Approved by the order of the Chairman of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan dated July 8, 2015

no. 108 (as amended by the order of the Chairman of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan

dated November 27, 2017 187)

**Methodology for organizing and conducting a survey of crop yields**

**1. General provisions**

1. In order to control the quality of data received from respondents on the harvest of grain crops, the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan (hereinafter – the Committee) and its territorial bodies conduct a nationwide statistical observation on the survey of crop yields (hereinafter – yield survey) in agricultural enterprises, peasant or farm enterprises and individual entrepreneurs.

This Methodology contains practical recommendations and calculations of the average yield of grain crops and is intended for use by specialists of the Committee, its territorial bodies, as well as interviewers when organizing and conducting a yield survey.

Yield surveys are carried out in all regions of the Republic of Kazakhstan where wheat and rice are grown.

The basic principle of this survey is based on determining the average yield per hectare by sampling from the surveyed areas, which are then sent to the agricultural laboratory service for weighing and determining the moisture content, weediness, as well as the quality of the grain after threshing.

2. The method used in the survey of yields is selective–measuring. In the context of the functioning of a large number of small and medium–sized agricultural formations, the advantage of this approach lies in the possibility of determining the average yield of grain crops in the whole country and in individual regions according to data generated on a sample basis.

When conducting this survey on a separate farm, the yield is measured not entirely over the entire field, but selectively: in the field that is included in the sample, separate samples are taken from several plots, each of which is one square meter in size. Based on the results of processing data from these plots, the yield per hectare is determined over the entire area of crops of the crop under study.

3. To conduct a yield survey, interviewers are involved, who are previously trained. The required number of interviewers is determined based on the number of farms surveyed and the workload per interviewer. Average workload per interviewer (time to complete all stages of the survey in one household on one selected site, taking into account the road) according to the results of timing is 13.9 hours.

4. Sampling during the survey is carried out by interviewers without the direct participation of the agricultural producer, and laboratory studies to determine the weight and moisture content of grain are carried out by specialists from testing laboratories, which, in turn, excludes the influence of agricultural producers or local executive bodies on the results of observation.

5. The following main definitions are used in this Methodology:

1) a peasant or farm enterprise is a labor association of persons in which the implementation of individual entrepreneurship is inextricably linked with the use of agricultural land for the production of agricultural products, as well as with the processing and marketing of these products;

2) crop yield – an indicator characterizing the average harvest of agricultural products per unit area, calculated in centners per 1 hectare;

3) agricultural enterprise – a legal entity or its structural subdivision engaged in the production, storage and processing of agricultural products, the provision of services in the field of agriculture;

4) agricultural producer – a natural or legal person engaged in the production of agricultural products;

5) development table – a table filled in to determine the place of sampling;

6) navigation map – a plan–scheme indicating the cardinal directions, used to determine the field that fell into the sample;

7) sampling site – a piece of land measuring one square meter from which samples will be taken.

**2 . Objects of the survey**

6. In the Republic of Kazakhstan, various types of crops are cultivated by agricultural enterprises (hereinafter – agricultural enterprises), peasant or farm enterprises, individual entrepreneurs and household households (producing products in household plots and summer cottages).

At the same time, grain crops, in particular wheat and rice, are grown mainly by agricultural enterprises, peasant or farm enterprises and individual entrepreneurs, in connection with which it is these categories of agricultural producers that are identified as the objects of the survey of crop yields.

**3. Formation of the general and sample populations for the survey**

7. To conduct a yield survey, preliminary, on the basis of data from administrative sources, a general population is formed, including agricultural producers who sowed wheat and rice in the reporting year. Then, on the basis of the general population, a sample is formed, into which all agricultural enterprises and 30% of peasant or farm enterprises and individual entrepreneurs are selected .

8. For the formation of a sample population, an ordinary one–dimensional sample is used with a probability proportional to size. The method is based on selecting certain agricultural holdings as primary sampling units proportional to their size, as well as selecting a fixed number of secondary sampling units such as fields (hectare to be sampled).

For each category of agricultural producers, the general and sample populations are formed separately. The sampling frame includes agricultural producers from each district, thereby ensuring the representativeness of the sample at the district level.

9. The main feature for the formation of the sample is the size of the sown area under wheat or rice in the reporting year for each agricultural holding. Agricultural holdings with large fields are likely to be represented in the secondary sample several times.

10. The formation of the general population for the survey of productivity is provided by the territorial statistical bodies. The formation of the sample population is carried out by the structural subdivision of the Committee responsible for the formation of samples. The generated lists of agricultural producers included in the yield survey sample, indicating the surveyed hectare, are communicated to the heads of territorial statistical bodies for organizing and conducting a yield survey on the ground.

**4. Statistical instrumentation for yield surveys**

11. When conducting a yield survey, the following statistical tools are used:

survey questionnaire;

navigation map;

development table;

forms for laboratory studies of weight and humidity.

12. The survey questionnaire contains a series of questions with which the interviewer clarifies information about the farmer's fields, as well as agrees on the dates of grain sampling.

With the help of the survey questionnaire, the sown area of wheat or rice is specified, since a certain period of time passes from the moment the sampling frame for the survey is formed until the survey is conducted, during which situations arise when the area of the field occupied by wheat or rice changes. An example of such a situation is the flooding of part of the field, as a result of which part of the crops died.

In order to come to the farmer's field to take samples immediately before harvesting, when the grain is ripe enough, but the harvesting has not yet begun, the questionnaire includes a question about the planned date of the interviewer's arrival to take a yield sample. The questionnaire also indicates the planned date of the interviewer's arrival in the field for the second time after harvesting to take samples for losses. After the examination, the questionnaire indicates the actual dates of sampling.

13. In fields where there are areas under different grain crops, as well as unharvested areas (areas under fallow or dead crops), the interviewer makes a navigation map to correctly determine the location of the grain sampling.

The navigation map reflects a schematic plan of the location of all fields available to the agricultural producer (sown with various agricultural crops, including wheat and rice, fields under fallow, fallow and others), as well as roads, rivers, canals and other terrain features that help to quickly find the field included in the sample survey. If the agricultural producer has a small number of fields, then the navigation map is compiled from his words. If the farmer has a large number of fields, it is recommended to contact the farmer (or the farmer's agronomist) for help in compiling a navigation map. The fields on the navigation chart are numbered from north to south and from west to east.

On each field of the navigation map, the name of the crop with which it is sown is indicated, or the fields are painted over in different colors, and symbols are made at the bottom of the navigation map indicating the name of the crop and the color corresponding to it in the navigation map. On each field of the navigation map, the size of the field in hectares is indicated to facilitate the entry of data into the development table. Examples of navigation maps for surveying the yield of wheat and rice are given in appendices 1 and 2 to this Methodology.

14 *.* The development table is necessary to determine the location of the sample in a particular field. The first page of the development table contains general data on a specific agricultural holding: the name of the farm, its BIN or IIN, sample number, a list of steps required to find a plot in the field included in the survey. The second page contains the development table itself, in each line of which the interviewer enters data for a specific field. This information consists of the total area of each field, the area sown under other crops, the area not harvested, the area with growth and the sampling location (for all fields of the agricultural holding that were included in the sample). All fields available to the agricultural producer and reflected on the navigation map are entered into the development table.

An example of filling in the development table (for wheat) is given in Appendix 3 to this Methodology, where the agricultural producer has 8 fields, the total area of which is 200 hectares, of which 60 hectares are sown with barley (1st and 7th fields), 10 hectares with oats (5th field), 10 ha with potatoes (6th field), 10 ha with perennial grasses (8th field), 10 ha of crops died from the cold (4th field), the remaining 100 ha were sown with wheat (1– e, 2nd, 3rd, 4th, 5th fields). The area of fields under wheat with an increase in each field is calculated as follows: the area of this field (column 5) plus the area with an increase in the previous field (column 6). For the first field of column 6 will be equal to column 5.

In column 7, the interviewer records the sample location, from the first page of the development table opposite the field, the area with the increase of which is equal to or greater than the value of the sample location. The number of the field included in the selection is circled. Suppose, in the previous example, the sample location from the first page of the questionnaire is 90. Looking at column 6, it can be seen that this value of the sample location corresponds to an incremental amount of 95. Then field number 4 is circled, and column 7 records the sample location 90 opposite field 4. In the navigation chart, the field that fell under the survey (in this example, field 4) is hatched .

Similarly, a development table is filled out for a survey of rice yield.

After filling in the development table, the interviewer asks the farmer the total area of harvested wheat, which should be equal to the last area with an increase. If this equality is not observed, the interviewer rechecks all records in the table for each field and recalculates all areas with increasing.

15. To record the results of laboratory studies of the weight and moisture content of wheat and rice, two forms are provided in the statistical toolkit – one for the pre–harvest sample (B–1), the second for the post–harvest sample (B–2). They provide the following information:

1) about the laboratory that conducts the study (name of the laboratory, its BIN and location, information about the laboratory assistant who conducted the study of samples and the head of the laboratory);

2) about the agricultural producer (name, characteristics (code part), number and place of sampling);

3) on the name and variety of grain crops;

4) total weight of samples in grams and moisture content in percent.

Forms for conducting laboratory studies of the weight and moisture content of wheat and rice are signed by the expert laboratory assistant who conducted the study and the head of the laboratory, indicating the date of the study.

**5. Stages of conducting a yield survey**

**Paragraph 1. Preparatory work**

16. To conduct the survey, the interviewer is provided with appropriate tools, the list of which includes:

this Methodology, survey questionnaire forms, laboratory research forms B–1 and B–2, navigation map for drawing a field plan, development table;

pencil, pen, calculator;

a folder with a clip for filling out questionnaires on it;

meter frame for selection of sites ;

secateurs for collecting spikelets;

paper bag, with printed labels, for collecting spikelets;

a package (bag) where you can put all of the above.

17. The yield survey is carried out at the time of full ripening of the grain: in the southern regions of the republic in July–September, in the northern regions – in August–October.

Field work during the yield survey is the responsibility of the interviewer. Field work includes:

interviewing an agricultural producer and drawing a field plan on a navigation map;

finding the field included in the selection;

site selection;

collection of spikelets.

In accordance with the received lists of agricultural producers, the interviewer prepares questionnaires for the survey, that is, fills in:

name and codes of the region, district, rural district;

the name and codes of the BIN or IIN of the agricultural producer;

sample number and location.

18. On the first visit to the farmer, the interviewer asks if the farmer agrees to participate in the wheat and rice yield survey.

If the farmer agrees, the interviewer finds out all the necessary information about his fields, filling in the navigation map, the development table and the survey questionnaire, determines the field of wheat that fell into the sample, and asks the farmer's permission to go to the selected field when the wheat is fully ripe for harvesting. samples, finds out the dates of the visit for sampling in the first and second stages.

If the farmer is against, the interviewer explains that it is necessary to obtain a certain number of spikelets from certain plots in order to obtain data on the yield of grain crops in the whole region, and that no damage will be caused to his fields.

19. If the farmer is still against it, the abandoned farm is replaced by a farm in the same area, which is the most suitable in terms of the size of the sown area. The replacement of farms is carried out by specialists of territorial statistical bodies in agreement with the relevant sectoral subdivision of the Committee.

The replacement of farms is also carried out in case of complete loss of wheat or rice in the sampled agricultural holding, as well as in the event that, due to poor quality of seedlings, the agricultural holding does not plan to harvest from all fields of wheat or rice.

When it is not possible to make a substitution, the survey of this agricultural holding is not carried out, since unequal substitutions can lead to distortions in the average data for the area.

20. Sampling from the fields is carried out in two stages:

before harvest (basic sample);

after harvest (loss test).

Based on the samples taken at the first stage, the yield of the main sample is determined. To take samples at the first stage, the interviewer having notified the agricultural producer, he arrives at the field of the agricultural producer, which was included in the survey, at the moment of full ripening of the grain: immediately (not earlier than a week) before harvesting or on the day of the planned start of harvesting the field.

If the farmer has one or more fields and it is not difficult to find the field under the survey using the navigation map, the interviewer independently goes to the field to take samples. If the farmer has many fields and without the participation of the farmer (or his representatives, for example, an agronomist or foreman) it is impossible to find the field included in the survey, it is recommended to seek the help of the farmer to visit the field.

According to the samples taken at the second stage, the loss yield is determined. Sampling at the second stage should take place within three days after the completion of harvesting, until the fields are used for other purposes (for cattle pasture, plowing for fallows or for winter crops), and also until the birds have pecked at the grain that fell during harvesting.

**Paragraph 2. Selection of sampling sites**

21. After obtaining permission from the farmer to enter the field to select plots, the interviewer determines the angle from which he will start measuring the plot and the direction in which he needs to move first (along the field or inland). An example of the movement of the interviewer for a rectangular field is given in Appendix 4 to this Methodology.

The counting starts from the corner that is first on the interviewer's path to the field, the second is the next corner in the direction of travel (to avoid overlap). Along the field, the interviewer moves along the longest edge of the field. In the case of a rectangular field, shown in example 1 in Appendix 4 to this Methodology, you need to move along in direction 1, and deep into the field – in direction 2.

Moving in each direction of the field (along or deep), the interviewer steps back from the edge of the field by 7 steps in order to avoid getting into the survey of the combine turning points, where the greatest losses are observed.

A set of random steps for fields of different sizes is selected in accordance with Appendix 5 to this Methodology.

The interviewer selects the set of steps that matches the size of the field being examined. This set of steps is noted in the table in order to use the next set of random steps for the next survey of a field of the same length.

In addition, the selected set of steps, the interviewer writes in a box on the first page of the development table opposite the field of the appropriate size. This is done for dual control:

so that the interviewer does not forget how many steps he needs to go along and deep into the field;

so that the interviewer does not mix up the sets of steps for fields of different lengths, if there are several samples for one agricultural holding.

Moving along and deep into the field for the number of steps specified in the table, the interviewer finds the area to be surveyed. For the example above, where the sampling site is the 90th hectare, which is in field no. 4 and the size of this field is 40 ha, the set of steps from the first row of the table is selected that corresponds to a field size of less than 50 ha, for example, the 6th set of steps. In accordance with this set of steps, the interviewer is recommended to take 20 steps along the edge of the field, and 75 steps into the depth of the field.

22. When finding a sampling site, the interviewer takes into account that the fields can be of different sizes. In the event of a situation where the interviewer started counting steps along the edge of the field and, having reached the edge of the field, did not score the required number of steps, he turns in the opposite direction and continues counting steps to the required number. Having collected the required number of steps, the interviewer turns into the depth of the field, and counts the required number of steps into the depth of the field. If the field is long but narrow, then the number of steps is usually enough in length, and in width it will be necessary to walk back and forth until the required number of steps is reached.

23. If the farmer has one large field and more than one sample falls on it, the interviewer ensures that each first plot of the corresponding sample is at different random steps from the first corner of the field. Suppose a farmer has only one field of 450 hectares, and two samples fall on it: the first sample location is the 38th hectare, the second sample location is the 314th hectare. The interviewer from the table of random steps for a field up to 500 ha selects two sets of random steps – 149 and 18, 98 and 226; writes them on the first page of the development table in a frame opposite the field with an area of up to 500 hectares, in the table these sets are marked as used. From the first corner of the field, counting 149 steps along (retreating from the edge of the field 7 steps), then from this place 18 steps into the field, the interviewer finds the first section of the first sample. Also from the first corner of the field, counting 98 steps along the field, then from this place 226 steps into the depth of the field, the interviewer finds the first section of the second sample.

24. If there is a plot not to be harvested (dams and canals, areas where crops died or did not sprout), an example of a field layout with non–harvested plots is given in Appendix 6 to this Methodology.

If the interviewer, moving in the direction along the field, has reached the border of the area that will not be removed and has not gained the required number of steps, then he continues to move in the same direction and gains the required number of steps, and, turning deep into the field, starts counting the steps not from the edge of the field, but from the beginning of the harvested field. Therefore, it is very important that the interviewer, when compiling a field map, be sure to indicate the fields that will not be removed.

25. If the non–removable area is in the center of the field, the interviewer, moving deeper, reaches the edge of the non–removable area, stops counting steps and continues counting steps after passing the non–removable area.

If the interviewer was warned about the presence of uncleaned areas, then he bypasses them, that is, excludes them from the survey. If the interviewer has not been warned and the site being surveyed is in a field that will not be harvested, then the interviewer continues to survey that site as it will represent other sites with poor soil.

26. In practice, fields of indefinite form are often encountered. Such fields on the navigation chart are given the shape of a rectangle, and the added sections are considered as not removed.

27. Two sites are selected by the interviewer for each sample . The second section is located from the first 30 steps along and 30 steps deep in the same direction when the count was stopped. An example of an interviewer's steps diagram is given in Annex 7 to this Methodology .

If, when finding the first section, there were not enough steps, and the count was continued in the opposite direction, then when finding the second section, the direction changes.

**Paragraph 3. Selection of samples**

28. To determine the yield of grain crops, the interviewer at each selected site takes a sample from an area of one square meter, using a special frame made of thin but strong strips (meter frame) for this purpose. The side of the frame in the internal measurement is one meter. To make it more convenient to apply the frame for sampling, three of its sides are fixed tightly, and the fourth is freely removed and laid. An example of a framework for conducting a survey is given in Annex 8 to this Methodology.

29. After finding the first area to be surveyed, the interviewer sets the frame tightly. In this case, the frame is superimposed not on top of the plants, but at the roots (with an open fourth side); having laid the frame, the fourth side a is closed, all the plants that have got there, the roots of which are outside the frame, are removed outside the frame, and all the plants that are outside of it, the roots of which are inside the frame, are introduced into the frame.

Then the interviewer cuts off the bunch of spikelets together with the stem almost at the ground, cuts off the ear 1 cm below the stem. The ear cutting scheme is given in Appendix 9 to this Methodology.

30. Each cut spikelet is folded into a paper bag. An example of filling a paper bag is given in Appendix 9 to this Methodology.

The interviewer ensures that the spikelets get into the paper bag as much as possible (that is, take into account the wind), without allowing any losses. A paper bag is used to collect spikelets, since in such a bag the grain breathes and if still wet grains get in, they will not become moldy. The bag is not filled completely so that it is possible to twist, that is, close the paper bag. It is very important that the bag is closed so that spikelets or grains are not lost during the shipment of the sample.

If one bag is not enough to collect spikelets from one area, the ears are put into another paper bag and the inscription is marked on each bag: “the first bag of sample A”, “the second bag of sample A”. Similarly for sample B. Therefore, on the sample packets from the first section, “Sample A” is indicated, from the second section – “Sample B”.

After cutting the spikelets throughout the plot, not only in the rows, but also in the aisles, everything that fell during the collection process is picked up, that is, fallen spikelets, grains, halves of ears.

On each package, on the marking label, inscriptions are made:

name of the agricultural producer, his address, BIN or IIN;

name and variety of grain crop;

place of sampling;

sample number .

31. Before sending the selected samples to the laboratory, the interviewer separates the grains from the stems (hulling) and the finished grain is placed back in the bag for delivery to the laboratory. Paper bags with the finished material are sent to the laboratory within two working days to determine the moisture content and weight. If the laboratory is located within the territory where the interviewer works, then he himself delivers the samples to the laboratory. If the laboratory is far away, the interviewer sends the samples to the district statistics department, whose employees deliver the samples to the laboratory. Together with the sample, the interviewer sends the B–1 form to the laboratory, the details of which are filled in by the laboratory assistant from the marking sheet of the package with the sample.

32. After sampling at the first stage, the interviewer reminds the farmer that he needs to come again immediately after harvesting in order to take samples for losses, and specifies the date of his visit. The interviewer finds out when the farmer will harvest and when he can come to determine the losses.

33. When determining a site for loss survey, all the rules that apply when choosing a site for taking the main sample are preserved: determining the first corner of the site, direction of movement, steps, indentation from the edge of the field, number of samples. There is only one change: the site must be 5 steps further in each direction than the main sampling site. In the rows and aisles, everything that is left after harvesting is collected: spikelets, pieces of spikelets, grains, but this is done carefully, without grabbing the ground.

If, however, the interviewer came to the field late, that is, when the farmer had already plowed the field or driven out livestock, the interviewer asks the farmer to show other sites similar to those that needed to be surveyed and indicates on the sample bag that the samples were taken from alternative sites .

The loss sample material is prepared for shipment to the laboratory in the same way as the main sample, and Form B–2 is filled out.

**6. Calculation of yield**

34. After receiving the results of laboratory tests, the calculation of the average yield is carried out. All further calculations are carried out by the specialists of the Committee and territorial bodies without the participation of interviewers.

The result of conducting a survey on a sample of holdings is self–sufficient data, that is, data that does not need to be disseminated.

35. At the first stage, the average yield for the main sample and the loss sample is calculated separately for each agricultural holding in the sample, according to the formula:

G i = \* \* \* (1)

Where:

Wi – the total weight of samples in grams;

N – the number of samples;

m i – grain moisture content in the sample, measured in %;

0.865 – the standard humidity for Kazakhstan.

For reference: 1 hectare = 10000 m 2

1 centner = 100000 grams

As a result of the calculation according to the above formula, the yield is obtained in centners per hectare, due to the conversion factor given in the formula. Loss yield ( L i) is calculated using a similar formula.

An example of calculating the yield of wheat.

Suppose an agricultural enterprise has a fairly large area under wheat, and sampling from five plots (N=5) is determined as a secondary sample. From these plots, during the main sample, wheat was collected with a total weight Wi=690 grams, moisture content m i =10.76%. Using formula (1), we determine the yield for the main sample in this farm G i =14.24 centners per hectare. The total weight of grain samples for losses in this farm was Wi=105 grams, moisture content m i =11.68%. Using also formula (1), we determine the yield by losses in this farm L i =2.14 centners per hectare. Similarly, you can calculate the yield of rice.

36. The average yields for the main sample and losses for each area and the net average yield for the area are then calculated.

The average yield for the main sample in the region is calculated by the formula:

= (2)

Where:

G i – yield on the main sample of the i–th agricultural producer;

N G – the number of agricultural producers included in the sample.

The average yield by losses in the area is calculated by the formula:

= (3)

Where:

L i – yield loss of the i–th agricultural producer;

N L – the number of agricultural producers included in the sample.

The net average yield for the area is determined by the formula:

Y=– (4)

Where:

– the average yield for the main sample;

– the average loss yield.

**7. Calculation of the standard error of the sample**

37. To determine the quality of the data obtained from the yield sampling survey, the standard sampling error and the coefficient of variation are calculated.

38. To calculate the sampling standard error for the survey as a whole, the sampling standard errors for the main sample and for losses are first calculated separately. The calculation is carried out separately for each district and separately for agricultural enterprises, peasant or farm enterprises and individual entrepreneurs.

The standard sampling error for the main sample is calculated using the formula:

S G = (5)

Where:

G i – yield for the main sample of the i–th agricultural producer;

– the average yield for the main sample in the region;

N G – the number of samples in the region.

standard errorloss sampling is calculated by the formula:

S L = (6)

Where:

L i – yield by losses of the i –th agricultural producer;

– the average yield by losses in the region;

N L – the number of samples in the area.

The standard error of the sample as a whole for the survey separately for each district and each category of agricultural holdings is determined by the formula:

S Y = (7)

39. Then, according to the formula below, for each district separately for each category of agricultural holdings, the coefficient of variation is determined, which shows what proportion of the average yield value is the standard error of the sample:

CV = ( S Y / Y)\*100 (8)

The allowable coefficient of variation (CV) at the district level is taken at the level of 15%. If the allowable coefficient of variation is exceeded, all the data obtained from the survey results are rechecked, and, if necessary, farms with extreme values are excluded from the average yield calculation.

**8. Use of data obtained from the results of a sample yield survey**

40. Based on the yield data obtained from the survey, the estimated gross wheat and rice harvest in the reporting year is determined, which is then used to control the data on the gross harvest of wheat and rice received from respondents in the framework of the national statistical survey.

The estimated volume of the gross harvest is formed for each district separately for agricultural enterprises, peasant or farm enterprises and individual entrepreneurs by multiplying the net yield obtained from the results of the survey by the sown or harvested area. The sown area is used in the calculation to obtain preliminary data on the gross harvest, the harvested area is used for the final calculation data .

The final estimates of the gross harvest of wheat and rice from the yield survey are compared with the gross harvest of these crops from respondents at the farm category level in each district. The difference between these data should not exceed the size of the allowable statistical deviation for the survey, which is calculated by the formula:

S P = S Y \* P (9)

Where:

S Y – sampling standard error, measured in c/ha;

P – the harvested area (wheat or rice) by district.

If the above difference exceeded the allowable statistical deviation for the survey, the Committee, if necessary, corrects the data received from the respondents by expert means.

Appendix 1

to the Methodology for organizing and conducting a survey of crop yields

Example of a navigation map for a wheat yield survey

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| road  Field #1  barley 10 ha, wheat 30 ha  North |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Field #2  wheat,  25 ha |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Field #3  wheat,  10 ha  East  West |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Field #4  wheat 40 ha, not harvested 10 ha  river |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Field #5  oats 10 ha, wheat 15 ha |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Field #6  potatoes, 10 ha |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| road  Field #7  barley, 50 ha  Field #8  perennial herbs, 10 ha |  |  |  |  |  |  |  |  |  |  |  |  |  |
| South |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

appendix 2

to the Methodology for organizing and conducting a survey of crop yields

Example of a navigation map for a rice yield survey

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| North  road |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | irrigation canal |  |  |  |
| West  East |  |  | Field #1  rice, 50 ha |  |  | Field #2  rice, 60 ha |  |  |  |  |  |  |  |
|  |  |  |  |  |  | Field #3  wheat, 70ha  Field #4  perennial herbs, 50 ha |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | Field #5  pairs, 80 ha |  |  | Field #6  perennial herbs, 80 ha |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | Field #7  pairs, 90 ha |  |  | Field #8  rice, 80 ha |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| South |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Appendix 3

to the Methodology for organizing and conducting a survey of crop yields

An example of filling out a development table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Field number | Total field area, ha | Field area used for other crops, ha | Not harvested area, ha | Area of wheat harvested for grain, ha | Increasing wheat area, ha | Sample Location |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | 30 | 10 |  | 20 | 20 |  |
| 2 | 25 |  |  | 25 | 45 |  |
| 3 | 10 |  |  | 10 | 55 |  |
| (4) | 50 |  | 10 | 40 | 95 | 90 |
| 5 | 15 | 10 |  | 5 | 100 |  |
| 6 | 10 | 10 |  |  |  |  |
| 7 | 50 | 50 |  |  |  |  |
| 8 | 10 | 10 |  |  |  |  |
| Total | 200 | 90 | 10 | 100 |  |  |

Appendix 4

to the Methodology for organizing and conducting a survey of crop yields

An example of an interviewer's movement for a rectangular field

direction of travel 1 along

1 angle indent angle 2

angle 4 angle 3

2

deep into

Appendix 5

to the Methodology for organizing and conducting a survey of crop yields

A set of random steps for fields of different sizes

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Field categories | 1st set  steps | | 2nd set  steps | | 3rd set  steps | | 4th set  steps | | 5th set  steps | |
| along | deep into | along | deep into | along | deep into | along | deep into | along | deep into |
| Up to 50 ha inclusive | 65 | 79 | 73 | 18 | 62 | 30 | 100 | 94 | 37 | 59 |
| Over 50 ha to 100 ha | 72 | 137 | 136 | 31 | 125 | 36 | 52 | 10 | 113 | 180 |
| Over 100 ha to 500 ha | 149 | 18 | 98 | 226 | 187 | 288 | 5 | 42 | 180 | 99 |
| Over 500 ha | 56 | 113 | 70 | 157 | 387 | 87 | 124 | 63 | 206 | 127 |

Continuation

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Field categories | 6th set  steps | | 7th set  steps | | 8th set  steps | | 9th set  steps | | 10th set of steps | |
| along | deep into | along | deep into | along | deep into | along | deep into | along | deep into |
| Up to 50 ha inclusive | 20 | 75 | 80 | 92 | 10 | 93 | 45 | 36 | 75 | 30 |
| Over 50 ha to 100 ha | 134 | 87 | 64 | 165 | 133 | 132 | 143 | 146 | 190 | 63 |
| Over 100 ha to 500 ha | 280 | 156 | 249 | 15 | 283 | 166 | 202 | 284 | 234 | 285 |
| Over 500 ha | 328 | 340 | 201 | 240 | 317 | 192 | 356 | 380 | 143 | 138 |

Appendix 6

to the Methodology for organizing and conducting a survey of crop yields

Examples of field layouts with non–harvested areas

example 1 example 2

Area not harevested

\*

example 3

В

В

С

С

А

А

Appendix 7

to the Methodology for organizing and conducting a survey of crop yields

An example of an interviewer's step chart

2 area

30

30 1 area

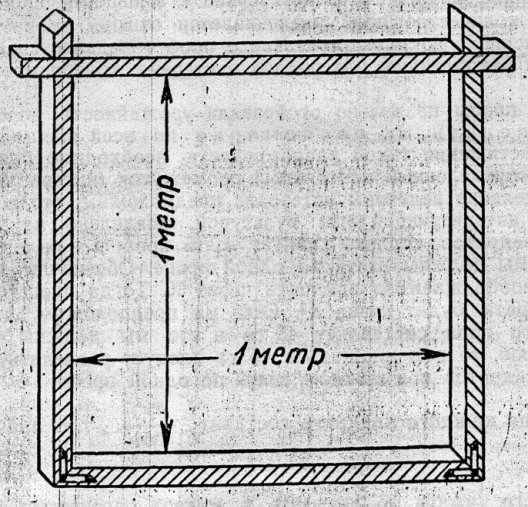
\*

\*

Appendix 8

to the Methodology for organizing and conducting a survey of crop yields

Sample survey frame



Appendix 9

to the Methodology for organizing and conducting a survey of crop yields

An example of an ear cutting scheme



1 sm

1 sm

near the ground

An example of filling a paper bag



filling limit

place ears of wheat inside a paper bag

50 sm

Fig.10

label

10 sm

30 sm