



Agricultural Mechanization in India

Profile 2010



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INDIA: AGRICULTURAL HIGHLIGHTS

(i) Basic Facts

Total Geographic Area	328 Million Hectare (Mha)
Grossed Cropped area	190 Mha
Net Cropped Area	142 Mha
Cultivable Land to Total Geographic Area	57%
Contribution of Agriculture (and Allied Areas)	16 % to GDP 10.23 % to Total Exports 52.1% to Total Employment
Percentage of Cultivable Land to Total Area	52%
Agro Climatic Regions	20
Soil Types	46
Total Irrigation Potential (till March 2009)	140 Mha
Gross Irrigated Area	80 Mha
Area under Irrigational Use	54 Mha
Ground Water Resources for Irrigation	40 Mha

(ii) Kharif & Rabi Seasons

Season	Period	Sowing	Harvest	Major Crops
Kharif	June- November	June-July: Pre-sowing and preparatory tillage of the soil July: Sowing	September - December	Bajra, Jowar Rice Maize, Pulses Groundnut Chillies Cotton, Soyabean Sugarcane and Turmeric
Rabi	Mid October- February	September- November	February-March	Wheat, Barley Mustard, Sesame Peas, Gram Safflower and Linseed

(iii) Agriculture & Gross Domestic Product

At constant prices 2004 – 05	2008 – 09	2009 – 10
GDP (Factor Cost) (\$ Bn)	923	992
Growth Rate in GDP (%)	6.7	7.4
Growth Rate in Industry (%)	8.2	9.3
Growth Rate in Agriculture (%)	1.6	0.2
Growth Rate in Services (%)	8.7	8.5
Agricultural Composition of GDP (%)	17.1	16
Value of Agricultural GDP (\$ Bn)	158	159

Source: Economic Survey

(iv) Dependence on Agriculture

Year	Total Population (in million)	Average Annual Exponential Growth Rate (%)	Rural Population	Cultivators	Agricultural Labourers
1981	683.3	2.20	523.9	92.5	55.5
Percentage of Total Population			76.7	13.5	8.1
1991	846.3	2.14	628.7	110.7	74.6
Percentage of Total Population			74.3	13	8.8
2001	1027.0	1.93	741.7	127.6	107.5
Percentage of Total Population			72	12.4	10.4

Source: Census 2001

(v) Projected Food Requirement (Million tones)

	2010	2020
Food grains	225	270
Cereals	175	212
Pulses	20	24
Oil	13	16
Milk	88	106
Fruits	88	106
Vegetables	131	159

(vi) Food Grain & Commercial Crop Production (Million tones)

	2006 – 07	2007 – 08	2008 – 09
Rice	93.4	96.69	99.15
<i>% increase</i>	4.1	3.5	2.5
Wheat	75.80	78.57	80.58
<i>% increase</i>	3.4	3.6	2.5
Coarse Cereals	33.90	40.76	39.48
<i>% increase</i>	-0.3	20	-3
Pulses	14.20	14.76	14.66
<i>% increase</i>	5.3	4	-0.60
Total Foodgrains	217.30	230.80	233.88
<i>% increase</i>	5.20	6.11	1.33
Oilseeds	24.30	29.80	28.15
<i>% increase</i>	-16.90	22.60	-5.53

Source: Economic Survey

(vii) Yield (Kgs / Hectare)

	2006 – 07	2007 – 08	2008 – 09
Coarse Cereals	1158	1404	1380
Rice	2131	2202	2179
Wheat	2708	2802	2888
Pulses	612	625	651
Oilseeds	916	1115	1023
Food Grains	1756	1860	1901

Source: Economic Survey

(viii) Area Coverage of Food Crops (Million Hectares)

Year	Rice	Wheat	Coarse Cereals	Pulses	Total
1950 – 51	30.81	9.75	37.67	19.09	97.32
2004 – 05	41.91	26.38	29.03	22.80	120.12
2005 – 06	43.66	26.48	29.04	22.40	121.58
2006 – 07	43.7	28.17	28.44	23.20	123.51
2007 – 08	43.9	28.10	29.00	23.60	124.60
2008 – 09	45.5	27.9	28.60	22.50	123

Source: Ministry of Agriculture, Government of India

(ix) Disbursement of Credit by Banks

	2006 – 07	2007 – 08	2008 – 09
Gross Bank Credit (\$ Bn)	462.04	590.47	693.87
% increase over previous year	28	27.79	17.51
Agricultural & allied sectors (\$ Bn)	50.98	56.59	65
% of Total Bank Credit	12.41	12.04	9.37

Source: Economic Survey

(x) Public & Private Investment in Agriculture

	2006 – 07	2007 – 08	2008 – 09
Public Investment (\$ Bn)	5.10	5.12	5.43
Private Investment (\$ Bn)	15.87	19.33	25.36
Total	20.97	24.45	30.79

Source: Economic Survey

INDIA: MECHANISATION OF AGRICULTURE

(i) Market Size

Estimated Market for Agriculture Equipment (In \$ Mn)	185 – 225
Estimated Total Export Market for Agriculture Equipment (In \$ Mn)	9 – 14
Estimated Total Import Market for Agriculture Equipment (In \$ Mn)	7 – 9
Estimated Total Domestic Market for Agriculture Equipment (In \$ Mn)	200 – 250

(ii) Evolution of Indian Agricultural Machinery

Processes	Traditional Practice	Current Practice
Land Development Tillage Seedbed preparation	Plough, Blade Harrow	Tractors Mould Board Plough Power Tiller
Sowing & Planting	Dibblers	Seed Drill Zero Till Seed-cum-Fertilizer Drill
Weeding	Hand Hoes, Animal driven Weeding Tools	Power Weeder
Plant Protection	Dusters, Hand Sprayers	Blower Power Spray
Harvesting & Threshing	Sickle, Animal Trampling	Self Propelled Harvesters Tractor mounted Harvesters Threshers

(iii) Total Power Consumption

	2001 – 02	2005 – 06	2019 – 20
Total Power Consumption (Kw / Hectare)	1.29	1.45	2
% change	61.3	12.4	37.9

(iv) Testing of Agricultural Machinery

Testing of machinery is not mandatory; however loans from banks and subsidy provided by the Government of India under various schemes, depend on the clearance of these tests

These tests are conducted to find out if the machine would operate under Indian conditions or not

The following tests are performed:

Commercial tests: *for testing performance characteristics of machines that are in or ready for commercial production*

Confidential tests: *These tests are carried out for providing information to the manufacturers on the performance of their machines and any other data that may be required by them*

O.E.C.D. Test: *Tests in accordance with Organization for Economic Co-operation and Development (O.E.C.D.) Official Test Codes for agricultural and forestry tractors are undertaken exclusively for export purposes however the tractors must be a regular commercial model*

Test under CMV Rules, 1989: *This test is carried out to check the compliance to Central Motor Vehicles Rules requirements*

(v) Vendors of Agricultural Machinery

Village craftsmen:

- Main source of supply and repair and maintenance of hand tools and traditional implements
- About 10-15 million present throughout India
- Low level of capital is required to start these enterprises
- Implements made include tools like Spade, Sickle, Local ploughs, Sowing devices, Yokes, Patelas, Levellers, Grinding wheels, Hand Mills, Hand Operated Milk Churning tools, Winnowing devices, Sieves, Wooden storage structures, Bullock carts, Manual water lifting devices etc.
- They are the closest to the farmers; so farmers are very loyal to them
- Products are not very sophisticated as the level of technology is low

Tiny and Small Scale Industries

- The bulk of the farm machinery is made by them
- These units fabricate bulk of the improved agricultural machinery such as Ploughs, Cultivators, Disc ploughs and Harrows, Seed drills, Planters, Plant protection equipment, Reaper harvesters, Combine Harvesters, Threshers, Cleaners, Graders, Mills, Crushers, Oil expellers, Diesel engines, Irrigation pumps, Dairy machinery etc.
- The level of technology offered is higher than that offered by village craftsmen
- These are located throughout India in certain clusters

Organized Farm Machinery Industries

- Higher end machinery like Sprayers and Dusters, Land Development machinery, Tractors, Power Tillers, Rotavators, Combine Harvesters, Threshers, Post harvest and processing machinery and Dairy equipment are manufactured by them
- The marketing of agricultural machinery by these is through their network of dealers; therefore, these manufacturers are able to provide effective after-sales service and repairs
- These upgrade their products through their own Research & Development efforts



(vi) Development of farm mechanization in Indian states

- Punjab, Haryana and western Uttaranchal are major states where farm mechanization is concentrated; these manufacturers are now searching for a higher level of farming technology which increases their productivity
- Farm mechanization in the southern part of India has increased considerably over the decade but still has a long way to go before adapting to a higher level
- Uttar Pradesh and Bihar are some of the future potential states who have started using farm implements with support extended by the Government
- West Bengal, Orissa and the North eastern states are in the process of adopting farm mechanization

MARKET OVERVIEW OF MAJOR AGRICULTURAL MACHINERY

Name of Machinery: Tractor

Nature of Market

- Market size: Approximately 370 000 units annually
- Market growth: 4-5% per annum
- Price sensitive market; sales dependant on Government subsidy
- Government Subsidy drives sales but there is no subsidy on tractors above 30 HP
- Domestic sector growing due to an increase in the irrigated area, Government policy related to export which decides crop switching by farmers
- Smaller tractors are very popular (35-40 HP); this is the fastest growing segment
- Out of the total tractors sold, one third are for non agricultural uses i.e. for transport and haulage

Visible Trends & Opportunities for Italian Manufacturers

- The Penetration Level of Tractors is 17 for every 1000 Hectares
- Italian companies could produce for the upper end (> 51 HP) as the lower end is catered by Chinese and Taiwanese manufacturers
- The operators of tractors are exposed to the latest technology and demand modern features like Gear Shifting Array, Smooth Shifting, Power steering, good styling etc- Rich farmers have driven luxury cars and now demand similar features like high paint quality
- Introduce crop specific tractors for paddy, potato, sugarcane etc
- Servicing is very important as breakdown on the field is a big loss
- Demand is saturated in Punjab and Haryana so higher end tractors are demanded in these states
- The 35-50 HP segment is most popular and 39 HP is the most sold



- Demand would grow for the less than 50 HP tractors for smaller holdings of 7-8 acres
- The 60-65 HP segment would grow due to contract farming
- Big tractors over 65 HP are used in construction sector and haulage, by Border Security Forces and the Army

Major Brands with Market Share

Manufacturer	Market Share
Mahindra & Mahindra	45%
Escorts	18%
Tractors & Farm Equipments	18%
Sonalika	13%
Others	6%

Source: Tractors Manufacturers Association

Pricing

Category	Price (\$)
30 HP	Approximately 8000 – 8200
35-40 HP	Approximately 10000
50 HP	Approximately 12000

Source: Company sources



Name of Machinery: Combine Harvester

Nature of Market

- Market Size: Approximately 3000-4000 units annually
- The market is in the infant stage; is growing by the day
- Demand is erratic as orders are placed depending on the monsoon
- There is no incentive from the Government like subsidy
- Majority of the users goes in for custom hiring; the machines are brought from Punjab and Gujrat to other states
- Model of the Combine Harvester is changed to suit the size of the land holding which is small
- Local manufacturers give tough competition to organized companies
- There has been an increase in demand by 40% in the last 2-3 years
- European companies are targeting India; so first mover advantage is immense

Pricing

Category	Price (\$)
Locally made	Approximately 30000
MNCs	Approximately 40000 – 65000

Source: Company sources



Visible Trends & Opportunities for Italian Manufacturers

- India is a growing economy and not only yield should be high but also manual losses from transport to storage area should be as low as possible
- Manufacturers cannot cope with the rise in demand as they are not prepared with this; this proves that the company that comes first would benefit
- Size of the Combines should be according to farm plots
- In India very simple machines are required and the price has to be right
- Precision items like Hydraulic Gears can be imported from Italy and high volume and low price items like fabrication parts could be made in India
- Land holdings are decreasing every year; so harvesters have replaced threshers



Name of Machinery: Thresher

Nature of Market

- Market size: Approximately 20000 units annually
- There are many local manufacturers
- Annual Growth: 10%
- Price range: Approximately \$ 1600 – 2700 ; price depends on the price of steel which is a key raw material
- Traditional threshing of wheat and several other crops is totally replaced by power threshing where current trend is for high capacity bulk-fed power threshers
- Power used < 30 HP; In Punjab and Haryana higher HP required

Visible Trends & Opportunities for Italian Manufacturers

- Great scope of education and training to farmers to explain to them more about the product; this would make them demand the product
- There are problems like ensuring safety as when paddy is put into the thresher, hands could go inside and get injured
- Can be improved through R&D as the material used is not of a high quality

Name of Machinery: Rotavetor

(Rotavetor is better than conventional tillage equipments because it:

-saves time, fuel, soil compaction and wear and tear of the tractor as it accomplishes pulverization in the shortest time

-leaves soil perfectly leveled

-stubbles and residues of previous crops are chopped into pieces and mixed in the soil to form organic manure-there is no need of multiple operations of cultivator, disc harrow and plank

-puddling in wet fields is done smoothly and efficiently; -sealed bearings prevent moisture / mud entry)

Nature of Market

- Market size: Approximately 50000 units annually
- Growth: 50% p.a.
- Price range: Approximately \$ 1700 – 2700
- Till now the tractor was used with the cultivator or disc harrow and required 2-3 operations; now the Rotavetor can be used in a single operation
- Specification used :
 - 3 sizes 5 ft, 6 ft, 7 ft width
 - 36 blade, 1.5 meter width
 - 42 blade, 1.75 meter width
 - 48 blade, 2 meter wide
- Sales depends on monsoons
- Buying season: October-March end
- Power of machines depends upon requirements of different states



Visible Trends & Opportunities for Italian Manufacturers

- The Penetration Level of the Tractor operated Rotavetor is 1 for every 1000 Hectares
- Can substitute for ploughs, harrows and is four times more efficient
- Crop yield increases as tillage is very efficient
- Production is increasing but unexpected demand is not being met; so quality of the machines gets compromised
- Transmission is of not very good raw material; so an improvement could be made
- Variety of blades can be developed
- Hydraulic technology can be developed



Name of Machinery: Self Propelled Vertical Conveyor Reaper

Nature of Market

- Market size: Approximately 1200 units annually
- Price range Approximately \$ 1700 – 2500 depending on the farmer
- Demand is high and cannot keep pace with the supply
- Specification commonly used:7 feet cutting bar
- Used by small farmers where Combine Harvesters are not used
- Volume is not very high as different tractor attachments use different sizes of reapers
- Transporting the machines is a problem as orders are given by farmers at the last moment just before the season

Visible Trends & Opportunities for Italian Manufacturers

- Reaper-cum-binder: An Italian company, BCS Co has introduced a Reaper cum Binder that harvests and binds into bales; it is tractor driven and the price is approximately \$ 5000
- This is highly in demand and farmers are interested to custom hire
- Lack of knowledge amongst farmers; they buy whatever is there in the market
- Lack of quality manufacturing in India
- Gear box is not sophisticated as communicated by farmers



Name of Machinery: Zero Till Seed Drill

Nature of Market

- Market Size: Approximately 15000 units annually
- Price: Approximately \$ 600 – 800
- Growth: 5% growth annually
- Specification used: 9,11, 13 tonnes
- The machine is simple to use as farmers' education about the machine is low
- Many local firms produce the machine

Visible Trends & Opportunities for Italian Manufacturers

- The Penetration Level of the Zero Till Seed Drill is 7 for every 1000 Hectares
- This would become very popular as it is a resource conserving equipment
- The physical structure of the soil is maintained
- Very little water is required
- Avoids large cracks in soil after dry periods
- Can keep previous crop's residue in the field
- Subsoil layer is not compacted by tractors (compacted subsoil impedes root growth)
- Opportunity increases as some states divert subsidy from one equipment to another if the subsidy amount is not exhausted
- Price is low; so affordable



Name of Machinery: Multi Crop Planter

Nature of Market

- Market Size: Approximately 300-400 units annually
- Price: Approximately \$1000
- Market has not picked up yet; used mainly for planting maize and cotton
- Benefit is that various crops could be planted with one machine
- Very low level of awareness amongst farmers regarding row specification, plant spacing, seed size
- Manual literature is missing so knowledge about the machine is insufficient
- Companies are selling mainly to universities for demonstrations
- Demand for Manual type is higher as in the automatic machine if the germination point is cut then the germination will not take place

Visible Trends & Opportunities for Italian Manufacturers

- Subsidy is given to private cooperative societies in states like Punjab; this would make farmers take equipment on hire
- There could be improvement on the product as grading of seeds has to be done as all sizes of seeds would not go inside
- Awareness of the machine is absent amongst farmers as far as specification, plant spacing, seed size are concerned; so interaction with farmers could greatly help them understand the product



Name of Machinery: Power Tiller

Nature of Market

- Market Size: Approximately 60000-70000 units annually
- Price range: Approximately \$ 3000 – 3150
- Growth rate: 10% p.a.
- Not a very big market but growing gradually
- Multi use Power Tillers with 3-4 attachments preferred in India

Visible Trends & Opportunities for Italian Manufacturers

- The Penetration Level of the Power Tiller is 2 for every 1000 Hectares
- Government subsidy would drive growth
- Horticulture could have market for Italian Power Tillers
- Italian power tillers are generally < 8HP and not for multi operation
- Chinese Power Tillers cost \$ 1000-1200, 13-15 HP, but getting spare parts is a problem
- Sector would not witness any dynamic growth like tractors
- Power tillers driven by petrol would not be popular due to high cost of petrol; diesel is subsidized and would be more popular



Name of Machinery: Laser Land Leveller

Nature of Market

- Market Size: Approximately 2000 units annually
- Price: Approximately \$ 8000
- Used for agricultural and construction sector
- Water conservation is one of the biggest benefits-as a level field demands the same level throughout; if its is undulated, water would not reach everywhere and would accumulate at one particular spot giving too much water thereby damaging the crop; also prevents soil erosion
- Growing gradually as farmers are seeing positive results

Visible Trends & Opportunities for Italian Manufacturers

- Due to the emphasis on Conservation Agriculture, the concept would be popular in future
- Some Governments are coming with subsidy schemes for this
- Farmers going in for hiring of equipments



Name of Machinery: Rice Transplanter

Nature of Market

- Market size: Approximately 600-800 units annually
- Currently Indian companies are importing from China
- Price: Approximately \$ 3700 – 5000
- Concept was not heard of 4-5 years back but now it is gaining popularity
- State Governments are purchasing as part of the Subsidy schemes
- Kerela is the most advanced; women operate the machine as part of Self Help Groups
- Companies are now looking at importing and as soon as the volumes pick up, they would start manufacturing

Visible Trends & Opportunities for Italian Manufacturers

- Have been introduced on an All India basis
- Government of India is promoting the machinery by providing subsidies
- The future market could be as high as 2000 machines a year
- In India, it was observed that higher and more stable yield was obtained from transplanted rice than direct seeded rice- 10 to 20 % higher than broadcast rice
- Labour cost is \$ 24-36 an acre where as it costs \$ 14 and \$ 20 per acre when a Rice Transplanter is used



Name of Machinery: Power Spray / Manual Spray

Nature of Market

- Market size: Approximately \$ 100 Mn annually
- Annual Growth: 10%
- Price Range:
 - Power Spray: Approximately \$ 50-500
 - Manual spray Approximately \$ 10-30
 - Chinese Power spray: Approximately \$ 45
- High volume low profit market
- Highly price sensitive market
- Household industry; there are more than 1000 suppliers
- Bundling of services with pesticide companies is done for branding
- Land holding does not matter
- Subsidy available from state Governments

Visible Trends & Opportunities for Italian Manufacturers

- The Penetration Level for the Manually Operated Spray is 29 for every 1000 Hectares and for the Power Operated Spray is 4 for every 1000 Hectares
- Top end market size is limited; at the lower end there is stiff competition from China and Taiwan
- Products should be adaptable to local products- nozzles should be able to fit into the machine properly and should be replaceable



Name of Machinery: Power Weeder

Nature of Market

- Market size: Approximately 25000 units annually
- Purchasing Season: August – September
- Pricing: 1 HP- 2.5 HP would be priced at \$ 650-800
- Chinese machines are imported by Indian companies

Visible Trends & Opportunities for Italian Manufacturers

- Light weight machines are required
- Demand for engines using diesel would be higher as it is subsidized
- It would require 18 inches distance between 2 rows for a power weeder, but in India distance is 8-9 inches as seed drill is used to sow seeds; so machines are to be made accordingly
- Indian machines are low on design so there is scope of further improvement

Name of Machinery: Drip Irrigation Equipment

Nature of Market

- Market size: Approximately \$ 275 Mn annually
- Annual growth: 20-25%
- Price range: Approximately \$ 670 per Hectare to \$ 1700 per Hectare depending on the spacing
- Huge requirement as demand is not met with present level of supply
- Many local manufacturers present as investment is low
- Government does not support imports; the import duty is as high as 20-35%
- This has helped farmers reduce water use by 30 to 70 % and to raise crop yields by 20 to 90 %
- Helps in weed control, quality of crops increases
- Requires high maintenance cost and education for installation

Visible Trends & Opportunities for Italian Manufacturers

- Various State Governments offer subsidy to farmers from 70% to 90%
- There is water savings of up to 50 % resulting in reduced labour and energy costs and yield increases by 30 to 50 %
- Only 1 % of the Irrigated area is covered by Drip Irrigation
- There is a lot of scope of increasing the area under irrigation with many Central Government Schemes of \$ 90 Mn being announced in 2009-10
- Huge scope in areas where cash crops are grown
- Features like timers / controllers could be introduced by Italian companies so that the pump can start and end by itself
- Due to the saving of water, this has unlimited potential in areas like North Western India and some parts of Western India



Name of Machinery: Sprinkler Irrigation Equipment

Nature of Market

- Market size: Approximately \$ 275 Mn annually
- Market would grow for the next 10-15 years
- Price range: Approximately \$ 550 per hectare
- India has the highest potentially irrigated area
- Majority of the suppliers are local manufacturers
- Subsidy provided by states are as high as 50% and 75%

Visible Trends & Opportunities for Italian Manufacturers

- Various State Governments offer subsidy to farmers
- Only 3 % of irrigated area in India is irrigated by Sprinkler Irrigation
- Many minor irrigation projects are being implemented by the Government
- Features like timers / controllers, start pump and end by itself could be introduced

TRENDS IN INDIAN AGRICULTURE

- India has small as well as big farms
- Mechanical power has replaced bullock power on Indian farms. The contribution of mechanical power and electrical power to the total power availability on the Indian farm has risen to 70% from 30 % during the last two decades.
- In hilly parts of the country and remote areas, most of the farm operations are still being performed manually or by animal drawn equipments and this will continue to be the case in future also. Hence, both small and large size machines would be needed
- Average size of farm holdings has gradually reduced from 2.58 hectare to 1.57 hectare. Fragmentation will continue due to 'Laws of Inheritance' and 'Hindu Succession Act' where the father would divide the land amongst his sons
- Labour shortage is being experienced at peak seasons due to the enactment of the National Rural Employment Guarantee Act and huge demand from the construction sector in cities; labour is available at a higher cost per hectare and this would increase the demand for mechanization
- India is a growing economy and an increasing population can be supported by multiple cropping; hence, to perform the operations timely, high capacity machines in some places are required
- Due to the high cost of agricultural machines, custom hiring / providing machines on rental basis is being promoted by the Government
- Conservation Agriculture has emerged to encourage sustainable agricultural production. It refers to the system of raising crops without tilling the soil while retaining crop residues on the soil surface. There is minimum soil disturbance by adopting no-tillage solutions
- The thrust areas of the Government include increase in the production and productivity of crops including horticultural crops, soya products, oilseeds and pulses
- Increased participation of corporates through Corporate Farming has become very popular. Companies are entering into agreements with farmers through Contract Farming
- Organic farming in India is set to get a major boost with the market being over \$130 million

MACHINERY FOR THE FUTURE

Types of Machinery	Use	Specifications required in future / Availability in India
(i) Laser Land Leveler	Precision leveling in both the directions Laser control system not available in India	55 HP
(ii) Zero Till Seed drill	It does minimum tillage of the field & thus increases the yield This has been developed to save time, fuel & irrigation expenses	35-45 HP
(iii) Crop Residue Mulch Cutting & Spreading Machine	The machine should cut and mix the crop residue in the soil India does not have good crop residue cutting and incorporating machines	35-45 HP tractor can operate it
(iv) Electrostatic sprayers	Charged particles come out of the nozzle and fall on the leaf and not on the ground as earth is neutral. This reduces the damage to crops No company in India makes these	25-35 HP Tractor driven
(v) Pneumatic Planter	For sowing / planting small and big seeds in the soil at the right distance No company is manufacturing Pneumatic	35 HP



	planters in India	
(vi) Field Plot harvester	To harvest cereals, pulses and oil seed crops and avoid mixing of seeds while harvesting We do not have field plot combines which can harvest small fields and all these different crops	35-45 HP
(vii) Root crop harvesting	For potatos, groundnuts A sugar beet harvester could also be used	30-50 HP Tractor driven
(viii) Fodder Harvester	Could be used in dairies Not manufactured in India but imported	30-50 HP
(ix) Vegetable Planters	In India, the design is not convenient and the seedling size does not match Self propelled and tractor operated available	30-35 HP
(x) Gender Sensitive Machinery	About 86% of all rural female workers are in agriculture and manual equipments for them are too heavy to pull; they feel the drudgery working for puddling operations Scope high in Rice growing regions	Low cost plastic shoes that can be easily worn in mud required Tear proof gloves required for working in the soil Belt required for wearing during bending for transplanting as normal belts do not work



Crop specific machinery	Power required	Specific features
Sugarcane Planter	50-60 HP	Heavy duty
Cotton	50-60 HP	Heavy duty
Sunflower Combine	50-60 HP	Heavy duty
Safflower Combine	50-60 HP	Heavy duty



FUTURE DRIVERS OF GROWTH

- India is a growing economy and to support a growing population we would require not only efficient but machinery that would increase the yield of food grains and commercial crops
- Farmer spending has increased due to higher food prices
- Government subsidy on agricultural machinery is on the increase and more and more equipments would be included for subsidy in the future
- The National Rural Employment Guarantee Act passed by the Indian Parliament envisages 100 days of work to a rural household whose adult members volunteer to do unskilled manual work. So labour is in short supply. Demand of labour from the construction industry is increasing so more and more rural labourers are coming to the city; this has also helped wages to increase sharply making it unviable
- It is expected that the percentage of population involved in agriculture will come down from the present 64% to a close 40% by 2020; this would increase the need for mechanization

GOVERNMENT'S INITIATIVES

- The Central and State Governments in India have kept in mind the importance of Agriculture for India and have introduced several schemes to help the sector grow in India and benefit farmers. Subsidy is an important measure by which the Government is promoting mechanization of agriculture
- The Government has considered Rural Infrastructure and Employment development as ways in which the rural population can witness prosperity

Some of the measures are as follows:

RURAL INFRASTRUCTURE

The Rural Infrastructure Development Fund (RIDF) is the main instrument to channelize bank funds for financing rural infrastructure

AGRICULTURE

- The total value of overdue loans from farmers waived is estimated at \$ 12 bn
- Government will continue to provide fertilisers to farmers at subsidized prices



- Irrigation and Water Resources Finance Corporation (IWRFC) with an initial capital of \$ 20 Mn has been set up
- Government is investing heavily in the Accelerated Irrigation Benefit Programme (AIBP) and the Rainfed Area Development Programme to manage water resources
- The centrally sponsored scheme on micro irrigation would target a larger area for irrigation
- Agreements have been signed with the World Bank to repair, renovate and restore water bodies

RURAL EMPLOYMENT

National Rural Employment Guarantee Programme envisages 100 days of work to a rural household whose adult members volunteer to do unskilled manual work. The corpus would be \$ 9 Bn for 2010-11

BHARAT NIRMAN AND FLAGSHIP PROGRAMMES

Bharat Nirman is a plan for action in rural infrastructure for the next four years in the areas of irrigation, road, rural housing, rural water supply, rural electrification and rural telecommunication connectivity

MINIMUM SUPPORT PRICE (MSP)

This is announced by the Government for purchasing foodgrains and commercial crops at a pre determined price which provides the incentive to the farmer to increase the area of that crop

SUBSIDY ON AGRICULTURAL MACHINERY

The Government of India and various State Governments provide subsidy to farmers for the purchase of Agricultural Machinery . Some of the schemes are mentioned below:

Schemes	Machinery Covered	Subsidy Amount
National Food Security Mission	Cono Weeder	50% of the cost or \$ 70 per farmer whichever is less
	Zero Till Seed Drill	50% of the cost or \$650 per machine whichever is less
	Rotavetors	50% of the cost or \$1300 per machine whichever is less
	Diesel Pumpsets	50% of the cost or \$225per machine whichever is less
	Sprinkler Sets	50% of the cost or \$ 170 per hectare whichever is less
Rashtriya Krishi Vikas Yojna (RKVY)	Power Reaper	50% of the cost or \$ 1600 whichever is less
	Power Thresher	50% of the cost or \$ 50 whichever is less
	Spray	50% of the cost or \$ 50 whichever is less
	Cono Weeder	50% of the cost or \$ 70 per farmer whichever is less



	Tractor Operated Seeder	50% of the cost or \$ 335 per farmer whichever is less
	Power Tiller	45% of the cost or \$ 1000 per farmer whichever is less
	Rice Transplanter	25% of the cost or \$ 900 per farmer whichever is less
	Tractor (up to 40 HP)	10% of the cost or \$ 1000 per farmer whichever is less
ISOPOM scheme (Integrated Scheme of Oilseeds, Pulses, Oil Palm & Maize)	Manually Operated Plant Protection Equipment	50 % of the cost or \$ 20 whichever is less
	Power Operated Plant Protection Equipment	50 % of the cost or \$ 45 whichever is less
	Sprinkler Irrigation set	33% to 50 % of the cost with a ceiling of \$ 225 to \$ 340
	Drip Irrigation set	35% to 50 % of the cost with a ceiling of \$ 115 to \$ 210
	Diesel Pumpsets	50 % of the cost or \$ 220 whichever is less
Macromode Scheme	Tractor (up to 35 HP) Power Tiller (above 8 HP) Transplanter Self propelled Reaper	25% of the cost or \$ 670 whichever is less
	Zero-Till-Seed Drill Raised Bed Planter	25% of the cost or \$ 450



	Sugarcane Planter Potato Planter Potato Digger Harvester Power Weeder	whichever is less
	Power Threshers	25% of the cost or \$ 225 whichever is less
	Sprinkler Irrigation set	25% of the cost or \$ 225 to \$ 335 whichever is less (depending on the category of the user)
	Drip Irrigation set	25% of the cost or \$ 360 to \$ 650 whichever is less (depending on the category of the user)
	Plant Protection Equipment	25% of the cost or \$ 20 to \$ 670 whichever is less (depending on the category of the user)

(The list is not an exhaustive one)



ITALIAN MACHINERY IN INDIA – THE WAY FORWARD

- The percentage of import of Agricultural Machinery from Italy is low but growing at a very impressive rate; it has increased from 5% of the total import of agricultural machinery in 2007 to 9% in 2009
- Indian agricultural manufacturers are extremely interested in working with Italian companies due to the high quality of Italian products and technology
- They are in favour of the following arrangements:
 - **Joint Venture:** Import of equipment from Italy attracts high import duty so the Indian and the Italian company could form a Joint Venture to manufacture machinery in India as India offers several advantages like low cost of production. This could also open up opportunities of re-exporting to Europe
 - **Technology Transfer:** The Italian company could supply technology to Indian companies for a royalty payment
 - **Importing critical parts:** The Indian company could import highly specialized parts from Italy in Semi Knocked Down / Completely Knocked Down condition and assemble them in India

Important Points for Italian Companies

- Indian companies are very keen on Joint Manufacturing or Joint Development of agricultural machinery and distribution of Italian farm machinery
- A tie up is very important as local knowledge is very important and it is extremely critical to know the psyche of the local farmers. This would help in establishing distributors in the interiors
- There could be an opportunity of cross selling products if a company owns more than one product in case of a strong brand name
- Long term relationship should be looked at as returns would be generated only after trust has been established between the farmers, distributors and the company
- Too many distributors should not be appointed; this could cut into the sales of other distributors due to price cuts and cause problems for them
- Italian companies should not treat the country geographically while appointing distributors; volumes that can be generated should be the consideration



- After sales service is very important to farmers; local manufacturers are better positioned to reach out to the farmers due to their high penetration level
- Higher end machinery could be looked into as at the lower end, there is stiff competition from China and Taiwan
- It is seen that managers of foreign companies change their jobs very often and this makes the new managers change strategies which affects the business of the Indian distributors
- In India, very simple machines are required and the price has to be appropriate
- Italian companies have to first demonstrate machinery to the farmers; this could be done through Agricultural Universities which could mobilize farmers and explain the working of the machines. The partnership would also help develop new products / features in the future
- Some Indian companies feel that Italian companies are slow in communicating to partners as a result of which the entire project gets delayed