Paper No. 144

# Farm machinery and its role in development

*By*

**Engr. Sikandar M. Khan**

Managing Director, Millat Tractors Limited, Lahore

*Paper No. 144*

# FARM MACHINERY AND ITS ROLE IN DEVELOPMENT

Engr. Sikander M. Khan*

## GENERAL

Due to continuous increase in world s population and limitation of cultivated area, Agriculture is becoming increasingly dependent on Farm Machinery, to sustain its production and the role of Farm Machinery in development and growth of Agricultural is being well established and understood day by day.

## ROLE OF FARM MACHINERY

1. Farm Machinery afford a considerable economic and time saving advantage over traditional methods such as :

   a. In time sowing and harvesting

   b. Increase in yield

   c. Relief to some extent from bad weather and labour shortages.

2. With Mechanized farming a farmer can now furnish the needs of food in much better way.

The average yield per hectare of major crops obtained in Pakistan and that of highest average yield obtained by developed (more Mechanized) countries can be seen in the following table.

---

* Managing Director Millat Tractors Ltd, Lahore.

| | Wheat | Rice | Cotton | Sugar Cane |
|---|---|---|---|---|
| Pakistan | 1640 | 2560 | 1041 | 39238 |
| Other Countries | 4793 | 5747 | 3057 | 88802 |

FAO Production Year Book 1981

The above table clearly indicates that the usage of Farm Machinery has increased the yield two to three times.

## WHAT IS A FARM MACHINERY ?

Farm Machinery basically consists of :

i. Agricultural Tractor
ii. Farm Implements.

## AGRICULTURAL TRACTOR

The most common layout for Agricultural tractor is a two wheel drive machine, used for all general Farm work.

Traction is obtained from the rear drive wheels and is thus most suited to linkage mounted equipment.

In nearly all cases the Tractors are fitted with adjustable track front and rear to suit row crop farming.

Tractor being prime-mover is plying very important role. Keeping this in view Govt. of Pakistan is also emphasising on setting up facilities for tractor manufacturing in

Pakistan.

It is estimated that approx 2,00,000 Tractors are in operation in our fields.

Comparison of Tractor owners and non tractor owners reveals that Tractor owners have higher yields than bullock farmers. The yield difference in some major crops are detailed below :

Yield/HA (Tons)

| Description | Tractor Owner | Bullock Farms |
|---|---|---|
| Jowar | 1.465 | 0.845 |
| Sugar Cane | 89.900 | 74.700 |
| Paddy | 2.920 | 2.445 |
| Wheat | 2.169 | 1.819 |

One Tractor can prepare approx 125 acres for seeding per season whereas a pair of bullock can cultivate 12 acres with less possibility of increasing income.

How Tractor reduces man working days: Please see table.

**PER HACTARE MAN DAYS ON FARM OPERATIONS**

| Description | Tractor Owner | Bullock Farms |
|---|---|---|
| Ploughing | 4.6 | 14.4 |
| Sowing | 15.9 | 13.7 |

Once the farmer is able to control their timings with the help of a tractor, the results are higher gross income.

Th ere below we quote an example of Saudi Arabia, A country with petro based economy has produced 800,000 tones of wheat during 1984.

Massey Ferguson's experts say the country's purchases of modern machinery alongwith its adoption of the most technologically advanced cultivation and irrigation techniques have resulted in a productivity of around 6 tons of wheat per hactare or about 85 bushels per acre. On the Canadian prairies 35, to 40 bushels is considered a good crop.

This astonishing leap in agricultural development is the result of heavy (round about $ 22 billion) investment on purchasing of most adequate Farm Machinery. This huge investment has propelled the kingdom beyond a point of self sufficiency in wheat and saving of more than $ 1.3 Billion on food imports.

## LINKAGE MOUNTED EQUIPMENT

The fundamental importance of matching Tractor horsepower with efficient cost effective implements is recognised.

The correct selection of Tractor and Implement is the key to maximizing the return on investments made in farming operations.

In the earlier stages very little attention was given to the development and introduction of appropriate implements and other machines to go with the tractor, resulting limited use of sophisticated implements and machines. The only implement then, in use, was the tiller.

The result is that todate our ploughing could not go deeper than 4" to 5", which has effected crop yield.

Here we quote an example, that now much difference in yield of (sugar cane) is recorded by using different implements.

| METHOD OF PLOUGHING | YIELD OBTAINED |
|---|---|
| Simple cultivation | 1200 Maunds |
| Chiesel Ploughing | 1850 Maunds |
| Ripping & sub-soiling and disc ploughing | 2436 Maunds |

(Mechanization of sugar cane)
by Mr. Khalid Sharif Ch.

From the above results one can observe that there is a possibility of increasing yield 4—5 times, if proper Agricultural implements are used.

Now we shall discuss different Implements description and their functions.

## IMPLEMENTS DESCRIPTION AND APPLICATION (PRIMARY CULTIVATION)

Following implements are used:

1. Mould board plough
2. Disc plough
3. Chiesel Plough

### M.B. PLOUGH

Designed for soil inversion, normally used in high rainfall or irrigated conditions, Fully invert the soil, to bury trash and crop residue and to set the soil up in a manner which allows tilth formation.

## DISC PLOUGH

Also designed for soil inversion used in harder, dryer soils, where total soil inversion is not necessary or desirable. Disc ploughs are used in root infested ground in lower rain fall areas.

## CHIESEL PLOUGH

Designed for soil shetter, effectively stir the soil, and do not invert it. The vertical and lateral cracking which results from the passage of a Chisel Plough tine, encourages the maximum infiltration and storage of available moisture.

Chiesel ploughs are also used for weed control in a fallow environment, normally used under dryland farming conditions or under controlled temperature conditions.

## SECONDARY CULTIVATION

1. HARROWS
2. CULTIVATORS

## HARROWS

a. Tandem Disc. Harrows are used to provide fine seed bed in lighter soil conditions. They are used when a fine shallow tilth is required.

b. Offest Harrow, used in cloddy and hard ground conditions to give a less fine tilth for moisture retention and erosin control.

## CULTIVATORS

a. Rigid tine

b. Spring Tine

c. Inter row

d. Power

**RIGID TINE**

Normally used in less developed agricultural environment.

**SPRING TINE**

They break soil closed down with the vibratory action of the tines. Used in areas of little threash or after a period of fallow:

**INTER ROW**

Used for weeding between rows of maturing plants.

**POWER CULTIVATORS**

Normally reffered to as rotary cultivators or rotavators. They are used for both primary and secondary cultivations.

**HARVESTING**

Need of Mechanized Harvesting is growing every day, it is not only saving the time but also has reduced the grain losses.

Due to economic uplift a tremendous change in attitude towards havesting and other work has been observed.

The following technology is being introduced in Harvesting operations:

1. REAPER — Basically useful implement for small size land holding farmers, reduces manual labour by 50%.

| | | |
|---|---|---|
| 2. | CUTTER BINDER | Medium size machine, it is costly than reaper, and suitable for medium size holdings. |
| 3. | COMBINE HARVESTER | The most sophisticated machine, suitable mainly for bigger land holdings. |

## CONCLUDED REMARKS

Land and water supplies are limited and it seems that physical bounds of an increase in the cultivated area have almost been reached.

Since the crop yields have direct bearing with improved farming conditions, the need and usage of Farm Machinery becomes very necessary.