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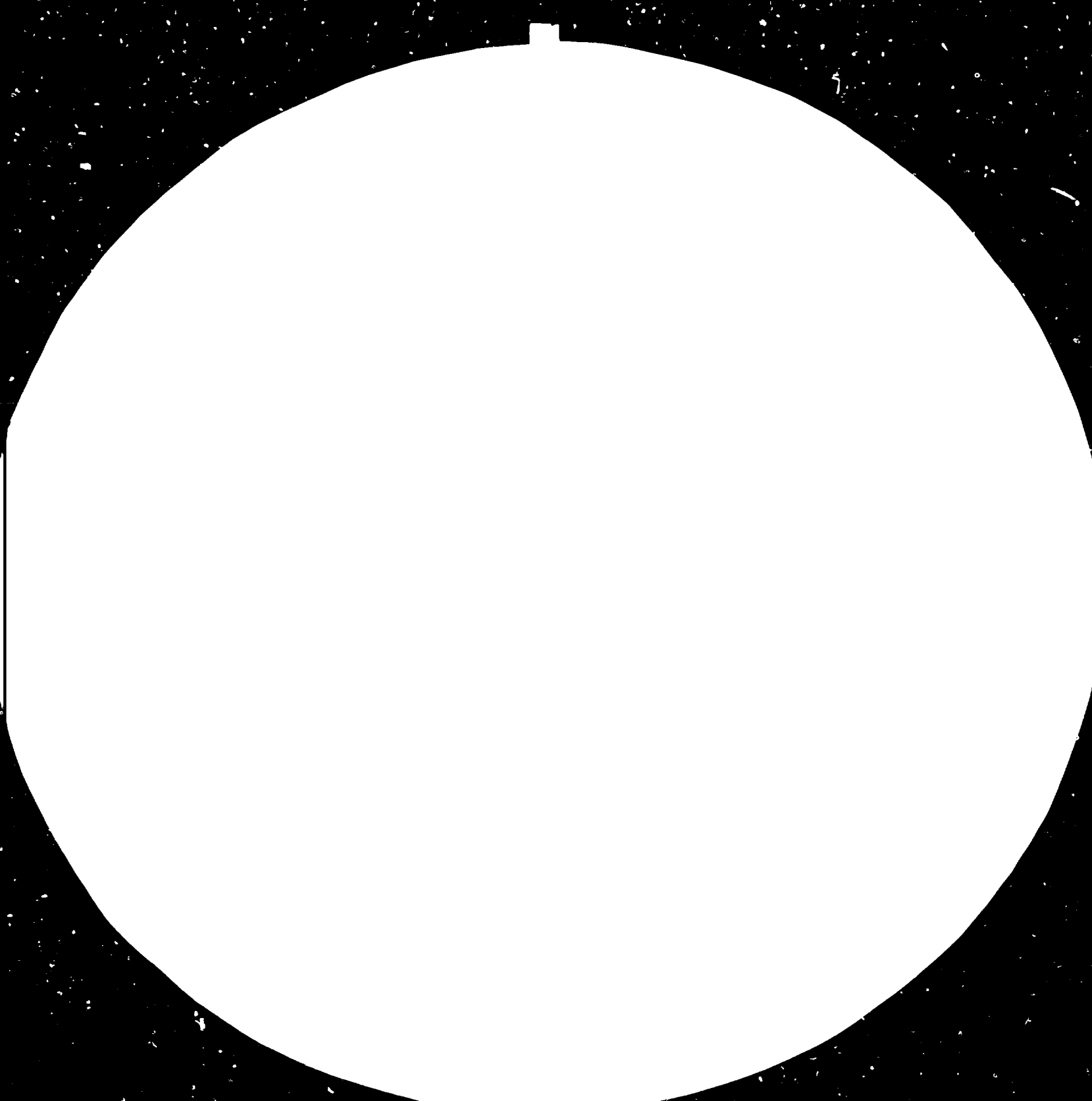
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September/October 1983

INDUSTRIAL TRAINING AND DEVELOPMENT CENTRE

(ITDC/SEGEM) TURKEY

Training Expert in the Design of Rapeseed
and Sunflower Harvesting Machines .

DP/TUR/77/024/11-03/T

Mission Report Prepared by

Peter Stewart Barton

1154

Expert of the United Nations Industrial Development
Organization acting as Executing Agency for the
United Nations Development Programme

This report has not been cleared with the United
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presented.

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1. Summary

A SEGEM/UNIDO project was established to conduct a training programme on rapeseed and sunflower harvesters, harvesting techniques, mechanical characteristics of harvesters and design criteria of different parts of harvesting machines to be presented to engineers from the public and private agricultural machinery manufacturers. After briefing in UNIDO headquarters the expert arrived in Ankara on 6 September 1983 and together with the SEGEM counterpart

- a) Visited manufacturers of farm machinery to give consultancy advice and collect background information.
- b) Prepared seminar material on
 - Harvesting and threshing with particular emphasis on sunflowers rice and oil seeds
 - Harvesting of sunflowers
 - Harvesting of rice
 - Harvesting of rape seed
 - Monitoring of harvesting machinery
 - Planting
 - Tillage
 - Machinery Management
 - Sunflower production (Turkish language).
- c) Conducted 5-days seminar based these note to participants of TZDK and Department of agriculture and forestries.
- d) Conducted seminar to the members of Industrial Estate, SOKE.
- e) Visited sunflower growers and harvesting contractors to give consultancy advice.
- f) Supplied various catalogues and technical information to improve the SEGEM library.
- g) Layout drawings were made and distributed of sunflower attachments.

Recommendations were made that:

- a) Fellowships should be requested for
 - sunflower storage and drying,
 - rice harvesting, threshing and drying,
 - nitrogen enrichment of straw.
- b) Technical assistance should be requested for in
 - the in-plant training phase of the current project,
 - expert in farm machinery design, sunflowers small plots, lentil harvesting, aniseed harvesting,
 - training expert on farm machinery maintenance.
 - expert in planters and seed drills

- c) For additional SEGEM/UNIDO projects
- sunflowers small plots,
 - sunflower drying,
 - design improvements and standardization of tyne cultivators.
- d) A selection of sunflower trays should be imported for comparison with those manufactured in Turkey.
- e) A "head snatcher" should be imported for evaluation in Turkey.
- f) Design drawings should continue be made of sunflower trays, small bat reels and dividers.
- g) The document production and technical library of SEGEM should be improved.

2. Mission Background and Objectives

This was the second part of a three months consultancy, scheduled to start in October 1982. In December 1982 after two months of the consultancy it was decided by SEGEM that it would be better to have the third month of the consultancy during the 1983 sunflower harvesting season so that more practical field work and demonstrations could be undertaken. A Training Seminar could be held to include a field demonstration of mechanized sunflower harvesting.

Sunflowers are becoming an increasingly important crop in Turkey providing oil for human consumption and the seed residue after oil extraction can be used for animal feed, the oil is also a possible substitute for fossil fuel in diesel engines. (Some modifications to the engines are needed development of these are not finalised so sunflower oil can not be used as a direct substitute.)

From the Job Description the duties for the expert are listed.

Duties: The expert will conduct a training programme together with his counterpart from the Industrial Training and Development Centre (ITDC). The programme will consist of two phases.

Phase I: In-class training rapeseed and sunflower harvesting techniques and their applications to machines, the mechanical characteristics of harvesters and design criteria and functions of different parts of the machines and all other necessary information related with the subject will be given to approximately 25 - 30 Agricultural and Mechanical Engineers (all related to design and manufacture of agricultural machines.)

Phase II: In-plant on-the-job training related firm and institutions will be visited and in the light of information given in Phase I the expert will give assistance to the participating engineers in the design and adoption studies of new headers, concaves and sieves to a grain harvester for rapeseed and sunflower harvesting.

Where the plot sizes are suitable sunflowers can be harvested using combine harvesters which have been adjusted to the correct drum speed, fan setting and the sives have been correctly adjusted or the correct size riddles fitted. Various attachments can be fitted to the combine harvesters to increase their efficiency and reduce losses. These attachments can be simple items such as long trays or pans extending ahead of the cutter bar to collect shattered seeds, small bat reels are also fitted these attachments are not usually made and supplied by the combine harvester manufacturers. But are made and sold by small specialist manufacturers. These are mostly produced without engineering drawings or quality control procedures. More complicated attachments such as "head snatcher" and "sullivan attachments" can also be used these should give greater speed and efficiency than the simpler attachments. The use of the more complicated attachments were not seen in Turkey by the expert.

Combine harvesters are mostly sold in Turkey by the following companies.

CLAYSON NEW-HOLLAND
CLAAS
CUMITAS JOHN DEERE (locally manufactured in Tarsus)
INTERNATIONAL HARVESTER COMPANY

Most of the combine harvesters in Turkey are owned and operated by contractors, not by the farmers themselves. There is plenty of work available and payment is by area covered so efficiency and reduction of losses can be a problem.

Methods of harvesting of sunflowers other than by combine harvester were not studied in depth during this assignment.

3. Mission Itinerary

05/09/83 Briefing UNIDO, Vienna
06/09/83 Travel Vienna - Ankara
07/09/83 - 13/09/83 Preparatory work at SEGEM
14/09/83 Field consultancy visit to sunflower growers, harvesting contractors and manufacturers of agricultural machinery.
15/09/83 - 21/09/83 Preparatory work for seminar and making engineering drawings of sunflower attachments.
22/09/83 - 24/09/83 Field consultancy visit to manufacturers of agricultural machinery at SÖKE also gave seminar to members of the industrial estate.
25/09/83 Preparatory work for seminar
26/09/83 - 30/09/83 Seminar held at TZDK Ankara for engineers of this organization also from the grain storage organization
01/10/83 Scheduled depart, Ankara
03/10/83 Scheduled debriefing UNIDO, Vienna
04/10/83 Scheduled debriefing UNIDO, Vienna

4. Activities

This consultancy was the second part one month two days, (some extension was granted) of a three months consultancy. The first part was completed October - December 1982.

During this consultancy the activities have concentrated upon:

- a) Preparing engineering drawings for sunflower attachments, in order to establish, manufacturing standards, and make available improved designs to those already sold in Turkey.
Drawings finished include:
 - Improved drum reel No. SB150983-01
 - Improved sunflower tray No. SB190983-01
- b) Consultancy visits to sunflower growers, harvesting contractors, and manufacturers of agricultural machinery.
- c) Seminar to agricultural engineers and others from TZDK, and the Ministry of Agriculture and Forestries.

Seminar material was prepared in the English language covering the following subjects:

- a) Harvesting and threshing with particular emphasis on sunflowers rice and oil seeds
- b)) Harvesting of sunflowers
- c) Harvesting of rice
- d) Harvesting of rape seed
- e) Monitoring of harvesting machinery
- f) Planting
- g) Tillage
- h) Machinery Management
- i) Sunflower production (Turkish language)

Hand-outs were given to all participants covering these subjects. The verbal presentation was given in both English and Turkish. A slide presentation was made using slides from the collections of SEGEM and the expert. Use was also made of the Professional Slides purchased for the project.

Visits were made to a number of manufacturers, farmers and harvesting contractors to give consultancy advice.

Prints of the drawings were distributed to the seminar participants and manufacturers.

Various publications were supplied in original or photo-copy form to improve the SEGEM technical library. A list is shown in Appendix I.

5. Acknowledgements

The expert expresses his thanks for the help and cooperation given by the staff of SEGEM and other organizations during this appointment. In particular his counterpart Mr. Tarik Pirkul is assistance friendliness and cheerfulness also his energy and devotion to duty contributed greatly to the success of the mission. During the seminars his translation and contribution was appreciated.

The Director and staff of TZDK for their help during the seminar.

The farmer and harvesting contractor at Polatali for their help with the field demonstration held as part of the seminar.

6. Conclusions

Sunflowers are being grown in Turkey. Attachments for combine harvesters to enable them to harvest sunflowers are being produced in small workshops by specialist manufacturers, standardization, design improvement, and quality control could be introduced. The combine harvester manufacturers do not appear to be involved with sunflower attachments. Some combine harvester owner operators are well informed in the techniques of sunflower harvesting others are not well informed. The seminars were very well received the participants were enthusiastic. The varied interests of the participants indicated some subjects could be covered in more depth. More attention could be given to improved seed bed preparation and planting.

Requests from manufacturers indicated that as found in other parts of the developing world one of the main needs of manufacturers and constraints on production and quality is the need for design information, this could be supplied in Engineering Drawing form, possibly supported by illustrations, photographs, and sample machines, this design information should be supported by manufacturing technology advice.

During this consultancy requests for design information have included:

- Slashers
- Planters
- Plastics
- Sunflower attachments
- Seeders

6. Recommendations

The SEGEM sunflower project should continue and be expanded. A further UNIDO project should be held during the 1984 sunflower planting season. Fellowships should be requested as shown on the list. Technical assistance should be requested as shown on the list. The suggested SEGEM/UNIDO projects on the list should be considered. The design drafting capability of SEGEM should be extended. One way could be by cooperation with the Turkish Agricultural Supply Organisation, Agricultural Machinery and Equipment Research Institute located at TZDK, Ankara.

The document production capabilities of SEGEM should be improved/ updated by the introduction of size reduction photocopying, scanner stencil cutters, word processing equipment, dictaphone and shorthand typing capabilities.

A selection of sunflower trays should be imported for comparison and evaluation with those manufactured in Turkey.

"Head snatcher" should be imported for evaluation in Turkey. The design drawings made by the consultant should be distributed, translated into Turkish and up-dated drawings of other items such as planters should be made and an up-date process of revisions to drawings should be established.

Fellowships

- a) Fellowship to investigate methods of sunflower storage and drying in similar climates to Turkey (possible locations Spain, South America).
- b) Fellowship for training in the harvesting, threshing and drying of rice (possible location international ice research institute, Philippines.)
- c) Fellowship for training on the mechanized methods of nitrogen enrichment of straw and other fodder for animal feedings (possible locations England, West Germany.)

Technical Assistance

- a) Further visit of expert on sunflower production to coincide with the planting season and manufacturing period for sunflower planters, 1984 sunflower planting season (during at least 2 months).
- b) Expert in farm machinery design to assist with the establishment of the projects on sunflower harvesting from small plots where combine harvesters are not justified/available.

Suggested SEGEM/UNIDO Projects

- a) Investigation/design of improved methods of sunflower harvesting and threshing for small plot production where the use of combine harvesters is not justified/available.
- b) Training in the mechanized methods of nitrogen enrichment of straw and other fodder for improved animal feeding.
- c) Training in tractor and farm machinery use and maintenance.
- d) Investigating/design of improved methods of lentil and other legumes harvesting (vacuum harvesters).
- e) Investigating/design of improved methods of aniseed harvesting.
- f) Investigating method of control of orabanche.
- g) Study on the problems/methods of drying and storage of sunflowers including monitoring of deterioration.
- h) Standardization/improvement in the design of tyne cultivators.

- i) Training in the cultivation harvesting threshing and drying of rice.
- j) Training in operation and maintenance of forage harvesting machines including balers.
- k) Training in seed bed preparation and planting of sunflowers also manufacture of improved planters and seed drills.

List of some Publications Supplied to
Improve the SEGEM Technical Library

1. Lysaght Referee
2. Gates Heavy Duty "V" - Belt Drive Design Manual
3. Gates Safety and Practical Maintenance Tips for "V" - Belt Drives
4. Gates Agricultural "V"-Belt Drive Design Manual
5. Gates Automotive "V" - Belt Drive Design Manual
6. Claas (Photocopies) Special Crops Threshing Equipment and Auxiliary Equipment
7. New Holland Catalogues 8030, 8040, 8050, 8060, 8070, 8080
Invest in Quality
Quick-Attach Combine Maize Headers
Rice Harvesting Equipment
8. Agricultural Electronic Equipment PTY LTD
AEE Air Seed Monitor fitted to the Symonds Air Seeder
AEE Grain Loss Monitor
AEE Area Monitor
AEE Area Monitor
9. RDS Farm Electronics, Total Product Catalogue
10. Myers, Sunraysia Draper Pick-up and Front
11. Sund MFG, 600 Series Raking Pick-up
12. Mann: Claas, Dominator 66 + 56
Dominator 68
Dominator 76 + 76H
Dominator 96 + 86
Dominator 106
Cutter Bar Extension for Rapeseed
13. Harvestaire catalogue on Air Reel
14. Horwood Bagshaw Catalogue on Vacuum Seeds Harvester
1070 Series II Harvester
15. C.P.M. Ripple Mill Catalogue and Data
16. The Scottish Agricultural Colleges, How to Choose and use combines
17. Massey Ferguson Australia, MF 760/750 Combines
MF 860/850 Combines
MF 587 Self-Propelled Headers
18. Allis-Chalmers Catalogues N7, N6, N5, L2, M2, F2

19. Sullivan Equipment Catalogue Sunflower Reels
20. Orbanchi. Photocopies of Information
21. M.L. Poole, Growing Sunflowers in South-Western Australia
22. Micro-Lights Keep Sunflowers Happy

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

JOB DESCRIPTION

DP/TUR/77-024/11-03/T

(Rev. 30.9.1981)

POST TITLE : Training Expert in the Design of Rapeseed and Sunflower Harvesting Machines.

DURATION : One month with possible extension

DATE REQUIRED : As soon as possible

DUTY STATION : Ankara, with possible travel within the country.

PURPOSE OF PROJECT: A training programme, on the rapeseed and sunflower harvesters, harvesting techniques, mechanical characteristics of harvesters and design criteria of different parts of harvesting machines, is going to be conducted to the engineers coming from public and private agricultural machinery manufacturers.

DUTIES : The expert will conduct a training programme together with his counterpart from the Industrial Training and Development Centre "ITDC".

The Programme will consist of two phases;

Phase I : In-class training rapeseed and sunflower harvesting techniques and their applications to machines, the mechanical characteristics of harvesters and design criteria and functions of different parts of the machines and all other necessary information related with the subject will be given to approximately 25-30 Agricultural and Mechanical Engineers (All related to design and manufacture of Agricultural Machines).

List of Organizations Visited and People Met

Mr. Tarik Perkul to complete this.

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List of People Attending Seminars

Mr. Tarik Perkul to complete this.

