Pest Management in Maize	1/15									
#4 -Fertilizing Maize										

* d - draft payment
f - final payment

Progress Record on Writing and Printing Fact Sheets - Urdu

	Rough copy received	Approved by Dave Lundke	Delivered to translator	Translation finished	Delivered to printer	Calligraphy approved	Printing proof approved	Job completed	Payments made
<u>WHEAT</u> #1 -Plant Good Seed Wheat	10/10	10/23	10/26	10/31	10/31	11/1	11/14	11/20	d f
#2 -Treat Seed With a Fungicide	10/11	11/1	11/2	11/4	11/4	11/15	11/25	12/3	d f
#3 -Prepare a Good Seedbed	10/17	11/2	11/2	11/15	11/19	12/1	12/2	12/9	d f
#4 -Plant Wheat Properly	10/26	11/8	11/28	12/1	12/4	12/12	12/17	12/22	d f
#5 -Control weeds in Wheat	11/18	12/3	12/6	12/10	12/14	12/18	12/22	1-1/20	d f
#6 -Control Diseases in Wheat	12/31	1/21	1/22	1/23	1/30	2/2	2/10	2/10	d f
#7 -Using Fertilizers for Wheat	1/3	1/14	1/14	1/17	1/18	1/19	1/20	2/10	d f
#9 -Test Seed for Germination	12/6	12/15	12/14	12/18	12/19	12/27	12/30	12/31	d f
#10-Harvest Wheat Properly	11/22	12/24	12/26	12/31	1/1	1/15	1/20	2/10	d f
#11-Store Your wheat Well	12/3	1/10	1/10	1/12	1/21	1/23	1/24	3/20	d f
<u>RODENTS AND BIRDS</u>									
#1 -Kill Rodents that Damage Grain	11/27	11/30	12/20	1/14	1/15	1/17	1/20	1/23	d f
#2 -Making Baits to Control Rodents	11/27	11/30	12/20	1/14	1/17	1/18	1/20	1/23	d f
#3 -Don't Let Birds Eat Your Grain	12/8	12/12	12/14	1/12	1/13	1/25	2/1	4/10	d f
#4 -Killing Birds That Eat Grain	12/8	12/22	12/24	1/11	1/20	1/25	2/1	4/10	d f
<u>GROUNDNUTS</u>									
#1 -Choosing and Measuring Land for Groundnuts	12/6	12/20	12/20	12/20	1/2	1/5	1/4	1/11	d f
#2 -Choosing and Treating Groundnut Seed	12/6	1/2	1/3	1/3	1/5	1/9	1/9	1/11	d f
#3 -Preparing the Soil for Groundnuts	12/16	1/4	1/4	1/6	1/9	1/10	1/11	2/1	d f
#4 -Sowing and Fertilizing Groundnuts	12/16	1/8	1/8	1/10	1/10	1/11	1/17	2/1	d f
#5 -Cultivating, Harvesting and Storing Groundnuts	12/16	1/10	1/10	1/12	1/14	1/16	1/17	2/20	d f
<u>MAIZE</u>									
#1 -Selecting Maize Seed	12/16	1/10	1/10	1/15	1/18	1/20	1/22		d f
#2 - Maize Cultivation	1/16	1/22	1/22	1/23	1/23	1/24	2/20		d f
#3 -Pest Management in Maize	12/7	1/18	1/20	1/22	1/22	3/1	3/25		d f
#4 -Fertilizing Maize	1/17	1/23	1/23	1/24	2/1	3/1			d f

FACT SHEETS IN URDU

Wheat Fact Sheets (completed by April 15)

- Wheat No. 1. Plant Good Wheat Seed
- Wheat No. 2. Treat Seed With a Fungicide
- Wheat No. 3. Prepare a Good Seedbed
- Wheat No. 4. Planting Wheat Properly
- Wheat No. 5. Control the Weeds in Your Wheat
- Wheat No. 6. Controlling Diseases in Wheat
- Wheat No. 7. Using Fertilizers for Wheat
- Wheat No. 9. Test Your Seed for Germination
- Wheat No. 10. Harvest and Thresh Wheat Properly
- Wheat No. 11. Store Your Wheat Well

Groundnut Fact Sheets (completed by April 15)

- Groundnuts No. 1. Choosing and Measuring Land for Groundnuts
- Groundnuts No. 2. Choosing and Treating Groundnut Seed
- Groundnuts No. 3. Preparing the Soil for Groundnuts
- Groundnuts No. 4. Fertilizing and Sowing Groundnuts
- Groundnuts No. 5. Cultivating, Harvesting and Storing Groundnuts

Rodents and Birds Fact Sheets (completed by April 15)

- Rodents and Birds No. 1. Kill Rodents that Damage Grain
- Rodents and Birds No. 2. Making Bait to Control Rodents
- Rodents and Birds No. 3. Don't Let Birds Eat Your Grain
- Rodents and Birds No. 4. Killing Birds That Eat Your Grain

Maize Fact Sheets (to be completed by or after April 15)

- Maize No. 1. Selecting Maize Seed
- Maize No. 2. Maize Cultivation
- Maize No. 3. Pest Management for Maize
- Maize No. 4. Fertilizing Maize

POSTERS IN URDU

Rodents and Birds Posters (completed by April 15)

- Rodents and Birds No. 1. Kill Rodents that Damage Grain
- Rodents and Birds No. 2. Making Bait to Control Rodents
- Rodents and Birds No. 3. Don't Let Birds Eat Your Grain
- Rodents and Birds No. 4. Killing Birds That Eat Your Grain

Groundnut Posters (completed by April 15)

- Groundnuts No. 1. Choosing and Measuring Land for Groundnuts
- Groundnuts No. 2. Choosing and Treating Groundnut Seed
- Groundnuts No. 3. Preparing the Soil for Groundnuts
- Groundnuts No. 4. Fertilizing and Sowing Groundnuts
- Groundnuts No. 5. Cultivating, Harvesting and Storing Groundnuts

Wheat Posters (to be completed by or after April 15)

- Wheat No. 1. Plant Good Wheat Seed
- Wheat No. 2. Treat Seed With a Fungicide
- Wheat No. 3. Prepare a Good Seedbed
- Wheat No. 4. Planting Wheat Properly
- Wheat No. 5. Control the Weeds in Your Wheat
- Wheat No. 6. Controlling Diseases in Wheat
- Wheat No. 7. Using Fertilizers for Wheat
- Wheat No. 9. Test Your Seed for Germination
- Wheat No. 10. Harvest and Thresh Wheat Properly
- Wheat No. 11. Store Your Wheat Well

Maize Posters (to be completed by or after April 15)

- Maize No. 1. Selecting Maize Seed
- Maize No. 2. Maize Cultivation
- Maize No. 3. Pest Management for Maize
- Maize No. 4. Fertilizing Maize

FACT SHEETS IN ENGLISH

Wheat Fact Sheets (to be completed by or after April 15)

- Wheat No. 1. Plant Good Wheat Seed
- Wheat No. 2. Treat Seed With a Fungicide
- Wheat No. 3. Prepare a Good Seedbed
- Wheat No. 4. Planting Wheat Properly
- Wheat No. 5. Control the Weeds in Your Wheat
- Wheat No. 6. Controlling Diseases in Wheat
- Wheat No. 7. Using Fertilizers for Wheat
- Wheat No. 9. Test Your Seed for Germination
- Wheat No. 10. Harvest and Thresh Wheat Properly
- Wheat No. 11. Store Your Wheat Well

Groundnut Fact Sheets (to be completed by or after April 15)

- Groundnuts No. 1. Choosing and Measuring Land for Groundnuts
- Groundnuts No. 2. Choosing and Treating Groundnut Seed
- Groundnuts No. 3. Preparing the Soil for Groundnuts
- Groundnuts No. 4. Fertilizing and Sowing Groundnuts
- Groundnuts No. 5. Cultivating, Harvesting and Storing Groundnuts

Rodents and Birds Fact Sheets (to be completed by or after April 15)

- Rodents and Birds No. 1. Kill Rodents that Damage Grain
- Rodents and Birds No. 2. Making Bait to Control Rodents
- Rodents and Birds No. 3. Don't Let Birds Eat Your Grain
- Rodents and Birds No. 4. Killing Birds That Eat Your Grain

Maize Fact Sheets (to be completed by or after April 15)

- Maize No. 1. Selecting Maize Seed
- Maize No. 2. Maize Cultivation
- Maize No. 3. Pest Management for Maize
- Maize No. 4. Fertilizing Maize

APPENDIX E

COPY OF LETTER REPORTING VISIT
WITH WORLD BANK OFFICERS

