TRIP REPORT

(July 9-26, 1991)

Analysis of Area Sampling Frame
Objective Yield Program

Agricultural Data Collection Component

Agricultral Sector Support Program

Prepared by:

C. Ray Halley
Survey Statistican
USDA, NASS, Washington, D.C.

Report Title: Analysis of Objective Yield Procedures.

General: Objective Yield Procedures for wheat, rice and cotton were reviewed. The scope of review included sampling procedures, enumerator training, enumerator instructions and questionnaires, editing, analysis, summary and expansion, and publication of results. The method used for the review was to select one crop (wheat) and follow the procedures from start to finish. The remaining crops were reviewed only where differences from wheat procedures existed.

I. Sampling Procedures:

A. Current Procedures: The objective yield samples are drawn systematically in proportion to size from all fields in the Area Sampling Frame (ASF) survey for the targeted crops. This insures uniform coverage of the targeted crops and proportionate coverage of all sizes of fields as they appear in the population.

As shown in Table 1 below, the ASF surveys are conducted on a semi-annual basis with timing to coincide with the summer (Kharif) and winter (Rabi) crops.

Table 1. Annual Cycle of Area Sampling Frame surveys.

Date of Survey	Date Collected
Jan 05 - 20	Summer crop - Area Planted final Winter crop - Area Planted current
July 10 - 25	Winter crop - Area Planted final Summer crop - Area Planted current

The wheat objective yield sample is selected from the winter ASF survey conducted Jan 5 - 20. All remaining crop objective yield samples are selected from the summer ASF survey conducted July 10 -25. Table 2 shows the sample sizes for each crop since the program began.

Table 2: Area Sampling Frame Objective Yield Sample Size

Crop Season	Year	Crop	Sample Size per District	District
Rabi	1987-88	Wheat	90	Shiekhupura
Kharif	1988	Rice	60	Faisalabad, Sheikupura Nawabshah and Larkana
		Maize	60	
		Cotton	60	
Rabi	1988-89	Wheat	60	Faisalabad, Sheikupura Multan, Jhang, Nawabshah, Larkana and Hyderabad
Kharif	1989	Rice	60	Faisalabad, Sheikhupur
		Maize	80 1/	Multan, Jhang,
		Cotton	60	Nawabshah, Larakana an
		Sugarcane	60	Hyderabad
Rabi	1989-90	Wheat	60	Faisalabad, Sheikhupur Multan, Jhang, Nawabshah, Larkana and Hyderabad
Kharif	1990	Rice	60	Faisalabad, Sheikhupur
		Maize	80 1/	Multan, Jhang,
		Cotton	60	Nawabshah, Larkana and Hyderabad
Rabi	1990-91	Wheat	60	Faisalabad, Sheikhupur Multan, Jhang Nawabshah, Larkana and Hyderabad

1/ 60 for grain and 20 for fodder

b. **Recommendation:**

1. Review of CV's for the 3 major crops at Pakistan level show that except for cotton in 1989, all are below the target level of five percent. Annual reviews of the reliability of the objective yield indications should be continued. If CV levels fluctuate, district sample sizes should be reviewed for increasing samples in certain districts or a shift of samples between districts. Between year fluctuations in the ASF wheat OY levels should be studied and verified. See table 3 below:

Table 3: ASF WHEAT YIELDS, BY DISTRICT, SINDH PROVINCE

	ASF WHEAT OY			% Change	
	1989	1990	1991 *	89/90	90/91
Nawabshah	3748	2214	3319	169.3	66.7
Larkana	2086	960	1324	217.3	72.5
Hyderabad	3654	2544	3931	143.6	64.7
Sindh Province	3363	2130	3292	157.9	65.9

* 2 plot combined.

It appears from Table 3, the year to year variation in the Larkana district may be more than just weather. If the 1990 yield of 960 is at an artificially low level due to acreage adjustments made to the indicated yield, then steps should be taken to correct the published acreage level rather than adjust the yields.

Once the procedure for adjusting the ASF acreage has been established and tested, the data sets for all ASF surveys should be resummarized. Comparing adjusted district yields from year to year has little value.

2. Recommend a procedure be established in all objective yield crop surveys to properly adjust the area planted indication from the ASF survey to an acreage harvested indication, using acreage adjustments obtained from objective yield surveys. If acreage adjustments are necessary they should be made to the published acreage statistic rather than adjusting the yield to obtain the proper productive level.

3. Recommend a procedure be established to assure that all wheat fields have a chance of being selected. Since some planted acreage is reported as intentions on the ASF survey, the possibility exists that fields reported planted to wheat end up to be another crop and fields not originally intended for wheat end up to be wheat. Allowances must be made to substitute new wheat fields for sampled wheat fields when the sampled field was actually planted to a crop other than wheat. This will allow the OY acreage adjustments to be more correct.

   Suggest the following:

   At the time wheat objective yield samples are selected from the winter ASF, in addition to printing the sticker for the selected field, print off an entire listing of all fields reported by the selected grower in summary. Instruct the enumerator to verify the field acres, waste acres, and crop acres for all fields controlled by the selected grower, at the time of the objective yield interview.

   At this point in the interview process, the reported crop acres represent planted acreage for the targeted crop. Continue the interview one more step by asking the grower to indicate by field the acres expected for harvest. A ratio could be established to adjust the ASF crop acres to an acres for harvest estimate.

4. Recommend that the proposed quality assurance program (see attachment A) be implemented for ASF survey as soon as is feasible.

5. Recommend that detail analysis of the Area Sampling Frame be undertaken. Review of Attachment B reveals the survey expanded. Total land estimate is not trashing as one would expect. Since the number and location of segments have not changed one would expect the survey expanded total land to be relatively constant. This analysis should review of survey expansions by strata by district.

II. Enumerator Training:

A. Recommendation: Although unable to observe an actual training session, the following suggestion are offered as training tips that will improve enumerator participation and learning retention.

1. Site Selection: Two very important points to consider in selecting a site for training are lighting and comfort. Proper lighting is essential if all participants are to be able to participate fully in the session. They won't be able to follow along if they can't see clearly what is being presented. The comfort issue is particularly important in training adults. Adult attention span is short even with ideal training conditions but it is even shorter if the participant is uncomfortable.

2. Use of Visual Aids: Proper use of visual aids will enhance any training session. Use of visual aids in Objective Yield training will allow the instructor to stress differences between maturity categories, how to make plant counts, and proper completion of the forms. Visual aids that have worked well in the past include 1) individual handouts, 2) overhead projector, with colored transparencies if available, 3) Easel/Flip Charts, and 4) Slide projector.

3. Exercises & Examples: Enumerator learning and retention is enhanced through the use of exercises and examples. The more involved the enumerators are, the better the learning. This is particularly important when training for face to face interviewing. The more familiar the enumerator is with the questionnaire and questionnaire wording, the higher the quality of data collected.

III. Questionnaires & Interviewer Instructions.

A. Current questionnaires and interview manuals (Translated to English) for wheat, cotton and rice were reviewed. The review centered on question ordering, flow of the questionnaire and enumerator instruction for completion of each section of the questionnaire. Copies of the 3 manuals are attached with suggestions noted.

B. **Wheat Manual of Instruction and Questionnaire:**

1. The enumerator are asked to verify the data on the sticker, the instruction manual should cover procedures to be followed in all situations. Currently instructions for handling errors on the sticker, etc. are communicated verbally.

2. The response to question No. 2 can never be greater than the crop acreage shown on the label unless the crop area on the label is corrected.

3. For question No. 2 (wheat), an enumerator instruction indicating acceptable area units for each province, (Kanals and Murlas or Acres and Ghuntas) should be added to the questionnaire.

4. Page 4 - It was unclear to me which of the sticks is used as the buffer stick for wheat, the buffer stick. Suggest that the 1 meter long stick be used, then cotton, rice & wheat procedures are the same.

5. Suggestion: When laying out the wheat plot in broadcast fields, use both sticker together when locating the position of the 3rd and 4th pegs: It is essential the unit be square and the flagging ribbon identifies properly which stalks are included and excluded.

6. Possible Problems and solutions, pages 10 and 11 of manual - Small diagrams would help clarify the solution and serve as a reminder for enumerators in the field.

7. It is important to remember in all line sown fields that the plot includes all wheat plants in 3 lines and 3 line middles. The area between line 1 and line 2 is the line 1 middle. The plot would include all plants from line 1 up to, but not including line 4. This rule is applicable for the location of both count plots and clip units.

8. Instruction for question 4 should be expanded, perhaps as follows:

   Code 1 should be entered in cell No. 404 only on the first visit (round) to the field.

   Code 2 should be entered in cell 404 only during the second, third or final rounds when the plot could not be located and it was necessary to relocate the plot. Remember in this situation, the row space measurements in question 4-B must be re-measured for all line sown fields.

   Code 3 should be entered in cell 404 on the second, third or final rounds when you were able to relocate the original plot.

9. The 3rd clip unit is located differently in Broadcast fields than it is in line sown fields for wheat. Diagrams and instruction should highlight this diffference.

10. The U.S. models are developed around clip units 7.2" square or exactly 1/3 of the 21.6" square plot for broadcast planting. The current procedure in Pakistan uses clip units of 8 inches square. This difference (11%) must be taken into account when forecast models are developed.

11. For all line sown fields, two row space measurements are to be made and entered in cells 400 and 402. No mention is made on how and where to make these measurement. Suggest the following:

    > Row space measurements should be made using the measuring tape anchored at the first peg. Record the one row space measurement to the nearest centimeter. Make the measurement of 1 line and 1 line middle first by extending the tape toward the 4th peg. Make the 3 line and 3 line middle measurement by extending the tape to, but not including, the 4th line. Also record to the nearest centimeters.

12. We need to define for question No. 5-C, what is a detached head and under what circumstances if any should the head be counted. I suspect that the head should be counted if the damage was caused by the enumerator. This procedure would be consistent with cotton procedures.

C. Cotton Manual of Instruction and Questionnaire

1. A section in the manual documenting survey time period, field work activities, and due dates might be appropriate. If you do not wish to reprint the manual each year, this information could be recorded on a supplemental handout for use of training schools and as a reminder for enumerator during the survey rounds. This suggestion applies to all crops.

2. When locating a plot in broadcast cotton, is it possible to use the 1 meter stick for the end measurement and the tape measure for the diagonal (3.16 meters) at the same time to assure that the plot is a true rectangle? Since the cotton is nearly mature at the time of the first visit, this may be difficult without damaging plants. However, it is essential the plot be exactly 1 meter by 3 meters.

3. When locating a plot in line sown cotton it is important to include 2 lines of cotton and the associated line middles. The location procedures (placement of pegs and wrapping plastic ribbon around the pegs) should assure that each line is 3 meters long and line middle between line 1 and line 2, and line 2 and line 3 are included.

4. If a plot or any portion of a plot falls outside the selected field, rather than turn to one side or the other, it is easier to move the plot back until the whole plot is in the field. We must make sure that the border of the field has a chance of falling within the plot. This applies to all crops.

5. I'm not sure a definition of a "boll fully emerged" is necessary since no counts of this stage are made. However, a definition for a <u>shell</u> is needed:

Suggest definition:	A shell is a burr from which <u>all</u> locks of cotton have been taken or are missing for any reason.

6. A procedures should be documented for handling the situation when the selected field is not planted to cotton. This can be corrected by including the appropriate parts of page 11 from the wheat manual in the cotton manual.

7. For question No. 2: add an enumerator note stating that the entry in cell 200 can't greater than the crop area shown on the label, unless the crop area on the sticker is changed.

8. See comments from wheat manual review for possible clarification of question No. 4-A. (Item B-8)

9. There is no discussion in the cotton manual describing how or where to measure row spaces for question 4-C.

   Suggest the following:

   The purpose of row space measurements in to derive the sampled area. The row space measurements will be made only on the first round except when the plot has to be relocated.

   For question 4-C i) measure the distance from the center of the line 1 to the center of line 2. This measurement should be taken from the first peg, extending toward peg 3. The measurement for question 4-C ii) will start at the same point (first peg) and extend in a straight line past peg 3 to the center of the 4th line. This area will cover 3 lines and associated line middles.

   Record all measurement to the nearest centimeter.

10. Need to clarify clipping (10 or less) open bolls for shipment to the lab: If less than 5 bolls an first plant, what do you do? Instructions. tell you to start at the top of plant 1 for the first 5 bolls and at the bottom of the second plant for the next 5 bolls.

11. For question 5-B, the manual says to clip shells along with remaining open bolls. The questionnaire makes no mention of including shells. It appears the manual is in error on page 13 and the shells should be recorded in 5-C.

12. For wheat, the date of planting is asked and recorded in cell 202, but for cotton & rice it is not. Is the planting data not needed for the summer crops?

13. It appears the yield for cotton is derived by accumulating the amounts of cotton counted each visit. If a plot cannot be relocated, information that would have been obtained on previous visits is not available. I'm not sure what value is gained by relocating a plot and starting the counts over.

D. Rice Instruction Manual and Questionnaire

1. Item i, page 5- Since the enumerator will contacting the grower to verify information shown on the label, the grower should be shown the selected field on the

   grower on enumerator about which field is selected and its location.

2. Page 6 - Suggestion: When laying out the plot in broadcast sown rice, use both sticks together when locating the position of the 3rd and 4th pegs. It is essential the unit be square and the flagging ribbon identifies properly "included" as "excluded" stalks. See suggested wording in the manual.

3. Page 8 - In line sown fields it is important to emphasize the plot size definition. The row space measurements and the plants or stalks that are counted should be from the appropriate lines and line middles.

4. Problem 3 and 6, pages 10 and 11 - In these two situations it would be easier and no less accurate to just back the unit up until the entire unit falls within the selected field. We must make sure that the unit location procedure doesn't create a border along the edge of the field where it is not possible to locate a unit.

   Suggested solution for problems 3 & 4:

   "When the number of paces into the field will cause part or all of the unit to fall outside the field, decrease the pace count until the entire plot is included in the field".

5. Add the following enumerator instruction to question No. 2: The entry in cell 200 must be less than or equal to the original ASF reported or the corrected crop area shown on the label.

6. The idea of the enumerator preparing a schedule of expected harvest dates for all selected fields & sending a copy to the supervisor is good. This same procedure should be expanded to other commodities.

IV: EDITING, SUMMARY AND EXPANSION:

A. **General:** Reported data used directly to calculate the yields of wheat, rice and cotton were reviewed in two districts for each commodity. The districts reviewed for each crop are as follows:

Crop	Districts
Wheat	Sheikupura, Larkana
Cotton	Multan, Nawabshah
Rice	Sheikhupura, Larakana

The data use to be calculate the dry yields were compared with the field and laboratory forms. The following observations were as under.

1. It appears, the data in the Sindh Province is subject to more variability and potentially higher non-sampling errors. For wheat, only 75% of the 60 samples were laid out and there was a problem in getting the correct field & crop acreage identified in the Larkana District. For cotton, the sampling could start earlier in Nawabshah District as many samples show large numbers of burrs on the first visit.

2. The model used to calculate the crop yields for wheat, rice and cotton were reviewed. The procedures and formula were found to be correct with one minor exception. The formula for deriving the standard yield (STDYLD) is slightly different for wheat than rice.

   Rice formula : STDYLD = DRYYLD/0.9
   Wheat formula : STDYLD = DRYYLD* 1.1

   Both formula are to set the moisture percentage at 10%. The cotton yield used the multiplication method also.

   Both ways are correct but yield slightly different answers. We suspect the multiplication method of adding back moisture is more appropriate.

3. It appears the issue of how to handle fodder acres Needs clarification in the acreage adjustment procedure.

For wheat, if the fodder acreage was only part of the field, the ASF acreage was adjusted down and the yield left in at zero. If the entire field was used for fodder, the ASF acreage was not adjusted and the yield was left in at zero. These two procedures are not consistent.

4. The laboratory time required to process a sample varies from 3 to 12 days based on Laboratory forms reviewed for all three crops. This period was necessary to dry grain down as above to zero percent moisture as possible.

5. The process of weighing samples into and out of the oven, and with and without trays, appears to be a source of slight error. For wheat, the average difference over 46 samples for dry weight was = o.2 grams or about 0.2 % upwards bias. Differences were observed in other crops also.

B. **Recommendations:**

1. Recommend that personnel in each district be identified and made responsible for data quality. This responsibility should include the manual edit of all forms prior to data entry, verifying the status of samples and each enumerators workload, analysis of between variable relationships, and outlier detection and correction. The assignment of responsibilities should be preceded by training to assure consistent edit and analysis procedures between Districts and Provinces. Edit guidelines should be documented and distributed to each district at the time of training.

2. Recommend standardized data entry instructions be prepared and distributed to each District and if needed, training sessions should be held for all data entry personnel.

3. Recommend a quality assurance program be implemented for all objective yield crops. Personnel identified in item 1 above should administer this program. In addition to assuring quality during edit & analysis processes, this program should be designed to assist in the supervision of enumerators, detect faulty equipment, assure proper field procedures are followed, and point out weaknesses in instructions and training.

4. Recommend the starting date for all objective yield surveys be reviewed. Although the number of samples harvested before the enumerator arrived for the first round is not large, it does appear the grower

cotton harvest has started in some parts of the Sindh Province.

5. Recommend the rice formula to calculated standard yield at 10 percent moisture be changed to be like wheat.

6. The issue of acres for grain vs acres for fodder needs to be addressed. In the calculation of production, either all fodder acres should be left in or taken out entirely. If fodder acres are deducted from the crop acres, then the zero yield should be taken out. If the fodder acres are included in the crop acres, the District yield calculation should include these samples with zero yield.

7. Recommend the use of moisture meter be explored to reduce error and increase through put in the objective yield lab. The United States program uses "Grain Analysis Computer II (GAC II), sold by the Dickie Johns Company. The sale price is approximately $ 2000 and it will work on wheat, corn, and rice. The digital readout provides moisture percent and grain temperature. The minimum sample size is 125 grams.

   I feel the lab output could be increased 3-4 times by using a moisture meter. Many samples would need no drying at all prior to moisture testing due to the relatively low moisture of the samples at time of receipt in the lab.

   Use of a moisture meter would also reduce the number of times samples are handled and weighed, which would address the concern expressed in general observation number 5 above.

VI. PUBLICATION OF RESULTS:

The only suggestion for publishing results would be to footnote more clearly what the estimates represent. For instance, if the winter ASF acres have been adjusted by Objective Yield data to more closely represent acres harvested, this should be noted. If fodder is included or excluded, it should be noted. If yield have been adjusted rather than change the previously publish ASF acreage estimate, it should also be footnoted. This is particularly important since much emphasis is placed on comparison of ASF and VMS results. The difference may not be as great as the data currently shows particularly in Larkana district for wheat in 1990.

ATTACHMENT - A

A PROPOSED QUALITY ASSURANCE PROGRAM

Insuring that the quality of field work is maintained is a major step toward reducing non sampling errors. Monitoring on a random basis serves a number of purposes. The most important is to insure that instructions are uniformly understood and implemented. The most dramatic use is to CATCH an enumerator who is not visiting segments and falsifying reports. This aspect of the program should be played down in training but not denied in favor of a more positive approach. Experience indicates that you will likely never catch a person falsifying reports but you will gain very valuable insight into how enumerators really work. Use this information to better design future surveys.

The following outline is a suggested procedure to consider.

1. After the enumerators have gone to the field but before any completed segments have been returned, pre-select five segments from each enumerator assignment.

2. When the first of these pre-selected segments is returned and completely processed, pull it out for the quality assurance program. Only one segment will be processed for each enumerator unless the first pre-selected segment returned has less than ten fields, in which case a second pre-selected segment will be processed for this enumerator. No more than two segments will be processed per enumerator.

3. The quality assurance officer (QAO) should in the office review the entire segment for completeness, neatness, proper handling within the office, and proper coding and editing. Difficulties with the office procedure should immediately be brought to the attention of the office supervisor.

4. The QAO should then visit the segment without the enumerator present to verify that field work was properly completed. The enumerator should not be present because at this stage the completed segment should stand alone. There should be no need for verbal clarification; as, all unusual situations should have been explained in notes on the questionnaire.

The QAO should work independently to speed the process of quality assurance. Coordinating survey activities so that the enumerator can accompany the QAO seriously impedes survey progress and is of little value to the proficient enumerator.

5. In the field the QAO should make an over all inspection of the segment to insure procedures were generally followed.

6. The QAO should then make a detail inspection of five fields - numbers 5, 10, 15, 10, and 25 to assure that crops were properly coded and areas were reasonably entered.

7. Next, the QAO should locate based on the check off on the back of the field form one of the operators that were interviewed by the enumerator. From this re-interview he should discover if the enumerator conducted himself in a professional, knowledgeable, and courteous manner. Also, the QAO can determine if the enumerator was able to respond to any respondent questions concerning this survey and the statistics program in general.

8. Serious deficiencies in field survey implementation should be brought quickly to the attention of the enumerator involved for remedial training or other action.

The following proposed form is suggested for the QAO to

Quality Assurance Report

Survey _____ Segment _____ Enumerator _____

Date field work completed ____/____/____

Date segment received in the office ____/____/____

Date office work completed ____/____/____

Date of quality assurance field visit ____/____/____

Comments on the quality of field work apparent from the office review:

Comments on the quality of office handling:

FIELD INSPECTION REPORT

	From the Field Form				QAO Observations			
Field Number	Crop	Field Area	Crop Area	Waste Area	Crop	Field Area	Crop Area	Waste Area
5								
10								
15								
20								
25								

Could one respondent reported form the segment be found? YES NO

Was the respondent identified correctly on the field form? YES NO

Comment on the overall quality of the interview and the handling of this segment in general.

QAO _____ Date Completed _____

Summarize remedial actions taken on the back of this form.

ATTACHMENT - B

Area in Square Kilometers

DISTRICT	SOP AREA	PLANIMTR AREA	PLAN. vs SOP	ASF JAN.1991	% Diff vs PLANIMT	ASF JUL.1990	% Diff vs PLANIMT	ASF JAN.1990	% Diff vs PLANIMT	ASF JUL.1989	% Diff vs PLANIMT
Faisalabad	5856	5865	0.15	5859	-0.10	5848	-0.30	5874	0.15	5883	0.31
Jhang	8809	8867	0.66	8661	-2.33	8706	-1.81	3607	-2.93	8677	-2.15
Multan	6499	6562	0.97	6388	-2.65	6534	-0.43	6694	2.02	6663	1.55
Shiekhupura	5959	5933	-0.44	5856	-1.29	5856	-1.30	5866	-1.13	5854	-1.33
Nawabshah	7501	7403	-1.31	7432	0.39	7398	-0.07	7394	-0.12	7402	-0.02
Larkana	7423	7256	-2.25	6369	-12.22	6301	-13.16	7136	-1.65	7194	-0.85
Hyderabad	5519	5540	0.38	5351	-3.42	5321	-3.95	5296	-4.40	5354	-3.36

ATTACHMENT - C

MANUAL OF INSTRUCTIONS

FOR ENUMERATORS

ON

OBJECTIVE YIELD SURVEY OF

WHEAT CROP

AGRICULTURAL DATA COLLECTION PROJECT
FEDERAL BUREAU OF STATISTICS
MINISTRY OF FINANCE & ECONOMIC AFFAIRES
GOVERNMENT OF PAKISTAN
ISLAMABAD

CONTENTS

BRIEF INTRODUCTION :

The importance of agricultural statistics in the economic development of an agro - based country like pakistan cannot be exaggerated. The US aided Project titled "Agricultural Data Collection" is being implemented to improve the existing system of generating crop acreage, yield and other agricultural statistics in the country. The project is being implemented in collaboration with the provincial departments of agriculture as a part of the US funded Agricultural Sector Support Programme.

The survey for the objective yield measurement of wheat is conducted on the basis of the January [Rabi' (winter crops)] acreage survey. For laying out the sample crop cutting plot a sticker pasted on face of the objective yield survey questionnaire provides information such as name and code of the district, farmer number, ASF field number, sample no., cropped area of the field etc. which was collected through the January crop acreage survey.

OBJECTIVES OF THE SURVEY:

1. To provide counts and measurements for estimating yield per acre / hectre of wheat.
2. To provide counts and measurements which can be used to forecast yield per acre/hectre during the season.
3. To examine the effectiveness of this newly introduced ASF technology.

25

ENUMERATOR'S KIT:

The articles which are used in the wheat objective yield survey are listed below. These will be supplied to you before the start of survey. Please keep in mind that you are responsible for proper use and care of all these items. If any of the items is lost, please bring it in the notice of your supervisor.

i) Plastic Ribbon Colored

ii) Hammer

iii) Scissors

iv) Measuring Tape

v) Wooden Pegs

vi) Paper Envelopes

vii) Cloth Bags

viii) a. A long stick (Sarkanda) having signs with red tape for 21.6" and with green tape for 8.0" for measurement of count unit (main plot) and clip area sides respectively.

b. One meter long diagonal stick (sarkanda) having signs with red tape for 30.55" (measurement of count unit diagonal) and with green tape for 11.31" (measurement of clip area diagonal). THIS STICK IS TO BE USED TO MEASURE THE BUFFER ZONE.

CHAPTER II

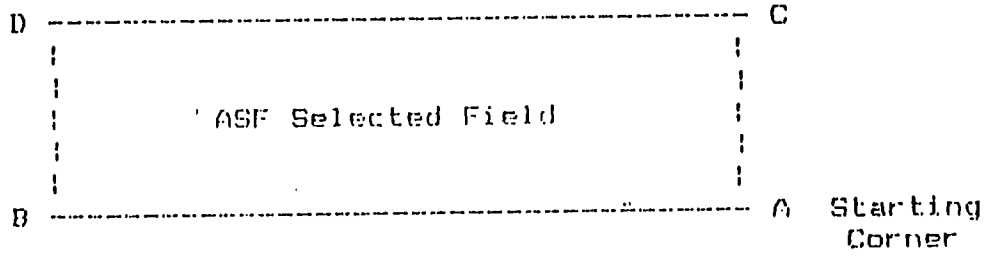
PROCEDURE FOR LAYING OUT THE SAMPLE PLOT

i) Locating the Selected Field:-

As sample fields are selected on the basis of January (winter crop) acreage survey, you are expected to know the location of this sample field. However, before proceeding, study your topo maps and photo enlargements / overlays. Looking at the topomaps & photo enlargements / overlays you can get an idea of where your designated field is located.

ii) Selection of the Starting Corner of ASF Field

Having identified the sample field you have to determine the basic / starting corner of the field from which you have to start work. The starting corner will be that which is nearer to you as compared to the other corners of this sample field. The diagramatic presentation of this is as under;



iii) Laying out the Count Unit and Clip Unit.

The required information such as segment no., grower no., field no., total area of the field, crop area, no. of paces along and into the field etc. are provided on the sticker pasted on top right corner of each questionnaire.

There are two ways for sowing Wheat crop in our country. These are;

i) Broadcast Sowing
ii) Line Sowing

The procedure for laying out the plot for each type is different from the other.

aying out a Wheat plot in Broad cast Sowing.

Plot Size = 21.6 X 21.6 Inches.

Please keep in mind that the plot will always be layed out on your right side when you walk into the field. Before entering into the sample field, please look at the shape of this field. It is important because you have to walk along the field edge to its long side and into the field to the width of the field. However if the field is in square shape either side can be taken.

After you have taken the last of the required paces, place the buffer stick down pointing straight ahead touching your right foot toe. Place a peg and tie the plastic ribbon with this peg. This will be the first peg of the Plot. Then place

another peg at a distance of 21.6" from the 1st Peg using the stick with plot size marked on it. After this (USING BOTH STICKS TOGETHER) place the 3rd peg at a distance of 21.6" from the 2nd peg to the right side of 2nd peg measuring the diagonal between 1st and 3rd peg. The distance of this diagonal must be equal to 30.55". Then place the 4th peg, which will be at a ~~distance of 21.6~~ DIAGONAL OF 30.55" from the ~~3rd~~ 2nd peg and exactly 21.6" from the 1st peg. Keep on extending the coloured plastic ribbon around the pegs. Please keep in mind that ribbon will always be tied outside the pegs, so that you may easily determine the exclusion or inclusion of plants/stalks in the plot.

If you look at the figure A, you will see three small plot of 8 inches square. These small plots are called the clip units. The procedure for formation of clip units will be explained later.

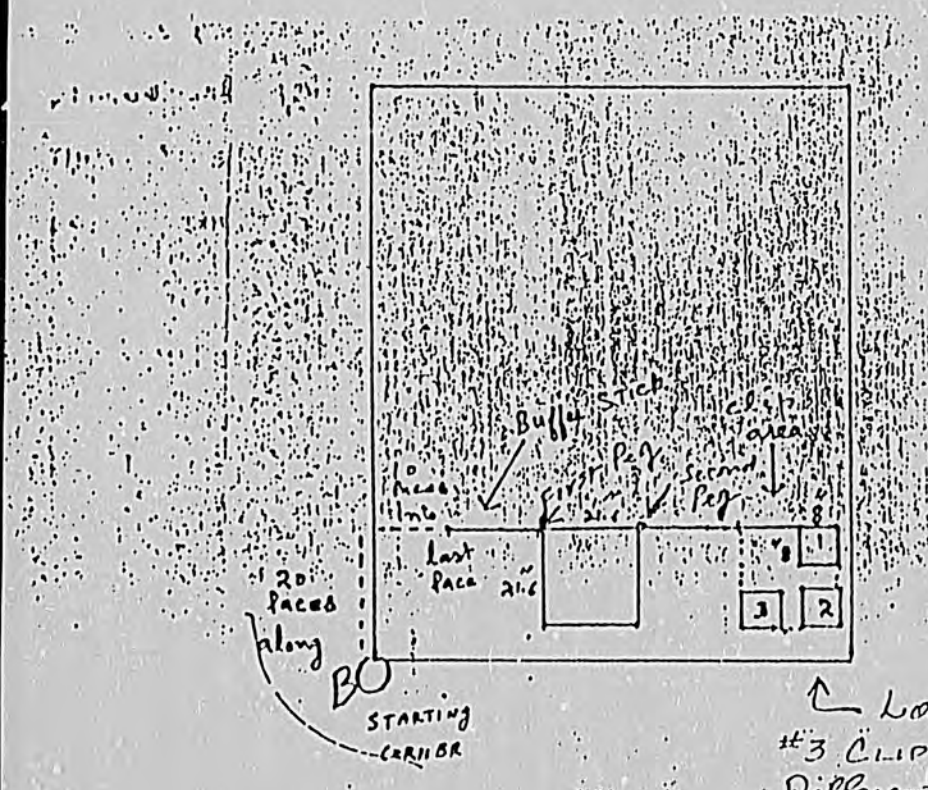


Fig: A

A Simple Wheat field with Parallel lines of Clips.

← LOCATION OF #3 CLIP Unit is Different in Broadcast Than in line sown Wheat.

Laying out a Wheat Plot in line sowing

Plot Size: 21.6" in length and three rows AND ROW Middles.

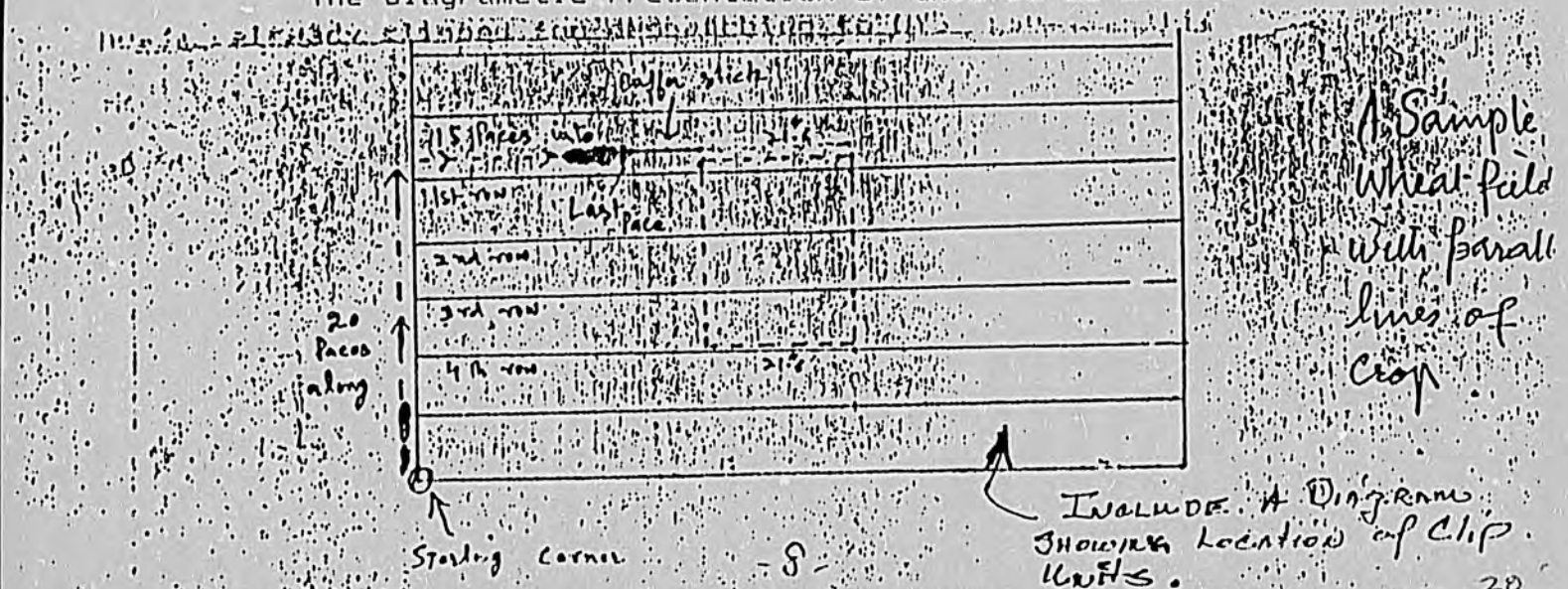
In line sowing you will have to count the no. of paces along and into the field as you do in the broadcast sowing but here the plot formation will be slightly different from the broadcast system. If the buffer stick lies away from the first row then bring it closer to the first row so that you may place the first & 2nd peg closer under the first row. Two possible ways for laying out the Wheat plot under this system are given below:-

Parallel Rows:

Where you place your last pace, lay down the buffer stick in such a way that it touches the toe of your shoe along the row, and then place the 1st peg at the end of the buffer stick. The 2nd peg will be placed at a distance of 21.6" from the 1st peg along the direction of the rows. The 3rd peg will be placed at the right side of the 2nd peg closer to the 4th row. The 4th peg will be placed at a distance of 21.6" from the 3rd peg in the reverse direction.

While placing the flagging ribbon around the 4 pegs, use the 21.6" sticks to verify that sides 2 and 3 are the proper length.

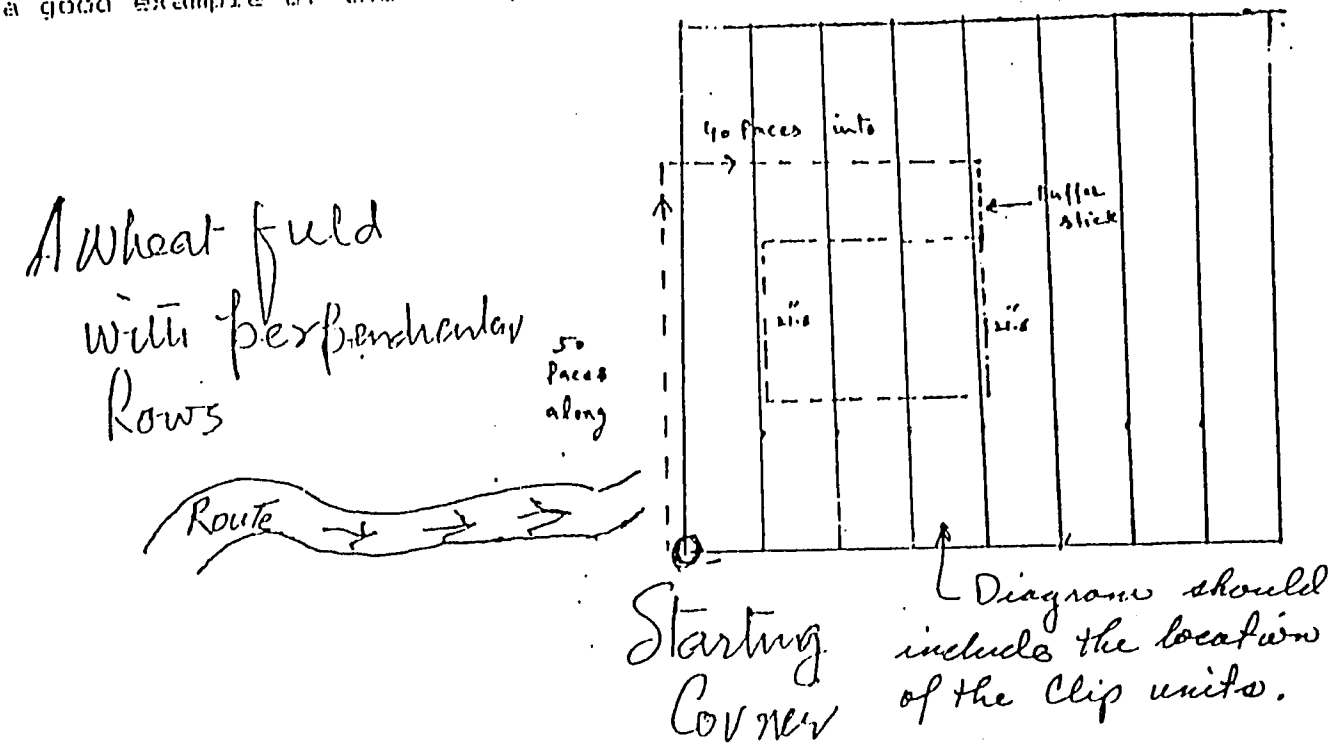
The diagrametic Presentation of this is as under:-



A Sample Wheat-field with parallel lines of crop

Perpendicular Rows:

The procedure for laying out the plot will be different if the rows are perpendicular from the starting corner of the sample field. In this case turn to your right side when you place your last pace into the field. After this, layout the plot according to the procedure already mentioned. The figure below is a good example of the said procedure.



What you have to do more in Wheat Plot.

After laying out the wheat plot in the sample field you have to do nothing within the plot till the maturity of the crop. When the crop is mature, clip the stalks of emerged heads 1/2 inch below the head. Please keep in mind that the heads lying on the ground detached from the plants will not be included in the heads already clipped for despatching to OYS Lab., Islamabad. However the number of detached heads will be entered against the question No. 5-C on the questionnaire.

POSSIBLE PROBLEMS AND THEIR SOLUTION IN LAYING OUT THE PLOT

Problems	Solution
1- If the number of paces are more than the total length --d width of the field.	In this case you will walk up to the end of the field and then walk backward and complete the paces.
2- If waste / un-cultivated area is found in the selected field.	If such area is found in the selected field look at the area recorded on the sticker to check if this waste/un-cultivated area has been excluded from the cropped area figures. If not carry out corrections. Now stop counting paces at the start of such area and resume counting from the other side.
3- If the plot or any portion of the plot falls out of the selected field.	In this case you will have to come back to your last pace. Here you will turn by making an angle of 90 degree in case of a broadcast field and 180 degree in a line sownfield and lay out the plot according to the procedure mentioned above.
4- If the first line of your plot is the last line of the field.	In this case you will consider the first line which is to your right side & the line to your left would be the second line.

See narrative for an alternative method.

5-	If the sample plot has been damaged completely or partially when you visit this sample plot in the next round.	If the sample plot has been completely danaged then no new plot will be made. However the clip unit will be made if this part is not damaged. If the sample plot fias been damaged partially then you will not abandon this sample plot but work in that portion of the plot which is un-damaged. Now you will report in the questionnaire about the sample plot having been partially damaged.
6-	If Wheat has been harvested from the sample plot	There is no need for making an alternate plot.
7-	If all or either of the pegs have been taken out.	If the first and third or second and fourth pegs are still at their proper places, then put the other pegs at their places according to the measurement. If the situation is otherwise, then make a new plot by adding 5 paces in to the paces already given on the sticker pasted on the face of the questionnaire.
8.	If the sample plot falls on such a place where wheat was sown but no crop has grown there.	Such a place will not be considered as barren land but there is no need to lay a plot and such plot will be considered zero but you will make the clip unit if their is crop in that area. Enter zeros and Explain with Notes.

PROCEDURE TO LAYOUT CLIP UNITS

The following points should be kept in mind before laying out the clip units.

i. At the most, three clip units against a sample plot can be made, at the start of March, April and May - before maturity of the crop.

ii. If wheat has been cut off or has been damaged in the clip area, and it is not possible to make the second clip unit at its original place, then make a clip unit in front of the third peg. If again the same position is there then make clip unit infront of the fourth peg.

iii. Usually clip units are made in front of the pegs on your right side. If its not possible, then make clip units on your left side against the sample plot.

a) Laying out the clip unit in Broadcast sowing.

size = 8 x 8 inches

Place the buffer stick in front of the second peg of sample plot, then put the stick of 21.6 " measurement in front of the second end of the buffer stick. At the end of the said stick put the first peg and put the second peg at a distance of 8" perpendicular to the first peg. Similarly the third and fourth pegs will be nail in. Be sure that the diagonal of the clip unit is 11.31". Use plastic ribbon to define the clip unit edges.

b) Laying of clip unit in Line sowing.

size = 8 inches in length and one row and row middles.

The method of laying out the clip unit in line sowing is slightly different from broadcast. Put the buffer stick in front of the second peg of the sample plot. Then put the other stick of 21.6" measurement against the far end of the buffer stick. At the end of measurement of 21.6" put the first peg along the first line of wheat. The second peg will be put at your right side near the second line perpendicular to the first peg. The third peg will be placed at a distance of 8 inches from the 2nd peg in the reverse direction. The fourth one will be put at the left side of the third peg and along the first line. Please tie the plastic ribbon while building the clip unit. You should also keep in mind that the first clip unit will be made on the first line, the second on the third line and the third one on the second line. The 3rd Clip area is located differently between broadcast and line sowing. 12

POSSIBLE PROBLEMS IN LAYING OUT THE CLIP UNITS AND THEIR SOLUTIONS.

	PROBLEMS.	SOLUTION
1)	If there is no head in the "Boot" or out of = "Boot" in the clip area.	Then write segment No. , ASF field No. and plot No. on the empty envelopes and also write the No. of heads as "zero" and return both the envelopes to Headquarter.
2)	If there are five or less than five heads in the clip unit.	In this situation cut all the heads and put them in the small envelop and write the number of heads on the envelop then cut all the "Boots" and put them in the medium envelops.
3)	If there is no plant in the clip unit.	Then write segment No. ASF Field No. Plot No. and No. of heads as "Zero" on the envelopes and send them back to headquarter.
4)	Should the pegs and tapes be taken out or not after completing the work in the clip unit.	When you have finished the work, take out the pegs and the tape and put them in your bag. These things will be used in the making of other plots.

CHAPTER-3

HOW TO FILL-IN THE QUESTIONNAIRE FOR OBJECTIVE YIELD PLOT

Sticker containing information regarding District, segment No., farmer No., ASF field No. and selected plot No. has been pasted on the questionnaire. Ask the farmer his name, father's name, address and record.

Note:- The following Q. Nos. 1, 2, 2-A and 3 may be filled-in only in first round.

Q.No. 1. Please verify the information given on the sticker such as total area of field, un-cultivated area, wheat area, regarding the selected field No.

If the information is correct then tick the box of "Yes" and if the information is incorrect then tick the box of "No" encircle the incorrect information and enter the correct information.

Q.No. 2. Ask the farmer that how much area of wheat will be cut for grain. Record the area only cut for grain and do not enter the area cut for fodder or otherwise.

Q.No.2-A. Here record the date when sowing of wheat was completed.

Q.No. 3. Record the farmer's expected date of harvesting.

Note:- The following Q.No. 3A and 3B may be filled-in in 2nd and subsequent rounds.

Q.No. 3-A - 3-B Expected date of harvesting recorded in Q.No.3 may also be filled-in in questionnaire to be used for 2nd round. On 2nd round Q.No.3-B, will be asked for verification if

the farmer gives a new date for harvesting then record this date in Q.No.3-B.

Note:- The date recorded in Q.No.3-A or 3-B may also be entered in the next round's questionnaire.

Q.No.4. This question itself is a feeding one in the questionnaire. Before filling-in the questionnaire please read the "Note" carefully and work accordingly.

Q.No.4-A - 4-B, In Q.No.4-A it has been inquired that whether the wheat is sown in lines. If the answer is yes then in Q.No.4-B enter the distance between lines in centimeters. The measurement of distance must be taken from to the middle of the plants.

Q.No.4-C To answer this question you have to tick only one box from among the (7) seven boxes given on the questionnaire. For assistance in determining the stage of maturity examin a few plants outside the plot by unrolling the skeath and do not damage any plants inside the plot.

Stages of maturity of wheat plant which have been mentioned in Q.No. 4-C have also been described in detail on pages 17/18 of this document.

Q.No.5, 5A, 5B These questions are regarding the counting of

heads. If the wheat is sown in lines count the heads of each line (and line middle), one by one and enter in the relevant box. In case of broadest sowing divide the plot in three parts with the help of floral sticks and then count.

Q.No.5-C, This question requires attention. Here you have to enter only the number of detached heads but do not send these detached heads to Lab. This question will be filled-in only in last round.

Care must be taken in making head counts to ensure that while counting the heads of each line the heads of its next line should also be included in the counting. For example first you make a count of heads present on 1st line and second you will include all the heads present in between 1st and 2nd line.

Q. No.6. Here sign your name and provide date of filling-in the questionnaire.

VARIOUS STAGES OF WHEAT PLANT

Pre-Flag

This is a general category in which you will record all units where tillers are only an inch or two high, up to units where stalks are large or mature enough to be in the "Flag or Early Boot" stage. The stalks do not indicate any swelling and do not have the definite flag leaf or other evidence of a partly developed head inside the leaf sheath.

Flag or Early Boot

Stalks are starting to joint and joints can be seen easily. The plant has four or five leaves and the "flag leaf" is identifiable and its collar is visible above the top foliage leaf. A partly developed head may be detected by noting that the stem has started swelling below the top foliage leaf (swelling at the widest point). This swelling may also be felt inside the sheath. Be careful not to damage the partly developed head by squeezing the stem sheath.

In most cases, the presence of heads enclosed in the leaf sheath could be verified by going outside the unit. Examine stalks that are similar in appearance to the doubtful ones before classifying the unit in the FLAG or EARLY BOOT stage. Clip a few stalks, unroll the leaf sheath and see whether or not there is a small, partially developed head encased in the sheath.

Late Boot or Flower (Heads Emerged), Includes Watery Kernels

The head has moved up the stem and swelling at the widest point has occurred above the base of the top foliage leaf. The sheath will be split and the head will be partially or wholly emerged. The flower stage occurs soon after the head emerges and small blooms or flowers begin to open at the middle of the head and blooming progresses towards each end of the head.

For our purpose, consider the unit to be in the late boot or flower stage from the time swelling at the widest point can be seen or felt above the base of the top foliage leaf until the head emerges and the watery clear liquid in the kernel has begun to turn milky.

Milk

Kernels formed in heads. Kernels of grain are soft, moist and milky. When the grain is squeezed, a milky liquid can be observed. The plant is still generally green. One or two of the lower leaves may be dead, but the blades of the three upper leaves and the head are green. Signs of ripening (yellow spots or strips) are visible only on the edges or tips of the leaves.

Soft Dough

The grains can be crushed between the finger and thumbnail; the contents of most of the GRAINS are SOFT and can be kneaded LIKE DOUGH with ONLY A FEW GRAINS PER HEAD containing any milky liquid. The plant has changed to a golden tint (except in the purple-strawed varieties which are a pinkish purple color); the stalk is smooth and shiny, tough and pliable. Only the upper-most leaves are swollen and green, the lower leaves being shrunken and brownish.

Hard Dough

The GRAINS READILY PART FROM THE HEAD and are likely to shake out of the glumes. The grain is FIRM and though it may be dented by pressure of the thumbnail, it is NOT EASILY CRUSHED. The characteristic color has become distinct. The yellow grains are paler, the red grains somewhat darker and flinty or mealy in character. The leaves are dry and shrunken. Wheat in this category may be swathed in some areas.

Ripe

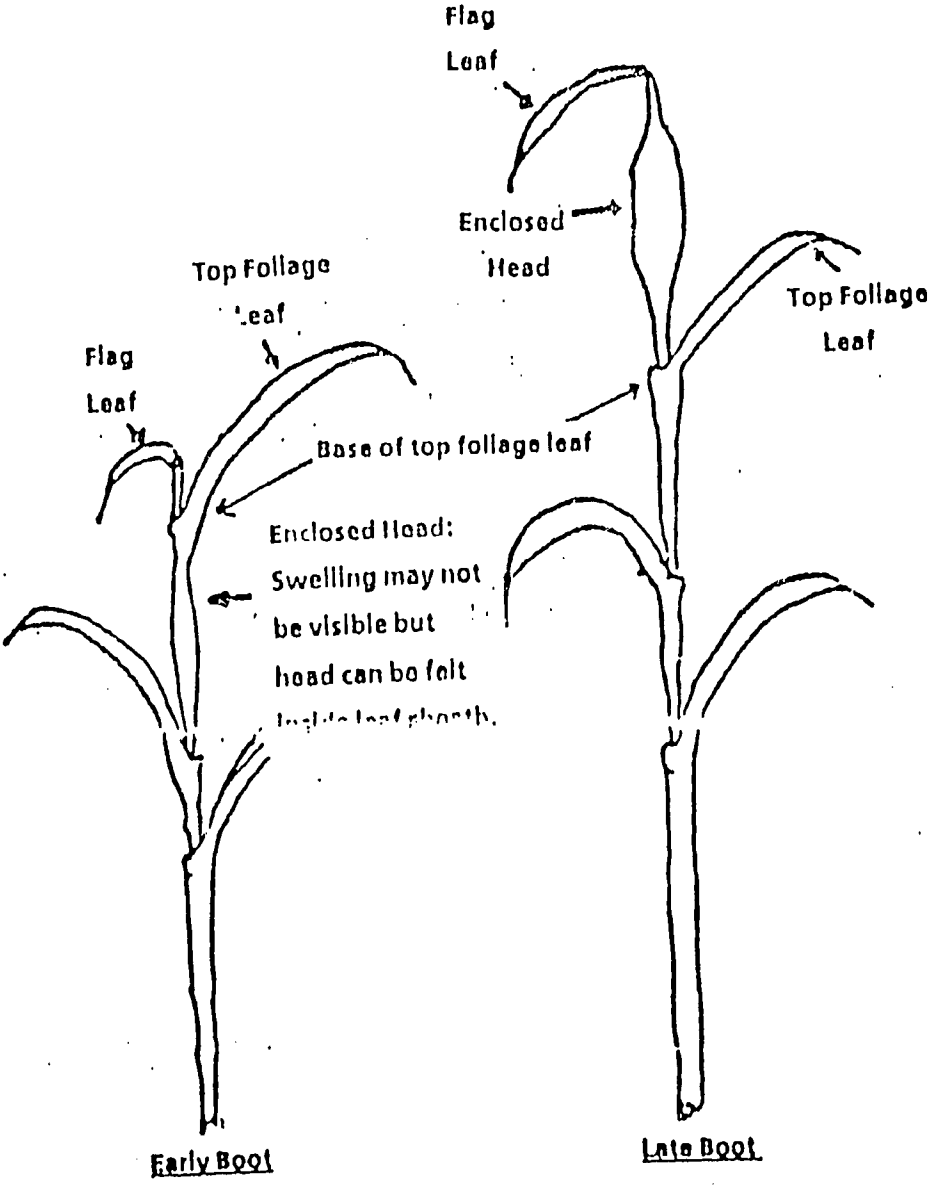
Straw is full and brittle at this stage; the GRAIN is HARD and BREAKS IN FRAGMENTS when crushed. Harvest may be expected at this time.

Blank

This maturity code is used for fields with blank areas where the sample falls. There will be no plants in the sample unit.

STAGE OF MATURITY

CLASSIFYING HEADS IN "EARLY BOOT" AND "LATE BOOT" STAGES OF MATURITY.



CHAPTER IV

DISPATCH OF OBJECTIVE YIELD SAMPLES TO ISLAMABAD

After completing the work on sample plot, you will send the wheat samples to ADC Cell Islamabad for laboratory Processing. But before despatching the samples to Islamabad it is important that you review your work for each sample. Be sure that all required information have been entered.

Before mailing the samples to Islamabad, please ensure that each envelop containing the sample has complete information about that sample on it. You will send the information / samples at the address given below.

The Director ADC,
Federal Bureau Of Statistics
5-Blue Area, F-6/4,
ISLAMABAD

Phone: 828203

GOVERNMENT OF PAKISTAN
STATISTICS DIVISION
FEDERAL BUREAU OF STATISTICS
ISLAMABAD

QUESTIONNAIRE FOR OBJECTIVE YIELD MEASUREMENT OF WHEAT CROP 1990-91

MARCH-APRIL-MAY - LAST ROUND
(Encircle the name of month Last round in which survey is being conducted)

FOR OFFICE USE
100

Farmer's Name .....

Father's Name .....

Caste .....

Address .....

STICKER

Note;- (Answer to Question No. 1, 2, 2A and 3 may be filled in the first round only).

Q-1 The information on the sticker has been taken from the January 1991 Crop Acreage Survey. Is this information correct? Please tick the relevant box (If the information on the sticker is not correct encircle it and provide the correct information outside the circle).

Yes	No

Q-2 From the area planted for wheat how much will be harvested for grains

200

↑ Need valid units for entry noted.

Q-2-A When this field of wheat was sown

Day-Month-Year	For Office Use 202

Q-3. Please provide the expected date of harvesting this field

Day-Month-Year	For Office Use 300

Question No.3-A & 3-B will be asked only in the 2nd and subsequent rounds

Q-3-A The farmer had told harvesting date as...../...../..... in the last round. Is this date still farmer's expected date of harvesting?

Day-Month-year	For Office Use 302

Yes	No

Note:- If the answer is yes, then go to Question No.4, otherwise fill-in Question No.3-B.

Q-3-B. If the answer to Q.No.3-A is No, then what is the revised expected date of harvesting now.

Day-Month-year	For Office Use 304

Procedure for Laying out the sample plot for Objective Yield Measurement.

Plot Size: 21.6 x 21.6 inches (In Broadcast Sowing)
Length 21.6", width three lines (In Line Sowing)

Note: Please walk paces along and into the field as given on the sticker and then make the plot according to the instructions.

Q-4. Write the relevant code No.

a) The plot was layed out in the first round Code 1.
b) It had to be layed out in the next round Code 2.
c) It is the same plot which was layed out, previously. Code 3.

Note :
1) If the answer is code No. 1. Go to Q.No.4-A.
2) If the answer is code No.2 make a new plot by adding 5 paces in the paces recorded on the sticker and go to Q.No. 4-A.
3) If the answer is code No. 3 go to Q.No.4-C.

Q-4-A Whether the wheat is cultivated in lines.

Yes	No

Note: If the answer is No, go to Q.No.4-C, otherwise to Q.No.4-B.

Q-4-B. If wheat is cultivated in lines in the plot, then record:

	In Centimeters
i) Distance between first and second line	400
ii) Distance between first and fourth line	402

Q.NO.4-C. Different satges of the growth of the plant have been given below. Tick the relevant one which represents majority of the plants in the field.

Flag or early Boot	Late Boot	Milk	Soft Dough	Hard Dough	Wheat Mat-ured	No wheat (empty plot)
1	2	3	4	5	6	7

		First Row or first Part	Second Row or Second Part	Third Row or Third part	Total
Q. 5	No of heads still in the sheath or Bud present				500
Q. 5-A.	No. of heads emerged out				502
Q. 5-B.	No. of stalks in the plot				513
Q. 5-C.	No. of detached heads **				504

Question No 5-C may be answered only in the last round . In case of broadcast sowing divide the plot into 3 parts and count the heads.

6. date of filling in the Questionnaire.

Note: Review the questionnaire to ensure that all questions have been answered completely.
If this is the first visit /Round record the expected harvesting date in the Q.No. 3 and aslo in Q.No.3-A of the next month Questionnaire.
If this is second or third visit record the expected harvesting date in (Q.NO. 3-A or 3-B) of the next month questionnaire.

ATTACHMENT - D

MANUAL OF INSTRUCTIONS

OF

OBJECTIVE YIELD SURVEY OF COTTON CROP

AGRICULTURAL DATA COLLECTION PROJECT

FEDERAL BUREAU OF STATISTICS

GOVERNMENT OF PAKISTAN

ISLAMABAD

CONTENTS

4A

BRIEF INTRODUCTION :-

The importance of agricultural statistics in the economic development of an agro - based country like pakistan cannot be exaggerated. The US aided Project titled "Agricultural Data Collection" is being implemented to improve the existing system of generating crop acreage, yield and other agricultural statistics in the country. The project is being implemented in collaboration with the provincial departments of agriculture as a part of the US funded Agricultural Sector Support Programme.

OBJECTIVE YIELD MEASUREMENT FOR COTTON

This survey is conducted for the objective yield measurement of cotton on the basis of the July- August acreage survey. The sample fields are selected randomly from the cotton fields enumerated during the July-August (kharif crops) Acreage survey.

For laying out sample crop cutting plot a sticker pasted on the face of the objective yield survey questionnaire provides information such as name and code of the districts, farmer no. ASF field no. sample no. cropped area of the field etc. which was collected through the January crop acreage survey.

OBJECTIVES OF THE SURVEY.

1. To estimate the total production and crop yield per hectre.
2. To examine the effectiveness of ASF technology.

ENUMERATOR'S KIT

The article which are used in the wheat objective yield survey are listed below. These will be supplied to you before the start of survey. Please keep in mind that you are respobsilble proper use and care of all these items. If any of the items is lost, please bring it in the notice of yoyr supervisor.

i) Plastic Ribbon Colored

ii) Hammer

iii) Scissors

iv) Measuring Tape

v) Wooden Pegs

vi) Paper Envelopes

vii) Cloth Bags

viii) Wooden stick one meter in length (for buffer zone).

CHAPTER II

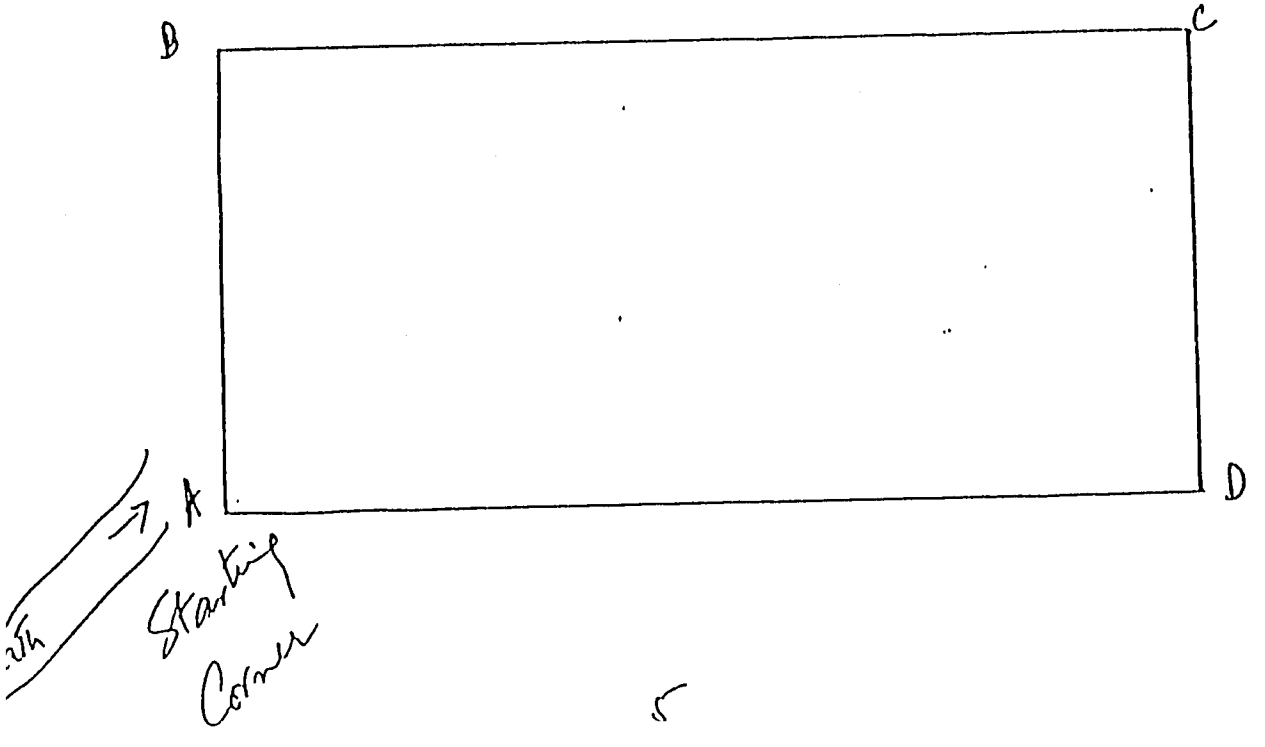
DIFFERENT STEPS FOR LAYING OUT THE SAMPLE PLOT

i) Locating the Selected Field:-

As sample fields are selected on the basis of July-August survey, it is expected that you are well aware about the location of this sample field. However, before proceeding study your topomap and photo enlargement / overlay. After looking over the topomaps & photo enlargements / overlay you can get an idea of where your designated field is located.

ii) Selection of the Starting Corner of ASF Field

When you have identified the sample field no., then you have to determine the basic corner / starting corner of the field from which you have to proceed on. The starting corner will be that which is nearer to you as compared the other corners of this sample field. The diagramatic presentation of this is as under;



iii) Laying out of the Selected Plot:-

The required information such as segment no., grower no., field no., total area of the field, crop area, no. of paces along and into the field etc. are indicated on the sticker pasted on top left corner of each questionnaire.

There are two ways of cultivation of Cotton crop in our country. These two methods are;

i) Broadcast sowing

ii) Line Sowing

The procedure for laying out the plot for each method is different from one another.

Laying out a Cotton plot under Broadcast Sowing.

Plot Size = Three meters in length & one meter in width.

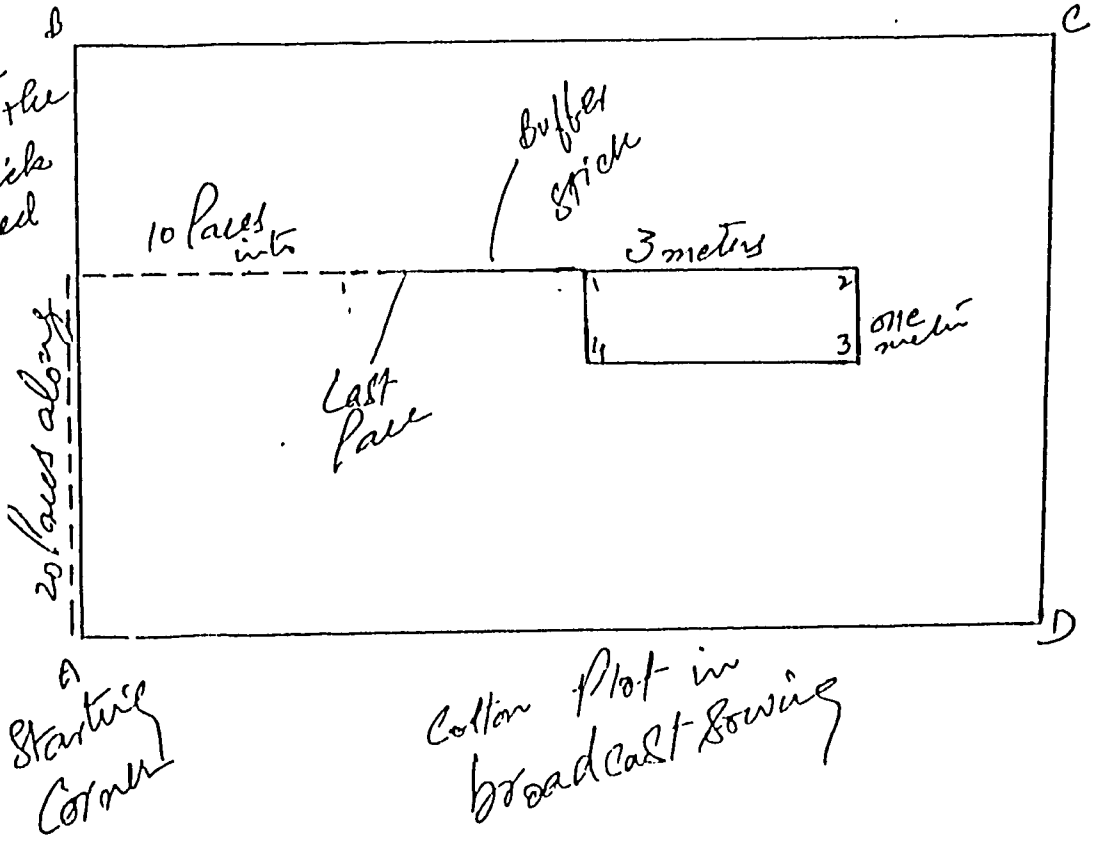
Please keep in mind that the plot will always be constructed on your right side, when you walk into the field. Before entering into the sample field, please look at the shape of this field. It is important because you have to walk along the field edge to its long side and into the field to the width of the field. However if the field is in square shape either side can be taken.

For laying out the plot you will have to walk about the given paces on the sticker along the field edge, then walk the required no. of paces into the field. After you count the last pace, lay down the bufferstick so that it touches the toe of your

SV

shoe. Then at the end of the buffer stick you will place a peg. This will be the first peg of the plot, now working from out side the plot anchor the zero end of the measuring tape in the first peg. The zero end of the tape must be anchored firmly and close to the ground so it will not move when you make measurement, place another peg three meters from the first peg in the straight way. This will be your 2nd peg. After this, place the third peg at a distance of one meter from the second peg to the right side of the and at a diagonal distance of 3.16 meters from peg 1. second peg. Then put the fourth peg, which will be at a one meter to the right of the first peg distance of ~~three meters from the third peg in reverse direction~~ and ~~exactly one meter from the first peg~~ at a diagonal from peg 2 of 3.16 meters. The next step is to tie a coloured plastic ribbon around the pegs. Please keep in mind that ribbon will always be tied out side the pegs, so that you may easily determine the inclusion or exclusion of plants in the plot.

To assure the square unit, the tape and stick should be used in unison.



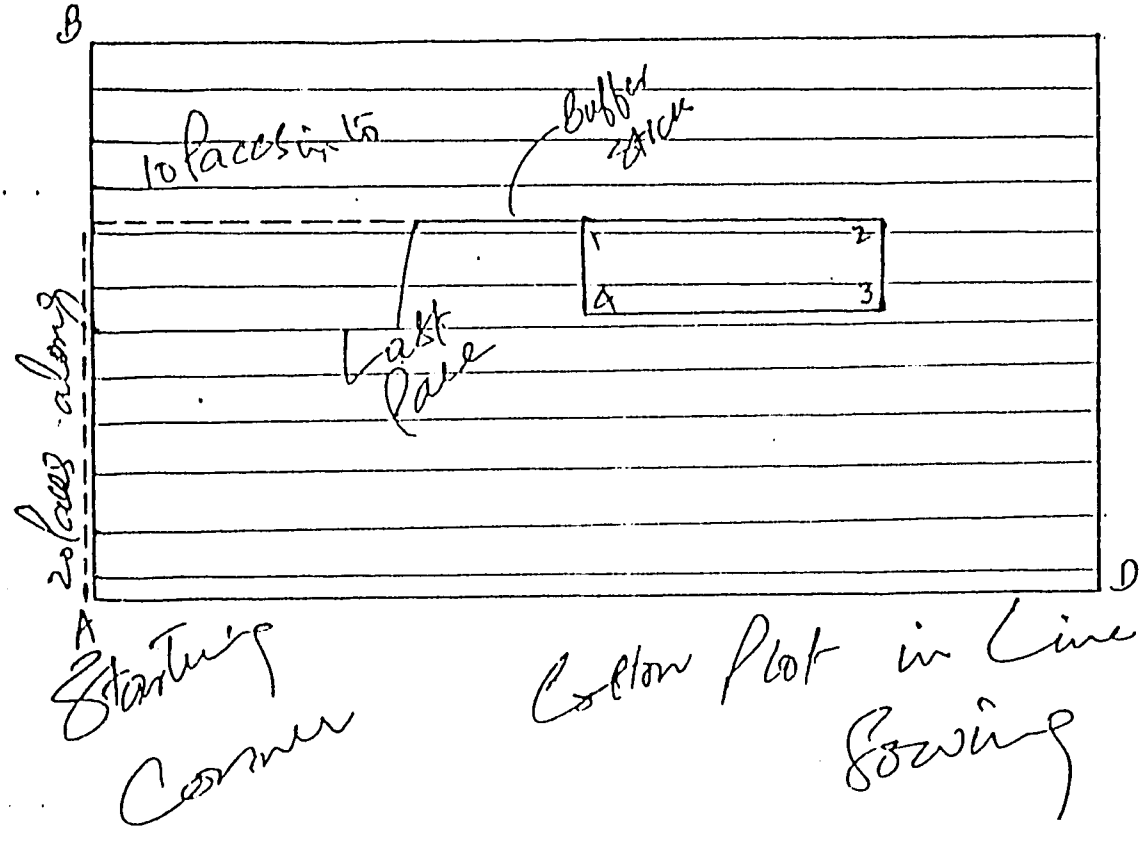
53

Laying out a Cotton plot in Line Sowing:-

Plot Size = Three meters in length and two rows and row-middles

In case of line sowing you will have to walk upto the given paces against the lines of cotton and then walk given paces into the field along the rows. Where you end your last pace, lay down the buffer stick so that it touches the toe of your shoe along the row, and then place the first peg at the end of buffer stick. The second peg will be placed at a distance of three meter from the first peg along the direction of the rows. Insert the buffer sticks perpendicular to the lines at the first peg The third peg will be placed at the right side of the first peg ~~just across the second~~ as close to the center of the third as possible. line. The fourth peg will be placed at a distance of three meter from the third peg ~~in the reverse direction~~. along the direction of the lines.

Note: In both line sowing & broad cast any difference in distance between the pegs may be corrected by adjusting the pegs without touching the first peg.



POSSIBLE PROBLEMS AND THEIR SOLUTION IN LAYING OUT THE PLOT

Problems	Solution
1- If number of paces are more than the total length and width of the field.	In this case you will walk up to the end of the field and then walk backward and complete the paces.
2- If waste non-cultivated area is found in the selected field.	If such area is found in the selected fields then check the area given on the sticker that whether such area has been excluded from the crop area. If not then report it. Now stop counting paces at the start of such area and resume counting at the other side.
3- If the plot falls in such area where there is no crop although it was sown.	You will have to layout the plot where it falls. whether there is any crop or not in this area. You can not change the place of the plot.
4- If plot or any portion of the plot falls out of the selected field.	In this case you will have to come to your last pace. Here you will turn to your right side by making an angle of 180 degree and lay out the plot according to the procedure mentioned above.
5- If the first line of your plot is the last line of the field.	In this case you will consider the first line, which is to your right side & the line to your left side would be the second line.

This problem should be solved like suggested in the wheat manual.

Problems & Answers/Solutions
Continue on next page

Problems & Solutions [illegible] Page 4 Taken from Bob's Recomm. [illegible]

6- When part of a cotton stalk is broken and it has large green bolls on it, should the bolls be counted and left on the stalk or should they be picked and discarded from the unit?

Answer: If the stalk is broken by the enumerator, the bolls should be counted as burrs (harvested cotton) and discarded from the unit. The logic is that stalks in other fields would not normally be broken by enumerators and the bolls on them would produce cotton. Therefore, the bolls on unintentionally broken stalks should be counted as cotton producers. If the stalks are broken by something other than the enumerator, the bolls should not be counted but should be picked and discarded from the unit. The logic is that there will also be some similar broken stalks in other places in the field that will produce no cotton and the sample plot will be representative of those.

7- What about cotton bolls that are opened but have one or two locks that are not open because they are diseased, etc. Should these bolls be counted as open? In other word, what is an open boll?

Answer: An open boll is defined as a mature boll with at least one lock opened sufficiently to be harvested either by hand or machine. If an open boll has a missing lock or locks as a result of insect or disease damage, it is still considered an open boll and the remaining good locks must be picked as part of the first 10 open bolls.

8- Should dried-up, partially opened bolls on the ground be discarded from the unit? How should their counts be handled?

Answer: All damaged bolls from which no cotton will be harvested should be clipped and discarded from the unit. This includes all damaged open, partially opened and large unopened bolls.

9- How about green bolls on the ground? Should they be counted? They may have been knocked-off by the enumerator or they may have fallen off on their own.

Answer: Pick up and discard away from the unit all large unopened and partially opened bolls which are on the ground within the unit. If bolls (green or otherwise) are knocked to the ground by the enumerator while working in the unit, they should be counted as burrs (because they would normally produce cotton) and then discarded from the unit.

10- When is a boll fully emerged? How can you tell?

Answer: To be determined.

See comments!

I understand that Bob has made some findings for a fully opened boll, partially opened/green, large/small bolls. We plan to show the same with the help of slides at Training School and also to incorporate the same in current-year Manual.

10. What is a skell? [illegible] See comments!

CHAPTER - III

INSTRUCTIONS FOR FILLING OF THE QUESTIONNAIRES REGARDING OBJECTIVE YIELD MEASUREMENT OF COTTON

NOTE

i) The enumerators should complete their Objective Yield Survey of cotton during the first 10 days of every month.

ii) If the farmer is going to have a final picking then the enumerator should complete the survey one or two days before the final picking.

Q No.1 The information recorded in the sticker are based on the July - August acreage survey. Is it correct ?

The objective of this question is to verify/review the information recorded during July - August acreage survey. If there is any error in this information, then encircle that one and record the correct one. This question will be asked in the Ist visit only.

Q No.2 From the area sown for cotton , how much will be used for picking.

This question will also be asked during the first visit only.

Q.NO.3 Expected date of final picking

The enumeratior should ask the expected date of final picking from the farmer and to confirm this date, visit this field one or two days before this date of final picking . If the farmer confirms this date then he should make final picking of this plot on that date

i) The final date as recorded in the first round questionnaire be written against Q.No.3- B of the second round questionaire.

ii) The date as told in second round be written against Q.No.3-B of third round quetionaire.

Q.NO.4-A Unit Location Code

Three code have been alloted for answering this question. Please record the relevant code in the box.

- First visit to lay out plot Code 1
- Plot relocated this month Code 2
- Same plot laid out previously Code 3

NOTE i) If the answer is code one or two, then go to Q.4-B.

ii) If the answer of question No 4-B is "yes" then go to Q.No.4-C

iii) If the answer of Q.4-A is code 3 then go to Q.no.5

Q.NO.5-A Number of clipped open bolls to be sent to the lab (10 or less)

The enumerators will make visits in the first 10 days of every month to their sample plots and pick up the 10 open bolls from each sample plot and send the same to Islamabad. The no. of open bolls should not be more than 10. The same no. should be recorded against question 5-A. The detail of clipping 10 bolls is as under;

Clip up 5 bolls starting from top towards the bottom of the plant nearer to the first peg in broad cast sowing and Ist plant of the Ist row in line sowing. Then clip other 5 bolls from the next plant starting from bottom to top. The cotton clipped from these bolls be sent to Islamabad for further processing in the envelopes containig segment no.,Sample no.,No. of bolls clipped,and name of the distt.

Q.NO.5-B The No. of remaining open bolls in the sample plot. If there are more than 10 open bolls present in the sample plot, then clip these alongwith shells, count them and record the no. of same against Q.No. 5-B.

NOTE

i) The no. of clipped bolls as recorded against Q 5-A, be not counted in the no. of bolls recorded against Q-5B.

ii) If no. of clipped bolls as recorded against Q 5-A is less than 10, then no.of bolls recoeded against 5-B will be zero. The cotton picked up from the bolls as recorded against 5-B will be handed over to the farmer and the shells be thrown away the plot. Moreover clip all the damaged or dried up bolls from which no cotton will be picked from the plants and discard them away

from the plot. from Cotton

Q 5-C The No. of shells which have been picked before the visit of enumerator.

If the farmer has picked up the cotton before the enumerator's visit, then the enumerator will clip all the shells present on the plant and falling on the ground and then throw them away after counting the same. The total no. of these shells be written against Q 5-C.

Q 5-D The no. of bolls which can be passed through the ring are the small bolls and will be recorded against Q 5-D.

Q 5-E The no.of bolls which can not be passed through the ring are called large bolls and be recorded against Q No.6-E.

Q 6 The visit for Objective Yield Measurement of cotton will be made during the first 10 days of every month and the date, when the work is performed be recorded against Q.NO.6.

CHAPTER IV

After completing the work on sample plot, you will have to send your cotton samples to ADC cell Islamabad for laboratory Processing. But before dispatching the samples to Islamabad, it is important that you review your work for each sample. Be sure that all required informations have been entered. Please note that all filledin questionnaires & samples be despatched on the same day when the work is done. Before mailing the samples to Islamabad, please be sure that each envelop containing the sample has complete information about that sample. You will send the information for each sample at the address given below.

To,

The Director ADC,
Federal Bureau Of Statistics
5-Blue Area, F-6/4,
ISLAMABAD

GOVERNMENT OF PAKISTAN
FEDERAL BUREAU OF STATISTICS
AGRICULTURAL DATA COLLECTION CELL
ISLAMABAD

QUESTIONNAIRE FOR OBJECTIVE YIELD MEASUREMENT OF COTTON CROP (KHARIF 1990)

October, November, December, January, February, Final.
(encircle the Survey month)

For office use
100

NAME OF FARMER _____

CASTE _____

FATHER'S NAME _____

ADDRESS _____

S T I C K E R

Q.No.1.2.3A will be completed in 1st visit only and Q.No.3 will be filledin in each visit.

---

1. The information on the sticker has been taken from the July-August (Summer Crops) acreage survey 1990. Is this information correct? Please tick the relevant box.

   (If this information is not correct and answer is "NO" then encircle the incorrect information and record the correct information)

Yes	No

2. From the area sowh for cotton, how much area will be used for cotton picking.

   (Record all areas in Kanal & Marlas for Punjab and in aeres and ghuntas for Sindh Province).

200 -

3. Expected harvest date of next picking

Day - Month - Year	For office use
- -	301

3.A. Expected date of Final Picking

Day - Month - Year: - -

For office use: 300

(Q.No.3B & 3C should only be completed in during the second and following visits)

3-B During the last visit the expected date of final visit reported by the farmer was

Day - Month - Year: - -

For office use: 302

Please confirm, is it the same.

Yes | No

3.C. If the answer to question 3B is "No" what is the expected date of filan picking?

Day - Month - Year: - -

For office use: 304

TO LAYOUT A PLOT FOR OBJECTIVE YIELD MEASUREMENT OF COTTON.

PLOT SIZE.

LINE SOWING = Length 3 meters width two lines

BROAD CAST = Length 3 meters wideh one meter.

NOTE:- Walk along the length of the field and into the field according to the No. of paces given on the sticker.

4-A. UNIT LOCATION CODE

Determine and assign the unit location status:

First visit to layout plot	Code 1
Plot relocated this month	Code 2
Same plot laid out previously	Code 3

406

Go to Q.No.5 ehrn vofr 3, otherwise go to Q.No.4-B

4-B Is the cotton sown in lines? Yes | No

If answer is No, Go to Q.No.5, Else go to Q.No.5C.

4-C. If the cotton is shown in lines:

i) Distance between 1st and 2nd line in centimeters. 400

ii) Distance between 1st and 4th line in centimeters. 402

TO COUNT NUMBER OF BOLLS IN THE PLOT

5-A Number of opened bolls clipped for despatching to Lab.(10 or less) 500

5-B Clip other open bolls (if any) 506

(If number of open bolls against Q.5A are less than 10 then record zero against 5-B)

5-C. If cotton is already picked before the enumerator's visit, then number of shells. 508

5-D. No. of small unopened bolls which can be Passed through the ring. 510

5-E. No. of large un-opened bolls which can not be passed through the ring. 512

5-F Number of cotton plants.

1st line/1st Part	2nd line/2nd Part

514

NOTE:- In case of broad cast planting, devide the plot into two parts and obtain the count.

6. Date of picking

Day - Month - Year	For office use
- -	600

NOTE:- i) Review the questionnaire to ensure all questions are completed.

ii) If this is the 1st visit, record the expected date of final picking (3-A) in next month's questionnaire 3-B)

iii) If this is the 2nd or later visit, record the expected date of final picking (3B or 3C) in next month's question 3B.

iv) Please note that perhaps you may have to visit this field for final picking before the start of next round. In this case final picking will be made one or two days prior/earlier to the date told by the farmer.

Name of Enumerator _____ Signature _____ Date _____

ATTACHMENT - E

MANUAL OF INSTRUCTIONS

FOR ENUMERATORS

ON

OBJECTIVE YIELD SURVEY OF

RICE CROP

AGRICULTURAL DATA COLLECTION PROJECT
FEDERAL BUREAU OF STATISTICS
MINISTRY OF FINANCE & ECONOMIC AFFAIRES
GOVERNMENT OF PAKISTAN
ISLAMABAD

CONTENTS

BRIEF INTRODUCTION :

The importance of agricultural statistics in the economic development of an agro - based country like pakistan cannot be exaggerated. The US aided Project titled "Agricultural - Data Collection" is being implemented to improve the existing system of generating crop acreage, yield and other agricultural statistics in the country. The project is being implemented in collaboration with the provincial departments of agriculture as a part of the US funded Agricultural Sector Support Programme.

The survey for the objective yield measurement of rice is conducted on the basis of the July (summer crops) acreage survey. For laying out the sample crop cutting plot a sticker pasted on face of the objective yield survey questionnaire provides information such as name and code of the district, farmer number, ASF field number, sample no., cropped area of the field etc. which was collected through the July crop acreage survey.

OBJECTIVES OF THE SURVEY:

1. To provide counts and measurements for estimating yield per acre / hectre of rice.
2. To examine the effectiveness of this newly introduced ASF technology.

ENUMERATOR'S KIT:

The articles which are used in the ~~wheat~~ Rice objective yield survey are listed below. These will be supplied to you before the start of survey. Please keep in mind that you are responsible for proper use and care of all these items. If any of the items is lost, please bring it in the notice of your supervisor.

i) Plastic Ribbon Colored

ii) Hammer

iii) Scissors

iv) Measuring Tape

v) Wooden Pegs

vi) Paper Envelopes

vii) Cloth Bags

viii) A long stick (sarkanda) having signs with green tape for 21.6" size for measurement of sides of the sample plot. Another about one meter long stick for measuring 30.55 long diagonal of the plot with red tape on it. The taller stick is also used as buffer stick

CHAPTER II

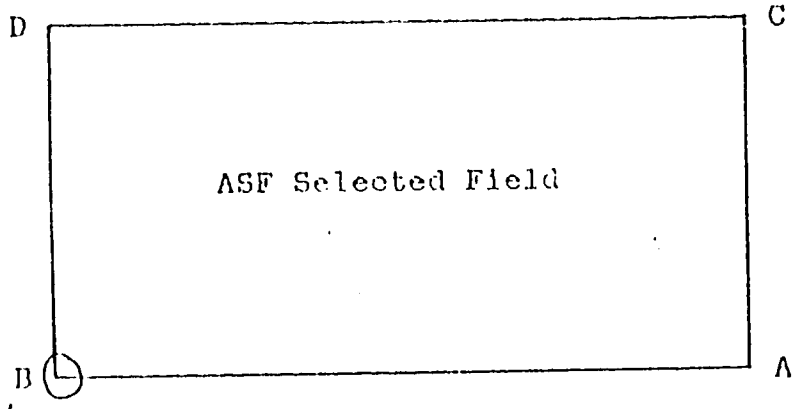
PROCEDURE FOR LAYING OUT THE SAMPLE PLOT

i) Locating the Selected Field:-

As sample fields are selected on the basis of July (summer crops) acreage survey, you are expected to know the location of this sample field. However, before proceeding, study your topo maps and photo enlargements / overlays. Looking at the topomaps & photo enlargements / overlays you can get an idea of where your designated field is located.

ii) Selection of the Starting Corner of ASF Field

Having identified the sample field you have to determine the basic / starting corner of the field from which you have to start work. The starting corner will be that which is nearer to you as compared to the other corners of this sample field. The diagramatic presentation of this is as under;



Basic / starting Corner. → Route →

iii) Laying out the sample plot.

The required information such as segment no., grower no., field no., total area of the field, crop area, no. of paces along and into the field etc. are provided on the sticker pasted on top right corner of each questionnaire.

There are two ways for sowing rice crop in our country. These are;

i) Broadcast Sowing
ii) Line Sowing

The procedure for laying out the plot for each type is different from the other.

Laying out a rice plot in Broadcast Sowing.

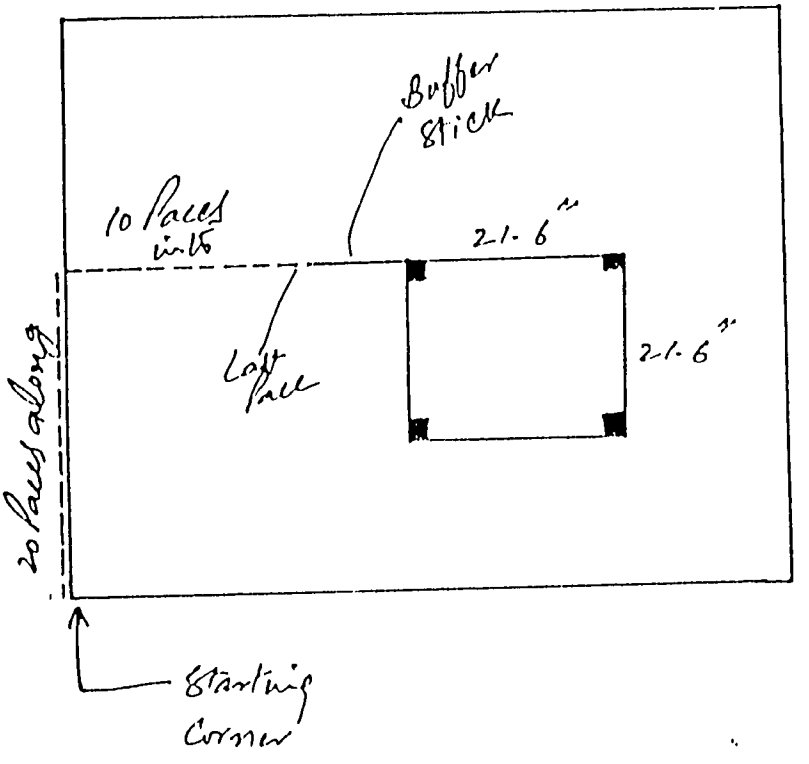
Plot Size = 21.6 X 21.6 Inches.

Please keep in mind that the plot will always be layed out on your right side when you walk into the field. Before entering into the sample field, please look at the shape of this field. It is important because you have to walk along the field edge to its long side, and into the field to the width of the field. However if the field is in square shape either side can be taken.

After you have taken the last of the required paces, place the buffer stick down pointing straight ahead touching ~~your~~ the ~~toe of your shoe right foot too~~. Place a peg at the end of the buffer stick and tie the plastic ribbon with this peg. This will be the first peg of the Plot. (Working from outside the unit,) ~~Then~~ place another peg at a distance of 21.6" from the 1st Peg using the

(using both sticks together)

stick with plot size marked on it. After this, place the 3rd peg at a distance of 21.6" from the 2nd peg to the right side of 2nd peg measureing the diagonal between 1st and 3rd peg. The distance of this diagonal must be equal to 30.55". Then place the 4th peg, which will be at a ~~distance of 21.6~~ diagonal of 30.55" from the ~~3rd~~ 2nd peg and exactly 21.6" from the 1st peg. Keep on extending the coloured plastic ribbon around the pegs. Please keep in mind that ribbon will always be tied outside the pegs, so that you may easily determine the exclusion or inclusion of plants/stalks in the plot. Hereunder is provided the diagamtic presentation of a sample rice plot in a broadcasted field.



A rice field in Broadcast sowing

Laying out a Rice Plot in line sowing

and 3 row middles.

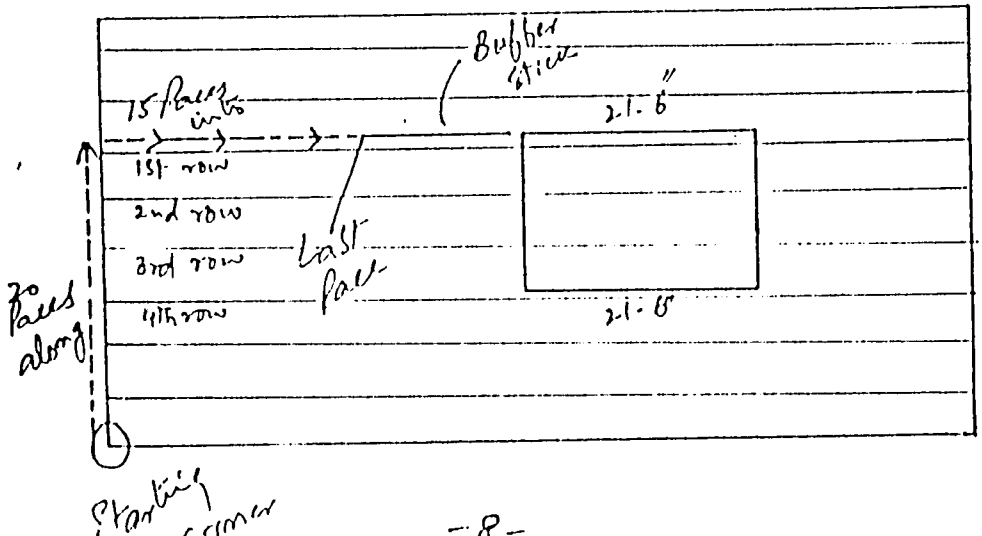
Plot Size: 21.6" in length and three rows.

In line sowing you will have to count the no. of paces along and into the field as you do in the broadcast sowing but here the plot formation will be slightly different from the broadcast system. If the buffer stick lies away from the first row then bring it closer to the first row so that you may place the first & 2nd peg closer under the first row. Two possible ways for laying out the rice plot under this system are given below:-

Parallel Rows:

Where you place your last pace, lay down the buffer stick in such a way that it touches the toe of your shoe along the row, and then place the 1st peg at the end of the buffer stick. The 2nd peg will be placed at a distance of 21.6" from the 1st peg along the direction of the rows. The 3rd peg will be placed at the right side of the 2nd peg closer to the 4th row. The 4th peg will be placed at a distance of 21.6" from the 3rd peg in the reverse direction. While placing the plastic ribbon around the 4 pegs, use the 21.6" sticks to verify that line 2 and 3 are the proper length.

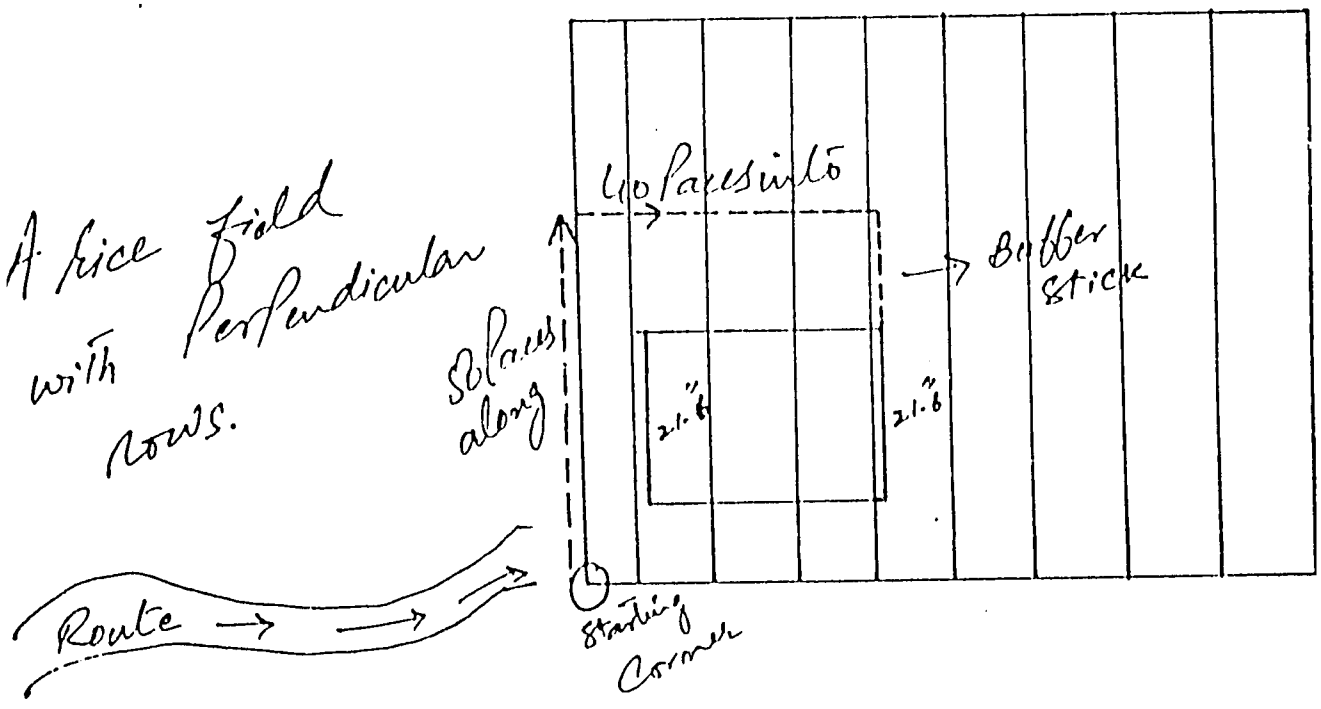
The diagrametic Presentation of this is as under:-



A sample rice plot with parallel lined crop.

Perpendicular Rows:

The procedure for laying out the plot will be different if the rows are perpendicular from the starting corner of the sample field. In this case turn to your right side when you place your last pace into the field. After this, layout the plot according to the procedure already mentioned. The figure below is a good example of the said procedure.



What you have to do more in Rice Plot.

The rice crop cutting plot will be layed out at the time of harvestings. After laying out the rice plot in the sample field you will clip the stalks of emerged heads 1/2 inch below the head. Please keep in mind that the heads lying on the ground detached from the plants will not be included in the heads already clipped for despatching to OYS Lab., Islamabad. However the number of detached heads will be entered against the question No. 5-B on the questionnaire.

POSSIBLE PROBLEMS AND THEIR SOLUTION IN LAYING OUT THE PLOT

Problems	Solution
1- If the number of paces are more than the total length and width of the field. --	In this case you will walk up to the end of the field and then walk backward and complete the paces.
2- If waste/un-cultivated area is found in the selected field.	If such area is found in the selected field look at the area recorded on the sticker to check if this waste/uncultivated area has been excluded from the total field area If not, carry out the correction. Now stop counting paces at the start of such area and resume counting from the other side.
3- If the plot or any portion of the plot falls out of the selected field.	In this case you will have to come back to your last pace. Here you will turn to your right side by making an angle of 90 degree in a broadcast field or 180 degree in a line sown field. If in a broadcast field again there is no space for laying out a plot on the right keep on turning to the right until you can make a sample plot and lay out the plot according to the procedure mentioned above.
4- What will you do, if you find a crop other than rice in your selected field.	In this situation you will count paces where rice is sown, the area sown under any other crop will be left unwalked.

Ck the wheat manual for a suggested alternative.

5- If the plot falls in such area where there is no crop although rice was planted in this field

You will have to layout the plot where it falls. whether there is any crop or not in this area. You can not change the place of the plot.

6- If the first line of your plot is the last line of the field

Ck wheat manual for suggested alternative.

In this case you will consider the first line which is to your right side & the line to your left would be the second line.

7- During lay-out of the post harvest rice plot, what should the enumerator do when it falls in a place where piles of rice ~~have been~~ were placed awaiting threshing and there is a lot of grain on the grould?

The Post harvest units should not be laid out until the harvest has been completed.

The enumerator should lay-out the plot exactly where it falls. In this case, the OY sample plot will represent large amounts of grain left on the ground in other fields not in the sample, which is a part of normal harvest lost.

Reliability & Post-Harvest-Survey

CHAPTER III

After completing the work on sample plot, you will send your rice samples to ADC cell Islamabad for laboratory Processing. But before despatching the samples to Islamabad it is important that you review your work for each sample. Be sure that all required information have been entered.

Before mailing the samples to Islamabad, please ensure that each envelop containing the sample has complete information about that sample on it. You will send the information for each sample at the address given below.

To,

The Director ADC,
Federal Bureau of Statistics
5-Blue Area, F-6/4,
ISLAMABAD

GOVERNMENT OF PAKISTAN
FEDERAL BUREAU OF STATISTICS
AGRICULTURAL DATA COLLECTION CELL
ISLAMABAD

QUESTIONNAIRE FOR OBJECTIVE YIELD MEASUREMENT OF RICE CROP, KHARIF 90

NAME OF FARMER .....

FATHER'S NAME .....

CASTE .....

ADDRESS .....

STICKER

1. The information on the sticker has been taken from the July 1990 {Kharif(Summer)}Crops Acreage Survey. Ask the farmer whether the information on the sticker is correct.

Yes	No

(If answer is 'No' then encircle the incorrect information and record the correct information).

2. From the area sown for rice, how much will be harvested for grain?.

200 -

(Record all areas in Kanal & Marlas for Punjab and in Acres & Ghuntas for Sindh Province)

3. What is the farmer's expected harvest date of this field?

D	M	Y	For office use
1	-		300

Note: If the crop is mature then the enumerator will lay out the objective yield plot and harvest the crop according to the given instructions. In case the crop is not yet ready for harvesting he will take permission from the farmer for laying out the sample plot and re-visit the field one/ two days before the farmer's expected date of harvesting and cut the sample plot. However, the enumerator during this period will remain in constant touch with the farmer so that in case the expected harvesting date changes he is in knowledge of that. He will prepare a schdule of expected harvest dates for all sample fields assigned to him and despatch the same to ADC office Islamabad through his supervisor.

PROCEDURE FOR LAYING OUT THE PLOT

i). Make the plot after walking along and into the field according to the given paces on the sticker.

ii). Plot size in case of :-

a) Broad- cost sowing 21.6 x 21.6 inches

b) Line sowing 21.6 inches in length & 3 lines

4. If rice is sown in lines please provide:- (In cm)

i) Distance between Ist and 2nd line in centimetres. | 400 |

ii) Distance between Ist and 4th line in centimetres. | 402 |

5. Count of heads in the slected Plot, please record.

In rice Plot

	Ist line / Ist part	2nd Line/ 2nd part	3rd line/ 3rd part	Total
No of heads on the stalks				502
No. of Detached heads				504
No. Of rice Stalks				506

Note:- Please write segment number , sample plot number number of heads obtained from the sample plot, date and district name on the paper envelope, put this envelope into the cloth bag write address and mail it to Islamabad

	D – M – Y	For office use
6. Date of completion of questionaire	– –	600

Name & Signature of enumerator .....

Date .....