Tractor Industry in India – Present and Future

Indian Agriculture – Vital Sector of Indian Economy

AGRICULTURAL DEVELOPMENT

Pre Green Revolution

(Before 1960's)

- Boost in the productivity growth of coarse grains and pulses per unit of land

Green Revolution

(Mid 60's to Mid 80's)

- Expansion of arable area and rapid growth in productivity of wheat and rice
- Expansion of agricultural research
- Establishment of national infrastructure

Post Green Revolution

(mid 80's to 2000)

- Continued growth in productivity through intensification of chemical and labor
- Expansion of area under maize, cotton, sugarcane and oil seeds

AGRICULTURAL DEVELOPMENT

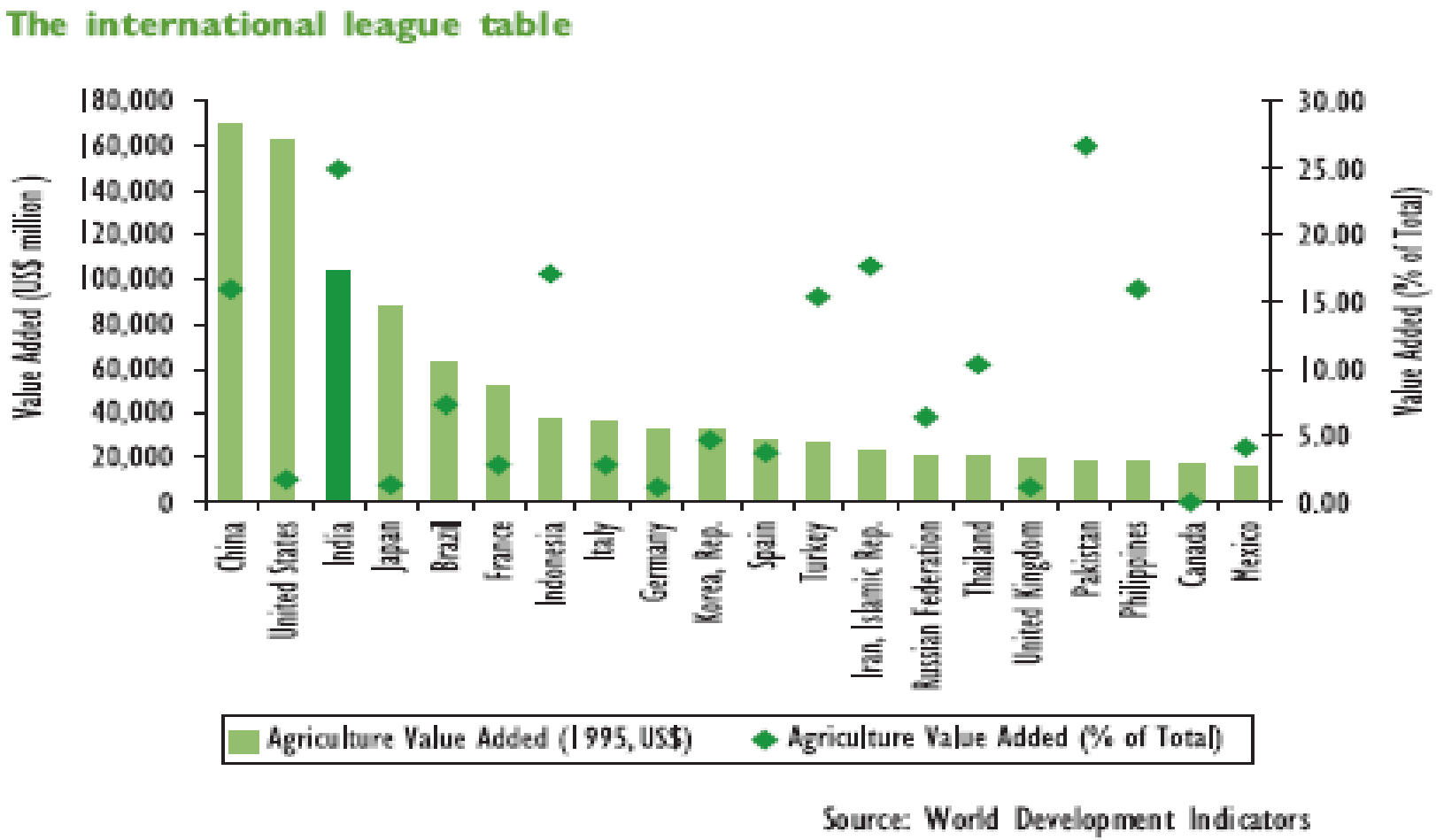
India - in the 4th stage of agricultural transformation

- Further diversification of cropping patterns from low value to high value crops such as fruits, vegetables, flowers and other horticultural crops for domestic consumption, processing and export
- Regaining Agricultural Dynamism a key goal of 11th Five Year Plan
- Aiming to Achieve the sustained growth rate of 4 - 5%
- Improvement in Farm mechanization

INDIAN AGRICULTURE SECTOR

- Key sector of Indian Economy
- Contributes 25% of GDP of the country
- 13% of India's Exports
- Second largest producer of rice & wheat in the world
- Largest producer of pulses
- Fourth largest producer of coarse grains
- Second largest producer of vegetables, groundnuts & fruits
- Current average growth rate: 2.2%

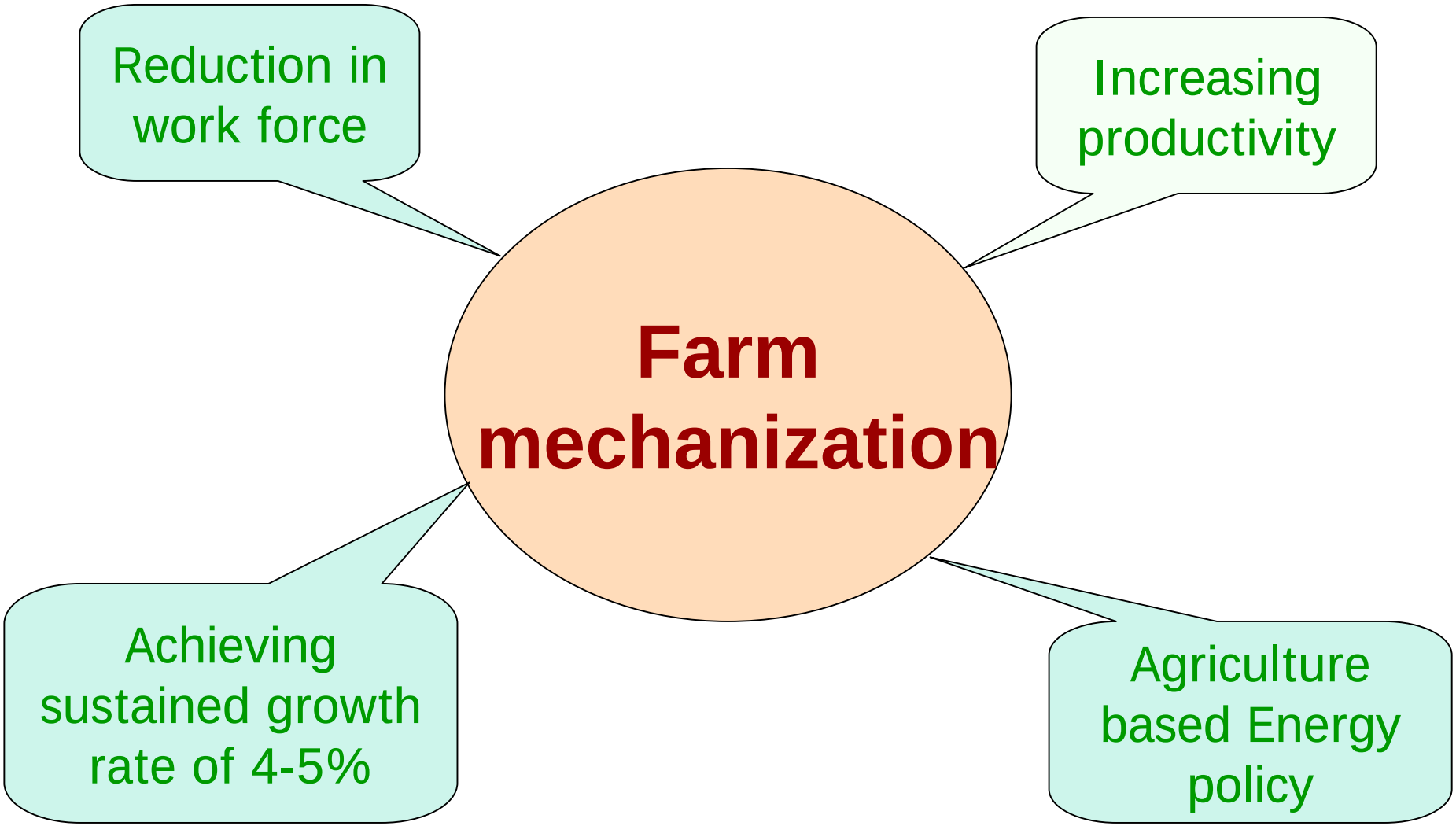
AGRICULTURE SECTOR – GLOBAL SCENARIO



INDIA - VISION 2020

- Raising productivity & Rapid diversification in agricultural sector
- Total proportion of work force involved in agriculture to reduce from 56% to 40%
- Growth rate to reach 4-5 % from current average growth rate of 2.2%
- Agricultural based energy policy to focus on production of fuel oil & biomass power – could generate lucrative alternate markets for farm produce while reducing the country's dependence on imported fuels
- Accelerated acquisition of technology capabilities to raise productivity in agriculture, industry & services
- Sectoral composition of GDP to drop from 28% to 6% in 2020

NEED FOR FARM MECHANISATION



Indian Tractor Industry – Current Status

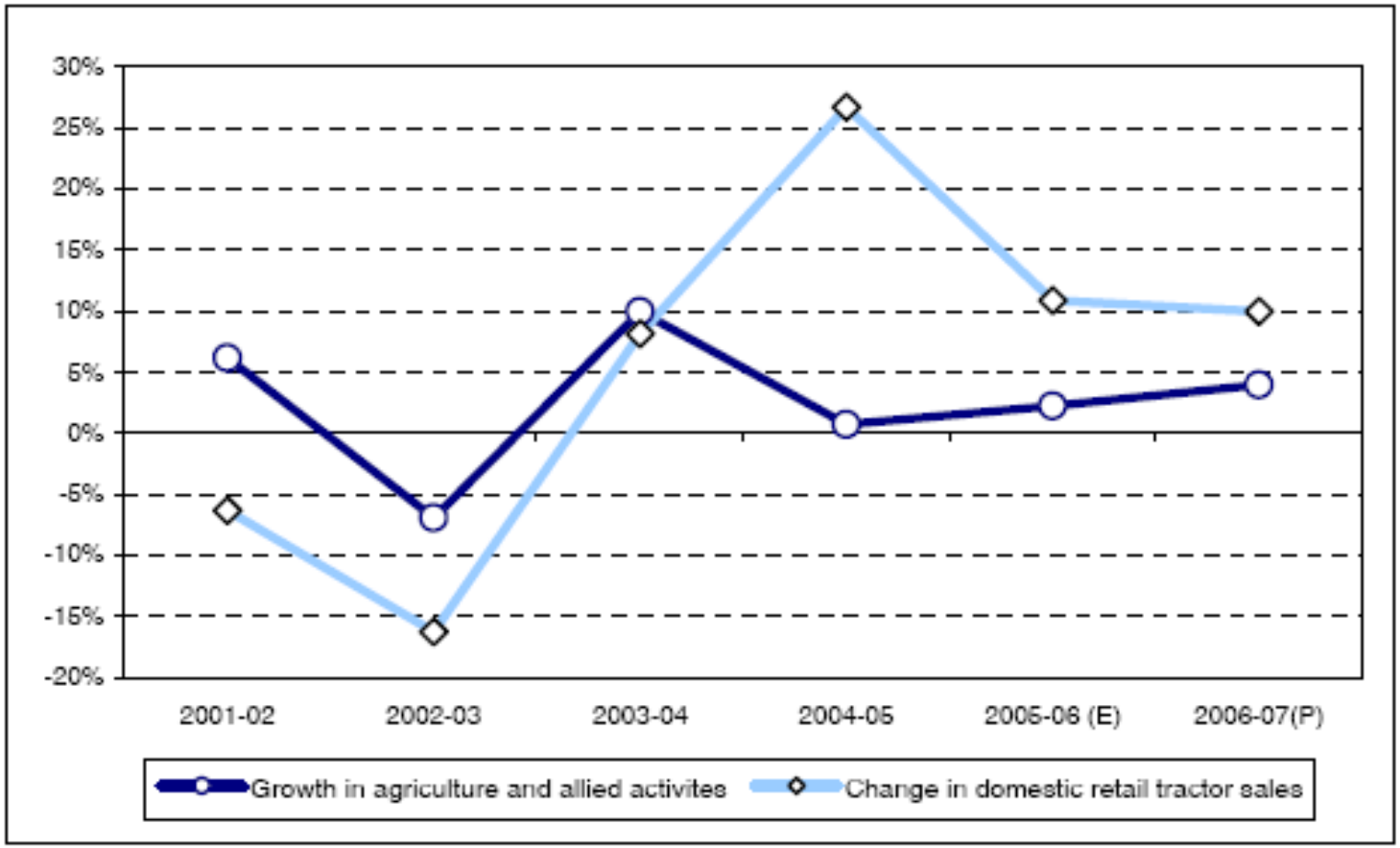
Indian Tractor Industry

- Largest in the world
- 1/3rd of Global production
- Positive Growth (CAGR) of 10% for last 4 decades

Industry Status

- CAGR of 19.5% in last 3 years.
- 2,92,908 tractor sale in nos. in 05-06
- Government focus on 4 % growth in Agricultural GDP

Comparing agricultural GDP with tractor sales **Figure 2**

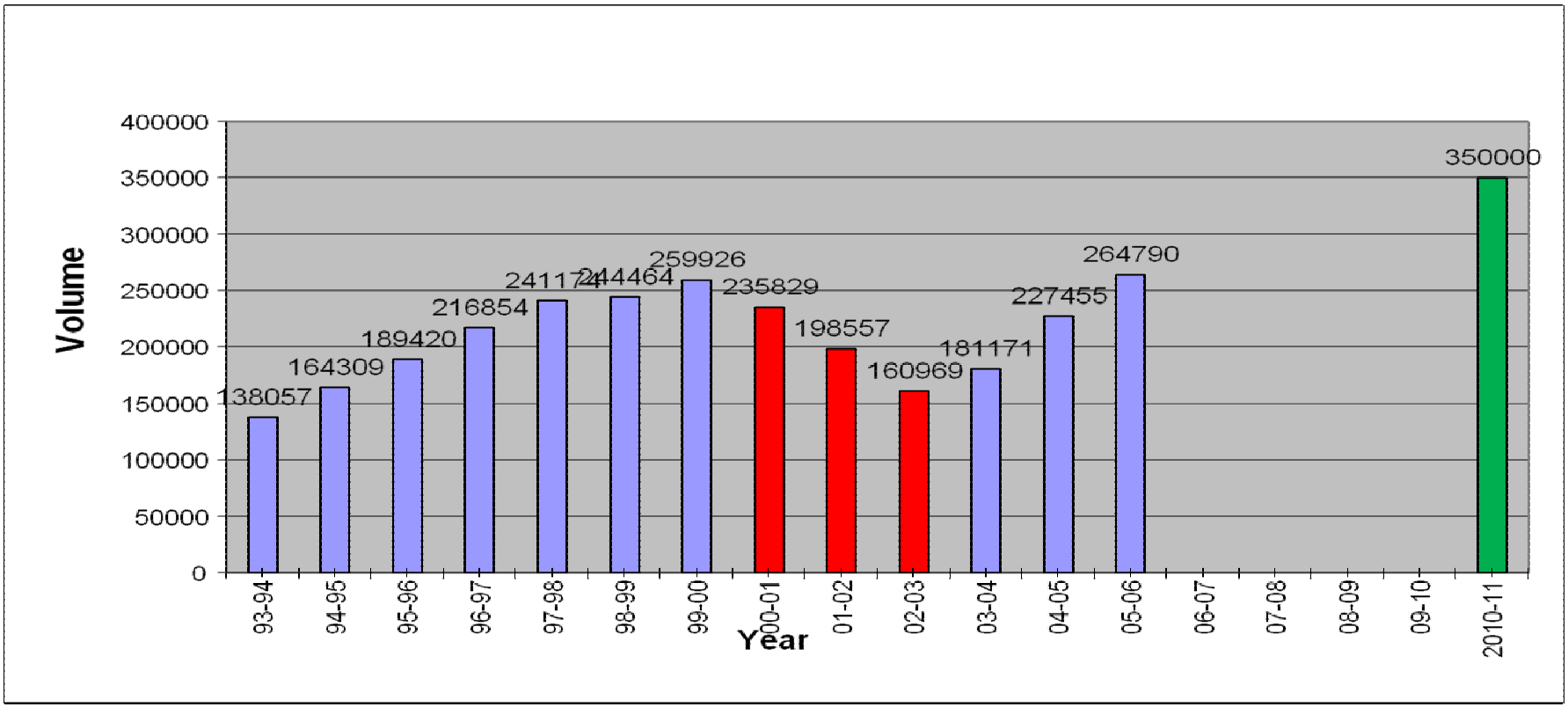


Source: Central Statistical Organisation and CRIS INFAC

Industry Status

- Next 5 years expected to have CAGR of 5 to 7% (2010-11)
- Domestic industry to reach a level of 3,50,000 tractors per annum by 2010-11

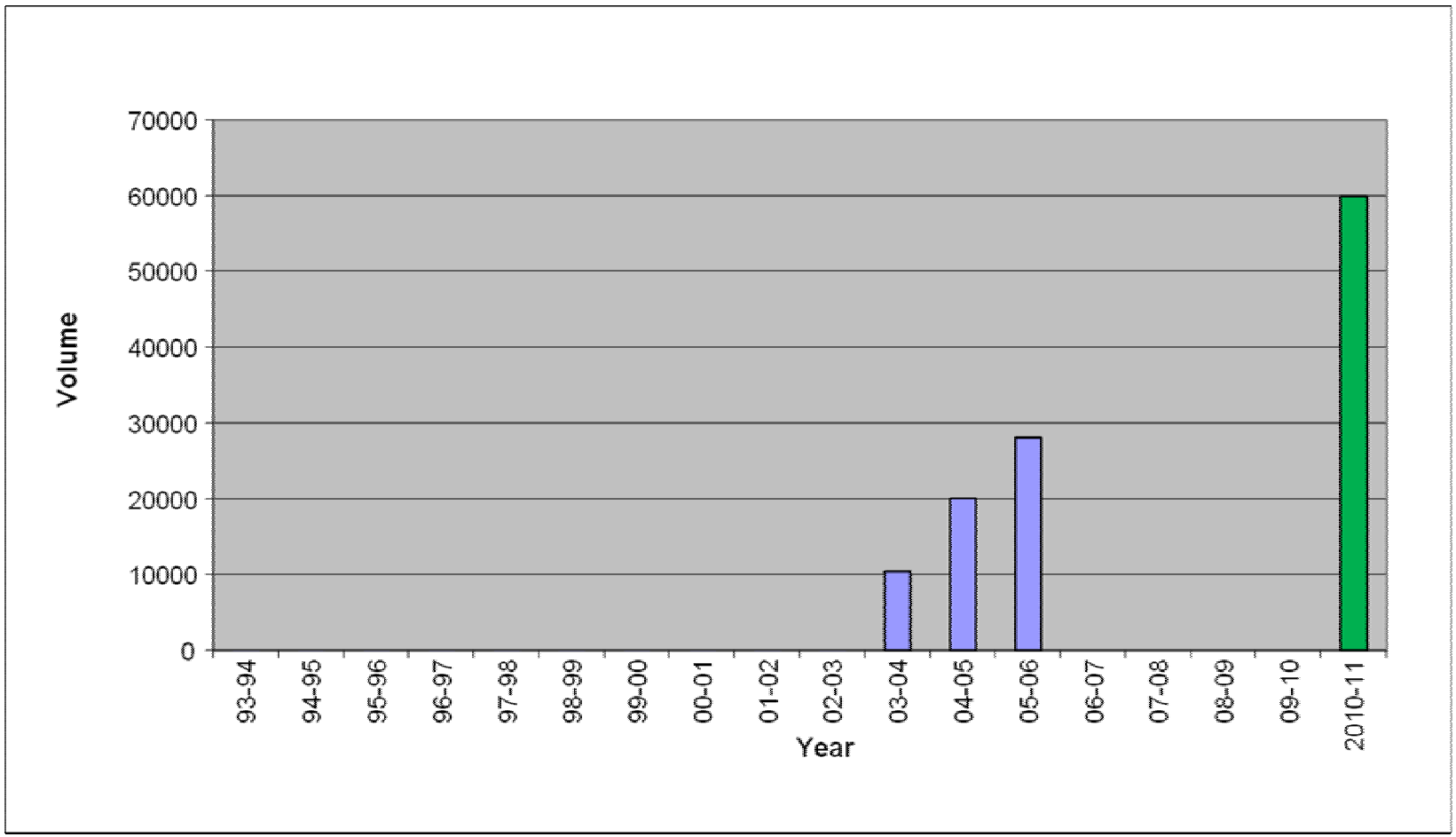
Domestic


Volume
400000
350000
300000
250000
200000
150000
100000
50000
0
138057
164309
189420
216854
241174
244464
259926
235829
198557
160969
181171
227455
264790
350000
93-94
94-95
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
2010-11
Year

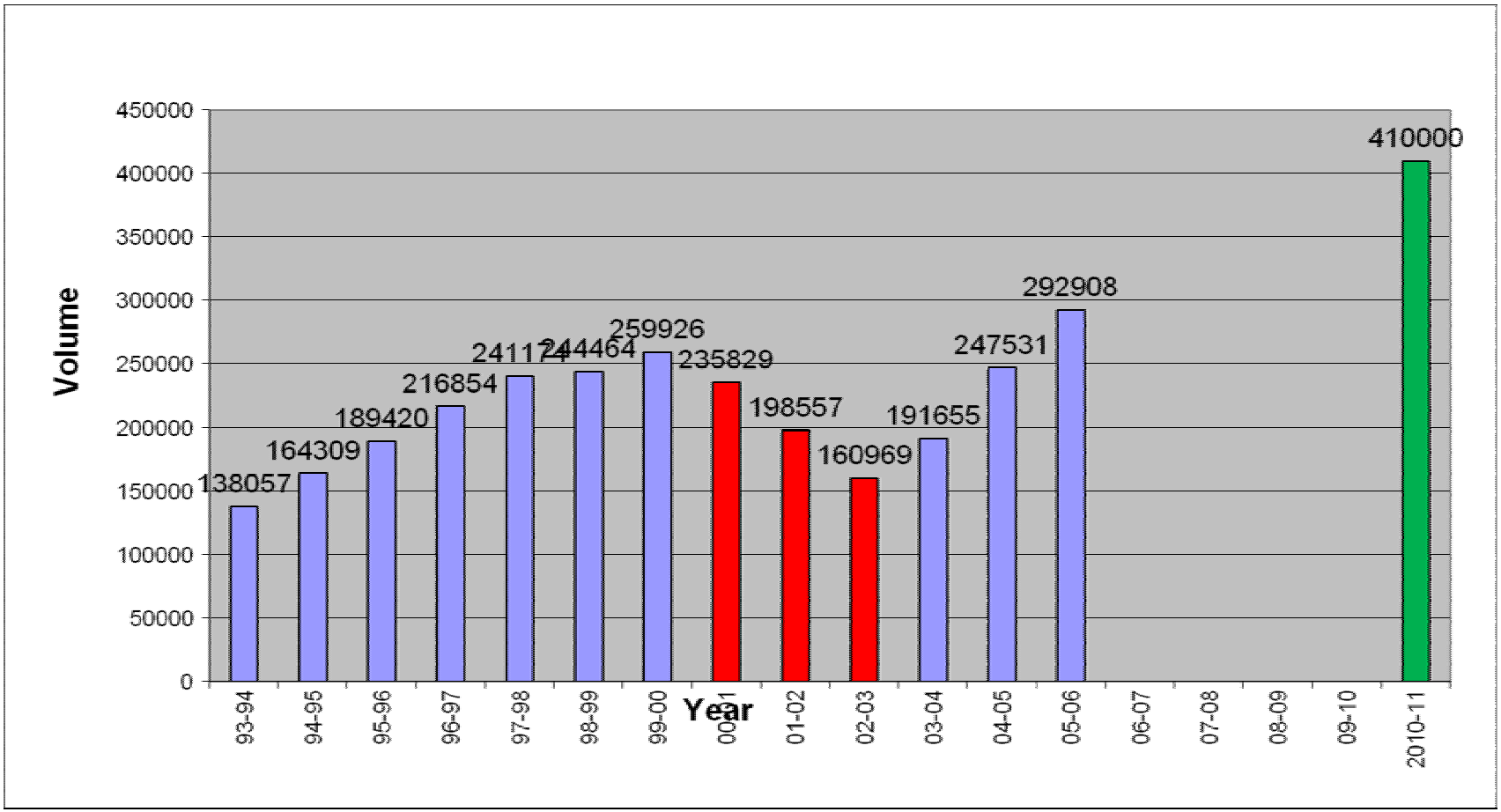
Exports

- Gaining acceptance in International Markets
- Exports grew by 55% CAGR in last 3 years. At 28,118 (2005-06)
- Major markets are USA, SAARC countries, Turkey, Malaysia and parts of Eastern Europe.
- Export to reach a level of 60,000 tractors per annum by 2010-11.

Exports


70000
60000
50000
40000
30000
20000
10000
0
Volume
93-94
94-95
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
2010-11
Year

Total (Domestic + Exports)



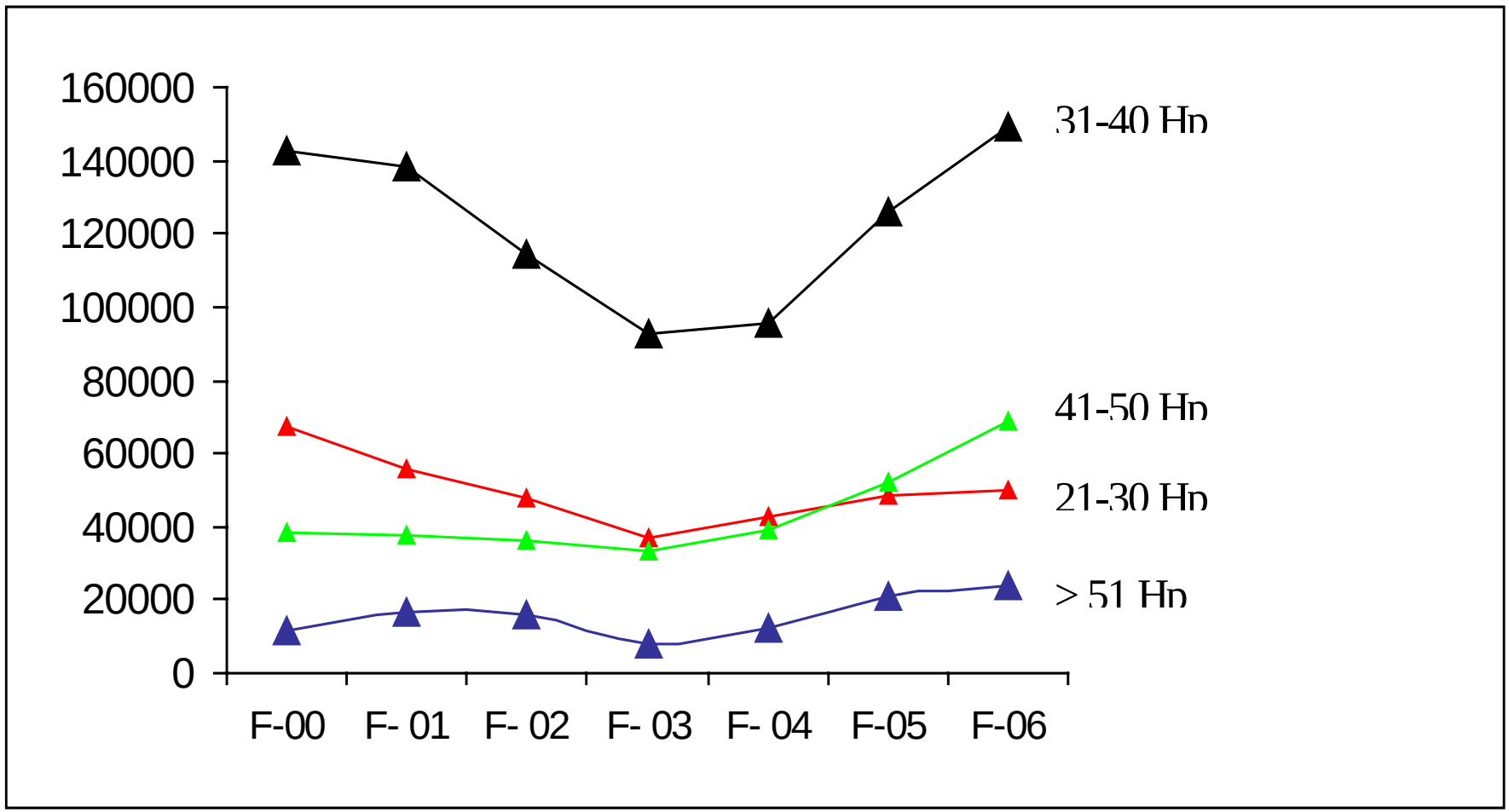
Major Players

MAJOR TRACTOR MANUFACTURERS	SALES IN NOS. FOR 2005-06	MARKET SHARE
MAHINDRA & MAHINDRA	85028	29.0%
TAFE (MASSEY FERGUSON & EICHER)	66667	22.8%
INTERNATIONAL TRACTORS LTD (SONALIKA)	32017	10.9%
PUNJAB TRACTORS LTD	31396	10.7%
ESCORTS	28297	9.7%
JOHN DEERE	19951	6.8%
NEW HOLLAND INDIA (CNH)	13214	4.5%
HMT	7900	2.7%
FORCE MOTORS	4461	1.5%
MAHINDRA GUJARAT TRACTORS LTD	2749	0.9%
VST (MITSUBISHI)	1228	0.4%
TOTAL	292908	100%

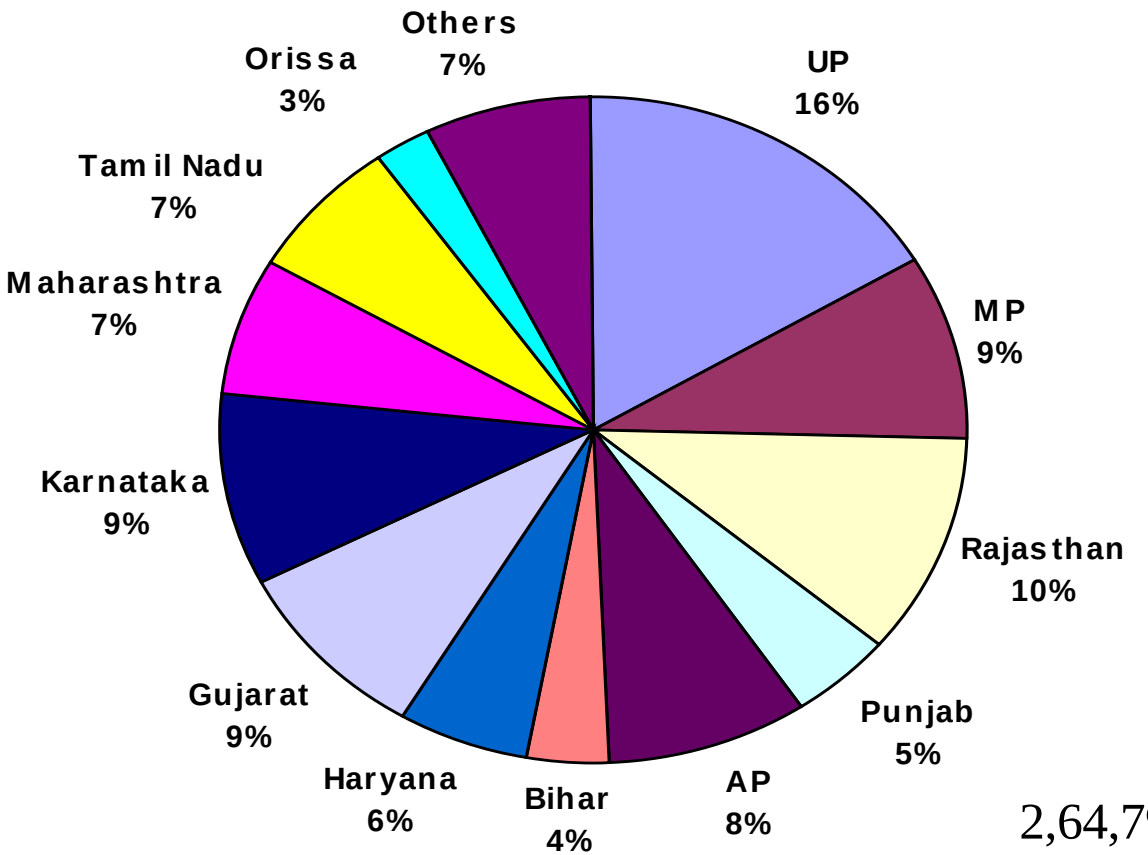
Manufacturer wise sales

MAJOR TRACTOR MANUFACTURERS	SALES IN NOS. APR'06 - SEP'06	SALES IN NOS. APR'05 - SEP'05	GROWTH OVER LAST YEAR
MAHINDRA & MAHINDRA	50922.00	39371.00	29.3%
TAFE (MASSEY FERGUSON & EICHER)	38391.00	28323.00	35.5%
INTERNATIONAL TRACTORS LTD (SONALIKA)	17090.00	13879.00	23.1%
PUNJAB TRACTORS LTD	15217.00	14667.00	3.7%
ESCORTS	24864.00	9053.00	174.6%
JOHN DEERE	8730.00	10398.00	-16.0%
NEW HOLLAND INDIA (CNH)	8203.00	5875.00	39.6%
HMT	2351.00	3016.00	-22.0%
FORCE MOTORS	1904.00	1790.00	6.4%
MAHINDRA GUJARAT TRACTORS LTD	1213.00	1192.00	1.8%
OTHERS	3750.00	1800.00	108.3%
TOTAL	172635.00	129364.00	33.4%

HP Segment-wise



State-wise



2,64,790 Tractors excluding exports

HP WISE SEGMENT AND TRACTOR FEATURES

TRACTOR CATEGORY < 30 HP			
AGGREGATE	**PARAMETER**	**CURRENT FEATURES**	**FUTURISTIC FEATURES**
ENGINE	No. of Cylinders	1-3	2-3
	Emission	TREMIII	Euro IIIA or higher
	Vibration & Noise control	Less Focus	High focus due to regulatory requirements
	SFC improvement	High Focus	Even higher focus due to higher diesel prices
	Aircleaner	Wet	Wet
HYDRAULICS	Basic specs	ADDC	ADDC
	TT applications	No std. Fitment provided	QRC fitment Multiple outlet points for hydraulic usage
TRANSMISSION	Clutch	91/4" - 10" Dry	11-12" Dry
	Brakes	6.5"x3.5" Dry	7"x4" Dry
TRACTORS	Ergonomics	Less Focus on operator comfort	High focus of operator control

HP WISE SEGMENT AND TRACTOR FEATURES

TRACTOR CATEGORY 31 - 45 HP			
AGGREGATE	**PARAMETER**	**CURRENT FEATURES**	**FUTURISTIC FEATURES**
ENGINE	No. of Cylinders	3	3-4
	Emission	TREMIII	Euro IIIA or higher
	Vibration & Noise control	Less Focus	High focus due to regulatory requirements
	SFC improvement	High Focus	Even higher focus due to higher diesel prices
	Aircleaner	Wet	Wet
HYDRAULICS	Basic specs	ADDC	ADDC
	Liftomatic	Not given	To be offered as feature
	Jerk Sensing feature	do	For jerk free operation
	TT applications	No std. Fitment provided	QRC fitment Multiple outlet points for hydraulic usage
TRANSMISSION	Type	Sliding	Constant mesh
	Gear shift	Centre shift	Side shift
	Brakes	6.5"x3.5" Dry	7"x4" Wet
TRACTORS	Ergonomics	Less Focus on operator comfort	High focus of operator control
	Steering	Mechanical	Power

HP WISE SEGMENT AND TRACTOR FEATURES

TRACTOR CATEGORY > 45 HP			
AGGREGATE	**PARAMETER**	**CURRENT FEATURES**	**FUTURISTIC FEATURES**
ENGINE	No. of Cylinders	3	4
	Emission	TREM III	Euro IIIA or higher
	Vibration & Noise control	Less Focus	High focus due to regulatory requirements
	SFC improvement	High Focus	Even higher focus due to higher diesel prices
	Aircleaner	Wet	Dry
	Turbo Charger	NA	To be offered as feature
HYDRAULICS	Basic specs	ADDC	ADDC
	Liftomatic	Not given	To be offered as feature
	Jerk Sensing feature	Selectively given	For jerk free operation
	TT applications	No std. Fitment provided	QRC fitment Multiple outlet points for hydraulic usage
	Volvomatic	Not given	To be offered as feature
	Electrohydraulic system	Not given	To be offered as feature
TRANSMISSION	Type	Sliding	syncromesh
	Gear shift	Centre shift	Side shift
	Clutch	Single/Dual	Dual
	Brakes	6.5"x3.5"/7"x4"	7"x4"
	Type	Dry	Wet
	Torque converter	NA	TO be given as a feature for off high way applications
TRACTORS	Ergonomics	Less Focus on operator comfort	High focus of operator control
	Steering Cabin	Mechanical NA	Power Cabin with/without AC

Current trends in farm mechanization

- Increased Haulage / Non agricultural Application
- Secondary mechanization
- Farmers with low land holding (2-4 acres) buying tractors
- Tractor exchange increasing

Drivers of tractor growth

- Primary Demand-Agricultural Growth
- Secondary Demand-Haulage
- Expansion / Extension of land-has not increased for last 20 years but is an immediate need
- Water resources-growth only through exploration of ground water

Drivers of tractor growth (Contd.)

- National policy on Water Resources
  - Interlinking of rivers – Major projects being undertaken by Government of India

- Value addition in farming
  - -Maximize Yield
  - -Shift from low to high value added crops

Drivers of tractor growth (Contd.)

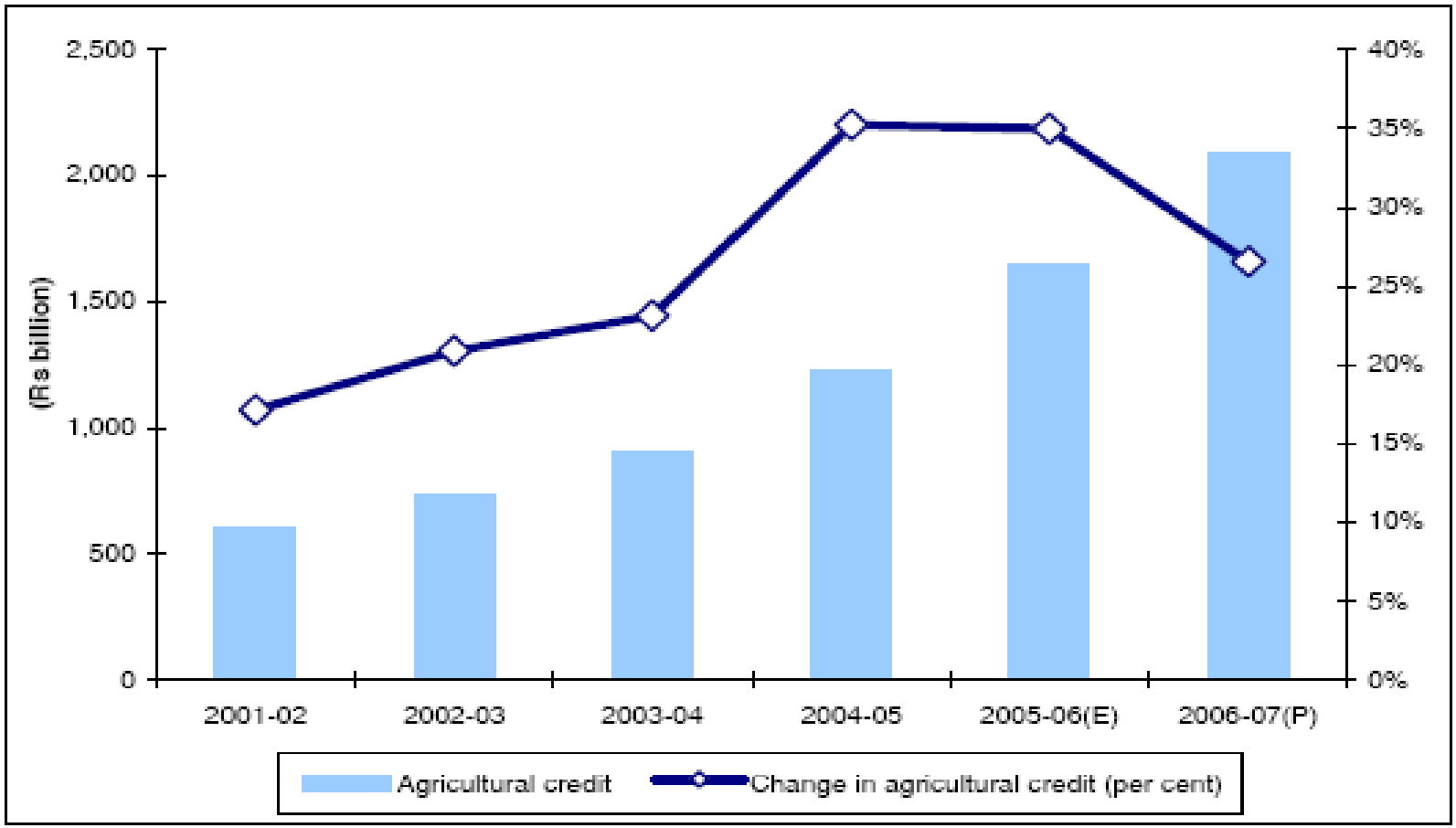
- Attract Educated Youth
  - -ROI in farming to improve
  - -Integration to world commodity trading
  - -Increased mechanization

- Credit / Money availability
  - -Low rates of interest

  - Banks as Catalyst
    - "India One" loan policy
    - Proactive to avoid NPA's

Farm credit disbursements and y-o-y growth

Figure 4



Source: CRIS INFAC

Indian Tractor Industry – Future Trends

INDIAN AUTO POLICY – KEY FEATURES

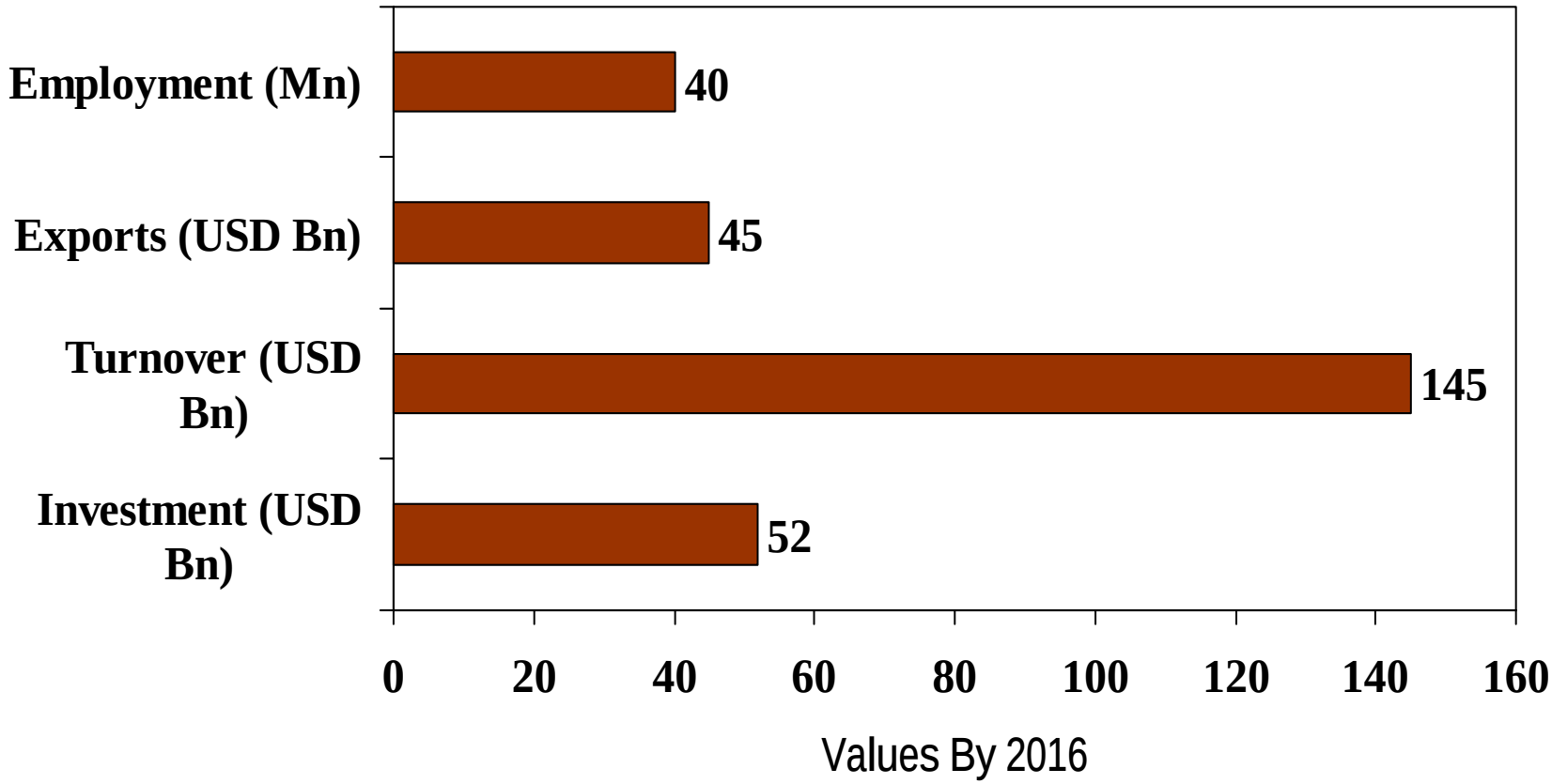
- **Fully Liberalized, de-licensed Industry with 100% Foreign Direct Investment Permitted**
- **Progressively Reducing Fiscal Burden**
- **Fiscal Incentives for R&D Expenditure**
- **Tightening Safety and Performance Regulations**
- **Export Promotion, Encouragement to Brand India**

Policy Aims to (i)Establish a Globally Competitive Automotive Industry in India (ii) Double its contribution to the economy by 2010 and (iii)Make India global hub of automotive manufacturing.

Automotive Mission Plan 2016

- USD 145 Billion turnover by 2016.
- 10% contribution to GDP
- 25 Million additional employment.
- Focused action plan on -
  - Demand Creation, brand building & infrastructure
  - International Trade
  - Competitiveness in Manufacturing and Technology
  - Human Resource Development
  - Environment & Safety

Goals of Automotive Mission Plan 2016



Tractor Testing Facility at CFMT &TI,Budni

S.no	Test facility	Test equipment
1	**PTO**	Fully Air Conditioned Chamber for PTO test.
		PTO Dynamometers
		1.Eddy Current Dynmo Fuchino Make (Japan) -Capacity 700 KW
		2.Hydraulic Shenck Make Germany Dynamometer -- Capacity 1100 KW
2	**Hydraulic**	1. Manual Hyd rig
		2. Automatic Hyd Rig -- Japan
3	**Drawbar**	Automatic Load Car , Equipped with 5th Wheel , Dynamometer, Load Sensor,Generator, Software for Calculation of Pull & power
		Oval Shaped Cemented Test Track 0.6 Km
4	**Steering Effort**	Sushma make Steering Torque tester with
5	**Brake**	Auto matic Brake Effort Measurement System equipped with Wheel & software to measure de acceleration , force, speed & distance traveled with print out .
6	**Vibration**	1.Mechanical Vibration measurement System for Displacement measurement
7	**Noise**	1.Noise Meter Bruel & Kajer
		2. Cygnet Sound Level meter 2021
		3.Automatic Anemometer for Wind Velocity
8	**Others**	1.Ramp. 12? 15? 18? for Aircleaner & parking Brake testing
		2.Roller Test bed for Water Ingress testing
		3.Weighing Bridge for Tractor Reactions.
		4. Generator --one set
9	**Haulage**	4 km metallic test track
10	**Emission**	AVL Emission Lab --Complete (Under Commissioning)

National automotive testing and R&D infrastructure project (NATRIP) is India's first comprehensive initiative to equip India with state-of-the-art automotive testing, homologation and pre-competitive/generic R&D Infrastructure to meet national requirements up to 2015.

Key Benefits of NATRIP

- **Creation of infrastructure to enable the Government to introduce global Vehicular Safety, Emission and Performance standards**
- **Encouraging larger value addition within the country leading to higher sectoral contribution to economy by way of revenues and employment.**
- **Facilitating development and mass production of high technology driven, affordable and globally acceptable Automotive products**
- **De-bottlenecking exports of Automotive products**

CHALLENGES FOR TRACTOR INDUSTRY…..

BUYING CAPACITY

Transfer of average age of tractor buyer from the age group of above 40 to young people

- Increasing demands
- Higher expectations on comfort levels
- Importance for styling and appearance
- Better finish (Paint finish like cars)
- Importance for brand identities
- Fuel economy
- Awareness about latest technologies
- Likes on new models
- Higher life – resale value

NEW PRODUCT DEVELOPMENT

- Rapid proto typing – Component development
- Engine Performance - Power train research & development
- Styling – Availability of latest software and technologies
- Accelerated testing techniques reduce the development lead time to help industry to introduce new models in shorter periods

NEW REGULATIONS

Emission Regulations in near future
Bharat TREM IV / EURO 3 / US TIER 3

- Homologation test facilities
- Dedicated Engine development test cells and research labs
- Accelerated durability test rigs
- Engine performance improvement

NEW REGULATIONS

NOISE / SAFETY / OTHER REGULATIONS

- NVH Center of Excellence
  - Availability of Anechoic chambers
  - Quiet rooms for subsystem level development
  - Latest software tools for NVH
  - Specialized Test tracks

- Center of Excellence for passive safety
  - Roll over testing
  - Crash testing (if needed)
  - ROPS Testing

- Various Gradients
- Various braking surfaces
- Vehicle dynamics

ALTERNATE ENERGY

ALTERNATE ENERGY SOURCE DEVELOPMENT & TRACTOR DEVELOPMENT ARE INTERDEPENDENT

- More Focus on agriculture based energy policy in near future
- Production of fuel oil & biomass power
- Lucrative alternate markets for farm produce
- Reduces the country's dependence on imported fuels
- Alternate energy development – most important agenda for Power train research & development

APPLICATION OF ELECTRONICS

The recent developments in application of Electronics in Agricultural Tractors like GPS and Auto Cruise systems, etc have helped farmers in great way

EXPORT POTENTIAL

MULTIPLE GROWTH IS ACHIEVED IN THE TRACTOR EXPORT TO VARIOUS COUNTRIES

- Testing as per various climatic conditions – one of the challenge for export of tractors – would be addressed by NATRIP Centers
- Testing and Certification as per OECD
- NATRIP would represent INDIA in the technical committees world wide
- Expert team to coordinate with standardization
- Cooperation with other test agencies world wide
- Advanced homologation labs to test as per regulations up 2015

- **The Indian Tractor Industry is the largest in the world.**
- **CAGR of 10% in the last 4 decades.**
- **Expected to grow at a CAGR of 5-7% to reach a level of 410000 tractors per year by 2010.**
- **Main drivers of growth of tractor industry are Agricultural growth, increase in allied uses of tractors, primarily haulage and Credit and Money availability.**
- **Excellent Tractor testing facility is already available in India at CFMT & TI, Budni.**

- **A project named NATRIP is underway which is country's first comprehensive initiative to equip it with state-of-the-art automotive testing, homologation and pre-competitive/generic R&D Infrastructure to meet national and international requirements.**
- **NATRIP is also planning to work with UNAPCAEM in close association in future.**