

# RESEARCH ASPECTS

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Major emphasis in Agricultural Engineering over the past 25 years has been in the applied phase of research. One of the reasons for this emphasis has been the expansion in the mechanized field and farmstead operations. Animal power has been replaced by machines.

Until recently, much of the work done by Agricultural Engineers could have been done by a good mechanic. However, this is no longer the case, and the Agricultural Engineering problems are more basic requiring more engineering knowledge and fundamental research.

In order to obtain various opinions, requests were sent to several Agricultural Engineers and other research workers. The following is a condensed summary of a few of the present Research Projects in Agricultural Engineering:—

## Irrigation and Drainage—

Tile drains—sizes, quality, cover materials.

Drainage systems—Bogland, surface and tile.

Irrigation—efficiency, plot irrigation, pond liners, consumptive use of water.

## Tillage and Seeding—

Tillage—trash conservation, deep tillage, breaking pasture sod, surface tillage.

Seeding—soil packing, machine trials, fertilizer placement.

## Harvesting—

Machinery—plot forage harvester, corn combine, potato harvester.

Instrumentation and Laboratory

## Apparatus—

Equipment to determine soil properties.

Instruments to evaluate plant growth.

Equipment to process cereal seeds.  
Instruments to measure light.

Tillage tests and silage apparatus.

## Structures—

Greenhouse investigations, design, cooling, refrigeration.

Poultry house ventilation.

Storage of vegetables.

Loose housing of cattle.  
Storage building—cellular type.

## Comments

These projects indicate that field machinery is not the main problem at present. Currently most projects are related to problems involving buildings, instrumentation, water use or tillage. Prairie provinces are interested in tillage methods and efficient use of water. Eastern Canada is concerned with drainage and harvesting machinery, while British Columbia is studying vegetable storage problems and buildings.

## Future Problems

Future problems listed by Agricultural Engineers were many and varied. A few of the problems are mentioned to indicate the type of project that may be considered in the future.

## Irrigation and Drainage—

Apply engineering principles to land conservation.

Water shed yield and ground water measurements.

Crack sealing materials for concrete canals.

Automatic control and application of irrigation water.

Land forming.

## Power and Machinery—

Improve efficiency of fuel and investigate solar energy and nuclear power.

High speed tillage.

Machine carriers and improved equipment, mounting attachments.

Vegetable oils and lubricants.

Wheel motors in tractors.

Swather studies.

Once-over seedbed preparation.

Packing of seedbeds.

Determination of soil tilth.

## Product Processing—

Product drying—forage, hops.

Air volume required for vegetable storage.

Ultrasonic velocity measurement on foods.

Permeability of packaging film and gasses.

Moisture losses from vegetable surfaces.

Food freezing, blast and absorption methods.

## Structures—

Durability of glues at low temperature and high R.H.

Grain pressures against sloping walls.

Low cost shelter areas.

Plywood dome structures.

Stressed skin construction.

## Materials Handling—

Mechanized feeding in stall barn.

Characteristics of fluids for separation of materials.

Instrumentation and Laboratory

## Apparatus—

Infra-red blanching oven.

Animal behaviour studies.

Internal pressure measurement in animals.

Ultrasonic fat depth measurement.

Color measurement of tomatoes and fruit.

Future trends in research projects indicate that more fundamental types of projects will be conducted. New fields of endeavour such as Product Processing and Materials Handling emphasize that the requirements of research are changing and that the Agricultural Engineers will be required to adjust the type of research project to provide answers for future problems.

## *The Economist and Agricultural Engineering Research*

An opinion was invited from several economists across Canada regarding Agricultural Engineering Research and the part it plays in the Agricultural Program.

The following are a few of the opinions:—

A—New approach to Research (4 stages).

(i) Fundamental Research or brain storming.

(ii) Testing the physical possibilities.

(iii) Checking operation on existing enterprise.

(iv) Pilot plant to check bugs.

B—Central laboratory for fundamental engineering research with colla-

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