

**Country Presentation**

**Nepal**

**The 2<sup>nd</sup> Regional Forum on Sustainable  
Agricultural Mechanization**

*Enabling Environment for Custom Hiring of Agricultural  
Machinery*

**9-11 September 2014**

**Serpong, Indonesia**

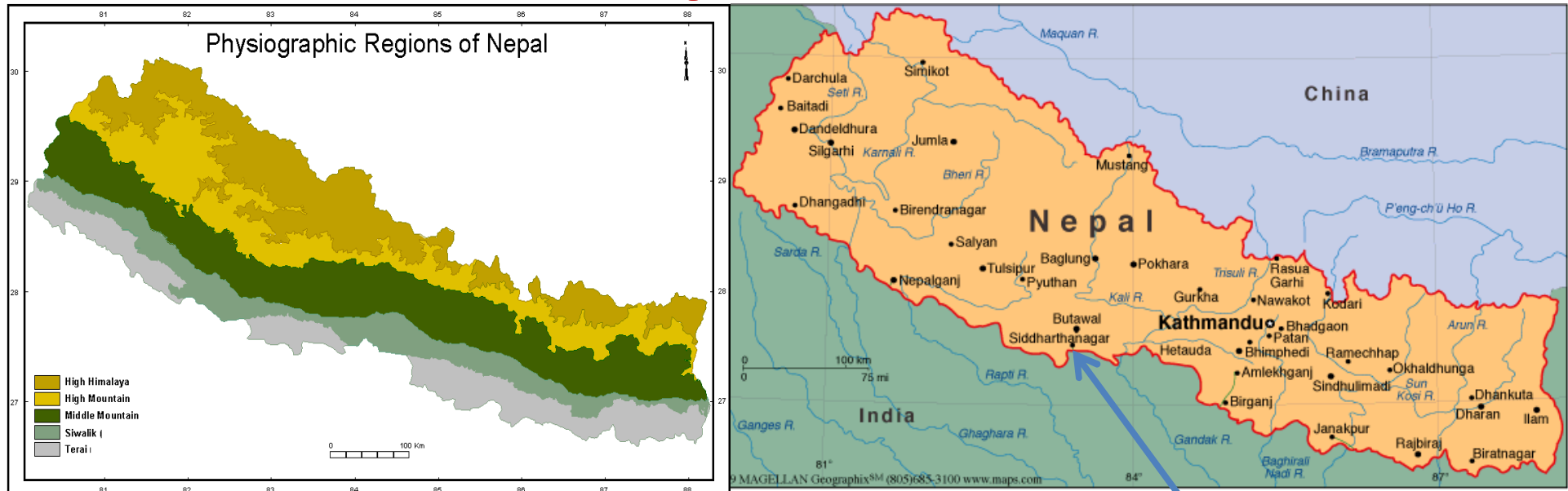
# Role of Custom Hiring Services of Agricultural Machinery in Agricultural Mechanization in Nepal



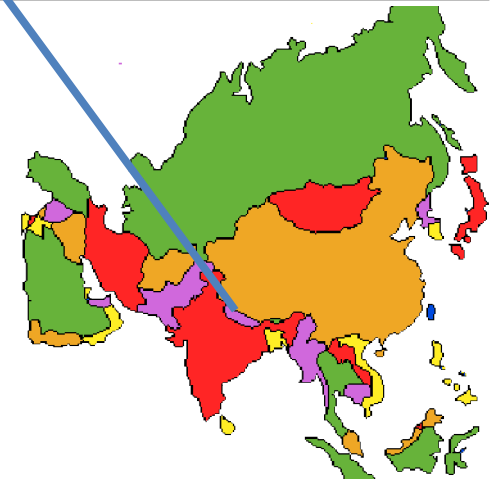
**Shreemat Shrestha,**  
**Chief, Agricultural Engineering Division**  
**Nepal Agricultural Research Council**



# Nepal



- “ Land area 147181 sq km (EW-885 km, NS-193 km)
- “ Population 26.67 M
- “ Three geographical region Terai, Hill & Mountain
- “ Elevation ranges from 70 m to 8848 m
- “ Climate temperate to sub tropical
- “ Rugged terrain and diversity (in all sense) the typical feature



# Agro Eco zone

**Mountain (35%)**



**Hill (42%)**



**Terai (23%)**



# Agricultural Scenario

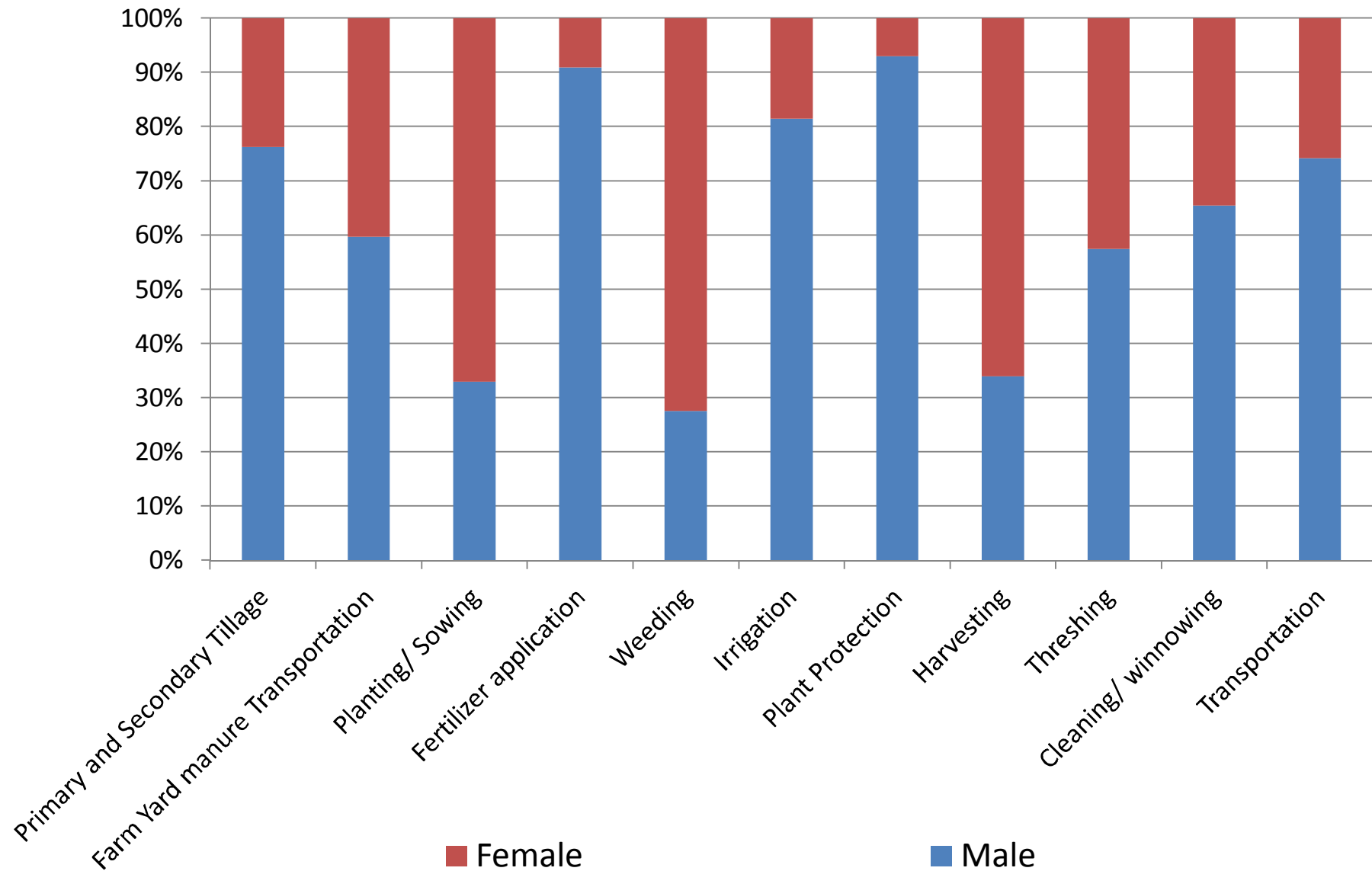
- “ Dominated by subsistence and small holder agriculture Average land size <0.65 ha.
- “ Agriculture contributed 34% AGDP and employment to about 60 percent of population
- “ Young people moving away from agriculture.
- “ Aging of farm labour
- “ Feminization in agriculture
- “ Emerging commercialization in agriculture

## **Area and Production of Cereal Crops, 2012/2013**

<b>Crops</b>	<b>Area (ha.)</b>	<b>Production (mt.)</b>	<b>Yield (kg/ha)</b>
<b>Paddy</b>	<b>1420570</b>	<b>4504503</b>	<b>3171</b>
<b>Maize</b>	<b>849635</b>	<b>1999010</b>	<b>2353</b>
<b>Millet</b>	<b>274350</b>	<b>305588</b>	<b>1114</b>
<b>Wheat</b>	<b>754243</b>	<b>1727346</b>	<b>2290</b>
<b>Barley</b>	<b>29598</b>	<b>33782</b>	<b>1141</b>
<b>Buckwheat</b>	<b>10681</b>	<b>10056</b>	<b>941</b>
<b>Total</b>	<b>3339077</b>	<b>8580285</b>	<b>2570</b>



# Gender-wise Farm Labour Involvement in Agricultural Operation in Terai



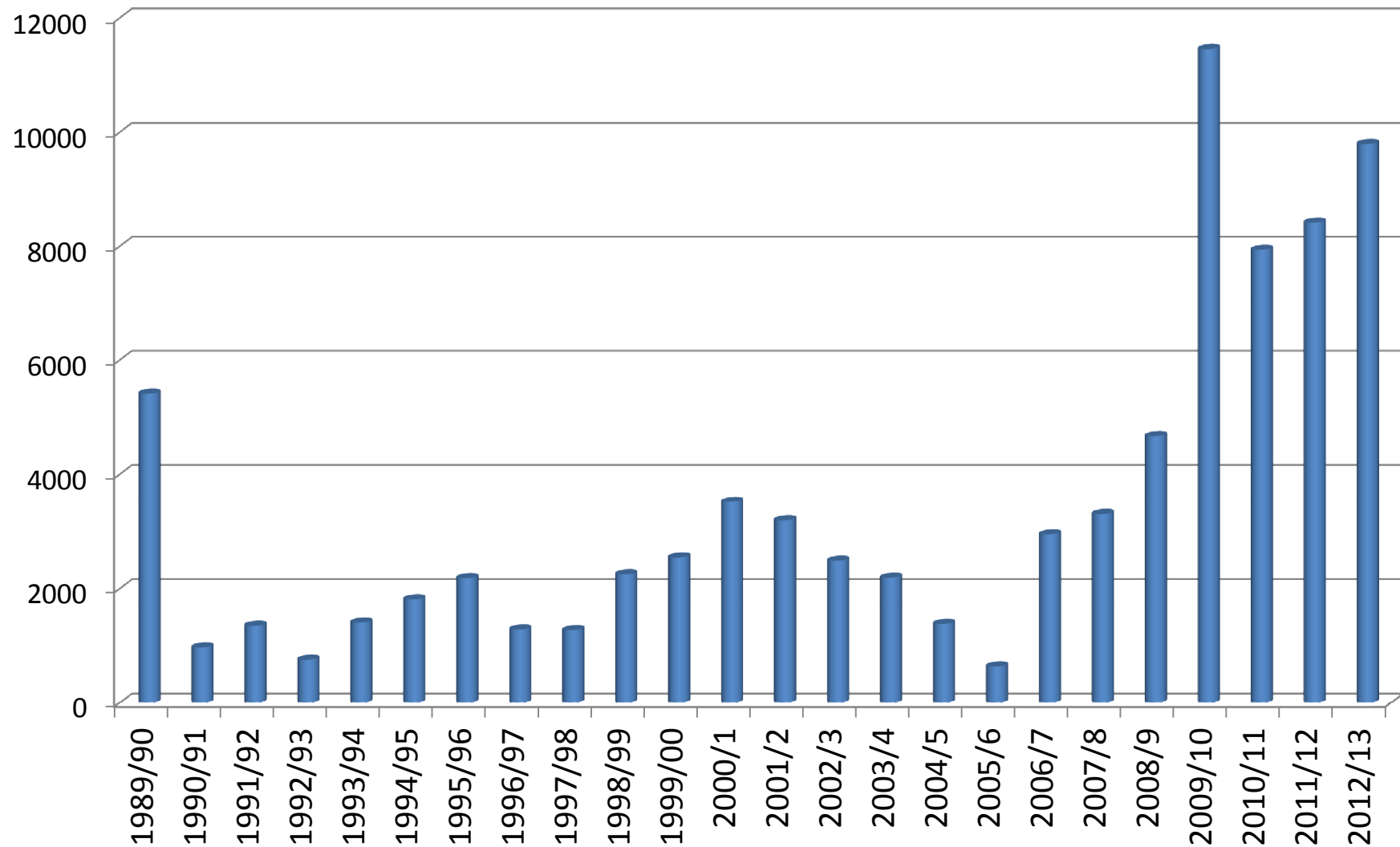


## Status of Agricultural Mechanization

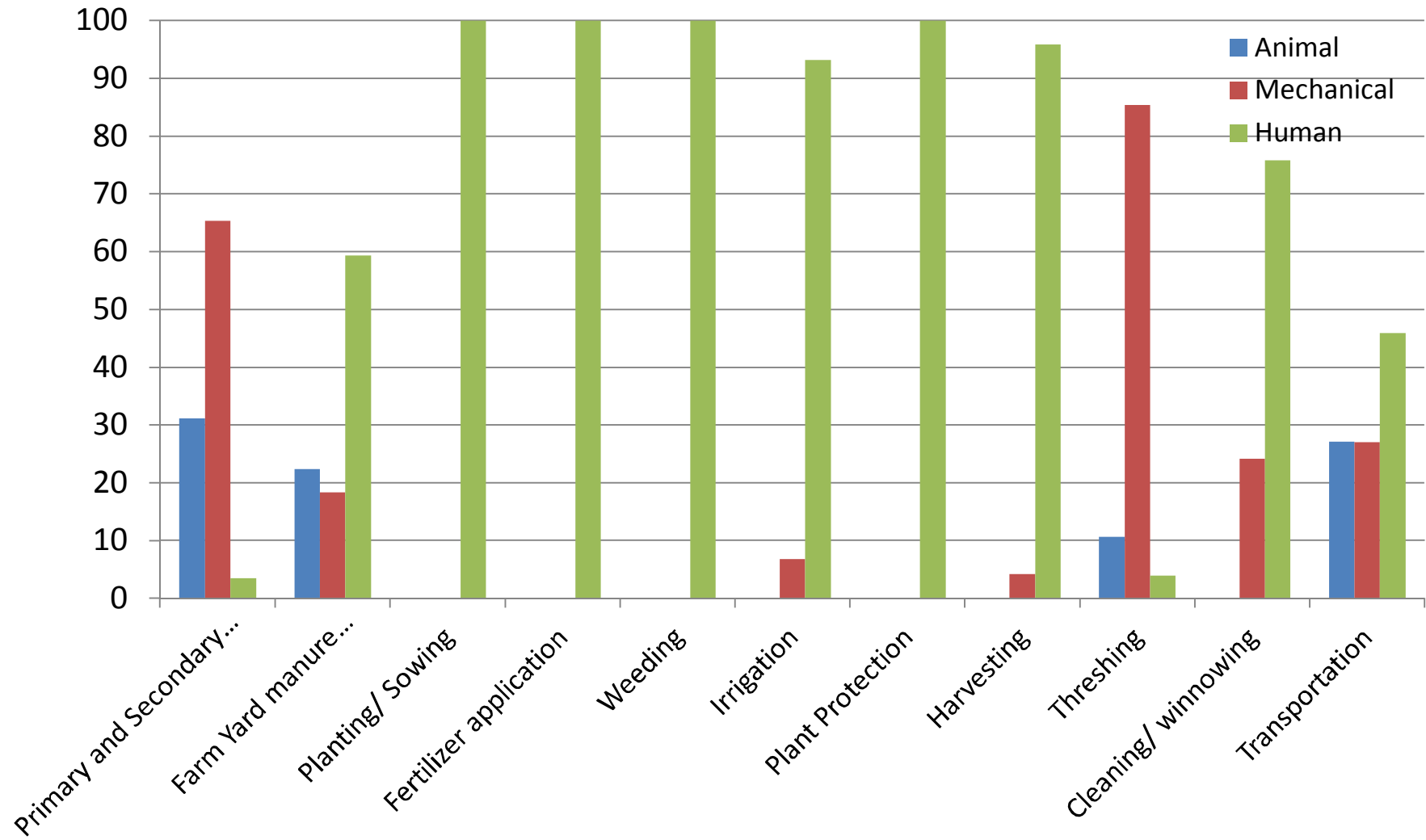
( Source: National Sample Census of Agriculture, CBS, 2012)

Machinery/Equipments used	No of Households	% Households
Iron ploughs	1,073,441	28.02
Tractor & Power tillers	920,371	24.03
Thresher	803,154	20.96
Pumping sets	548,203	14.31
Sprayers	574,014	14.98
Shallow tubewells	367,744	9.56
Deep tubewells	159,725	4.17
Treadle pump (Dhiki)	79,145	2.06
Animal drawn cart	334,978	8.74
Other Equipments	290,084	7.57

# Trend of Tractor Registered in Nepal



# Farm Power Used in Agricultural Operation in Terai



# Constraints of Agricultural Mechanization in Nepal

- **Past policies ignored mechanization due to fear of labor displacement** by the use of larger power operated machines (mainly tractor). Agricultural Policies and Plans such as APP(1995-2015) and other policies did not have any policy statement on agricultural mechanization
- Past policies such Land Act (1964), National Civil Code (1853;1962) have **encouraged land fragmentation** with the provisions of land inheritance & land ceiling resulting in disincentives for mechanizations
- **Subsistence farming, small farm size, fragmented land holding and physical constraints of rugged and steep topography, narrow terraces** in Hills and Mountains discouraged use of machineries.
- **Infrastructure, institutional capacity and capital constraint.**

# Status of Agricultural Mechanization

## Tillage

- “ Majority of tillage by animal power
- “ Only 28% of farmers use iron plough
- “ In Nepal 25 % use tractor & Power tiller
- “ Most of the tractor use cultivator
- “ Custom hiring of tractors is common
- “ Power tiller / mini tiller is getting popular



# Status of Agri .Mechanization (cont.)

## Planting / Seeding

- “ Rice is manually Transplanted
- “ Wheat is broadcasted
- “ Maize & vegetable seeds is dibbled
- “ More than 64% is performed by women
- “ Zero till drill & minimum till drill is being promoted



# Status of Agri. Mechanization (cont.)

## Inter-culture Operation

- “ Rice, Potato, maize and vegetables need major inter culture operations
- “ Hand tools- Khurpi and sickles, Kuto etc. are used
- “ Bullock drawn local plough is also used for maize inter culture
- “ More than 72% of inter-culture operation by women



# Status of Agri .Mechanization (cont.)

## Irrigation

- “ 42% of area irrigated and 18% year round
- “ only 242000 ha is irrigated by GW in which 208746 is through STW and 33732 ha by deep tube wells
- “ 14.3% of farmers use CF pump mainly for shallow tube well and lifting water from river
- “ More than 100000 treadle pumps in terai
- “ Simple low cost drip system and sprinkler irrigation is being used for vegetable cultivation





# Status of Agri .Mechanization (cont.)

## Harvesting

- ” Manually performed by using Locally made sickles
- ” Serrated sickles locally made is also popular
- ” More than 300 Combine harvesters are in operation in Terai
- ” 4 wheel tractor operated reapers, power tiller & mini tiller operated reaper are also getting popular

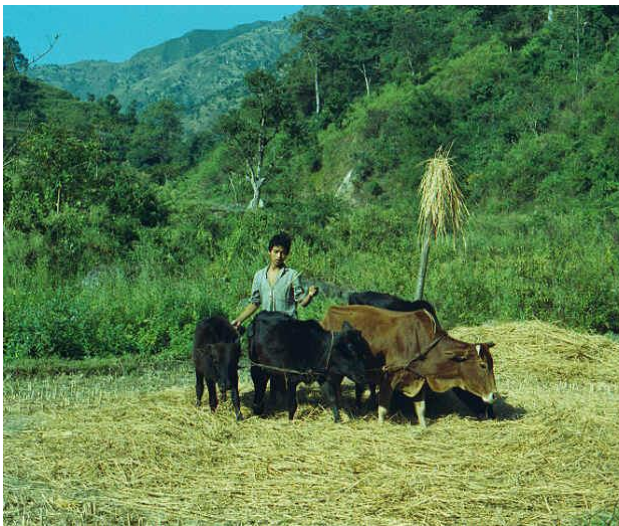


Combine Harvester in Operation

# Status of Agri. Mechanization (cont.)

## Threshing

- “ Beating on stone/ drum
- “ Animal/ tractor treading
- “ 21% of Nepalese farmers use thresher. It is found that more than 85% of threshing in terai is performed by thresher



# Demand for Agricultural Mechanization

- “ In recent years, however, demand for mechanization is increasing with **acute labor scarcity at peak season and high cost of production** (as a result of increased wage rate) in farming resulting in from youth migration and feminization
- “ **Wage rate in agriculture has doubled in the last 10 years** and households receiving remittance income has more than doubled in the last one and half decade from 23% in 1995 to 56% in 2010. (CBS, 2011)
- “ **Female headed households have also doubled in last 15 years** from 13% in 1995 to 26 % in 2010 (CBS, 2011).

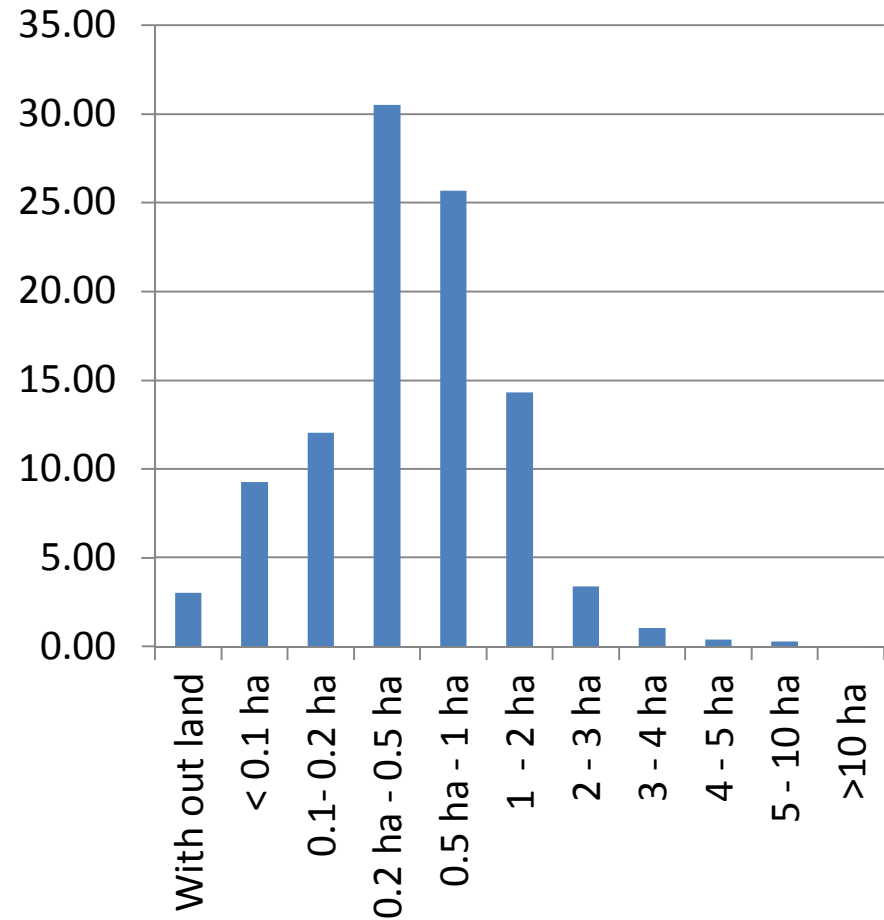
# Demand for Agricultural Mechanization...

- “ **Increased attraction of returned youth migrant** in **commercial agriculture** and use of modern machineries
- “ **Increasing road connectivity** in rural areas resulting in use of tractors and other machineries
- “ **Increasing realization of agricultural mechanization among planners and policy makers** resulting in development of new policy on Agri Mechanization
- “ **Very liberal import policy with tax exemption** for Agricultural Machinery particularly on Tractors
- “ **Spill over effect** from neighboring countries

# Agricultural Mechanization and Custom Hiring

“ Custom hiring has got major role in agricultural mechanization due to following reasons

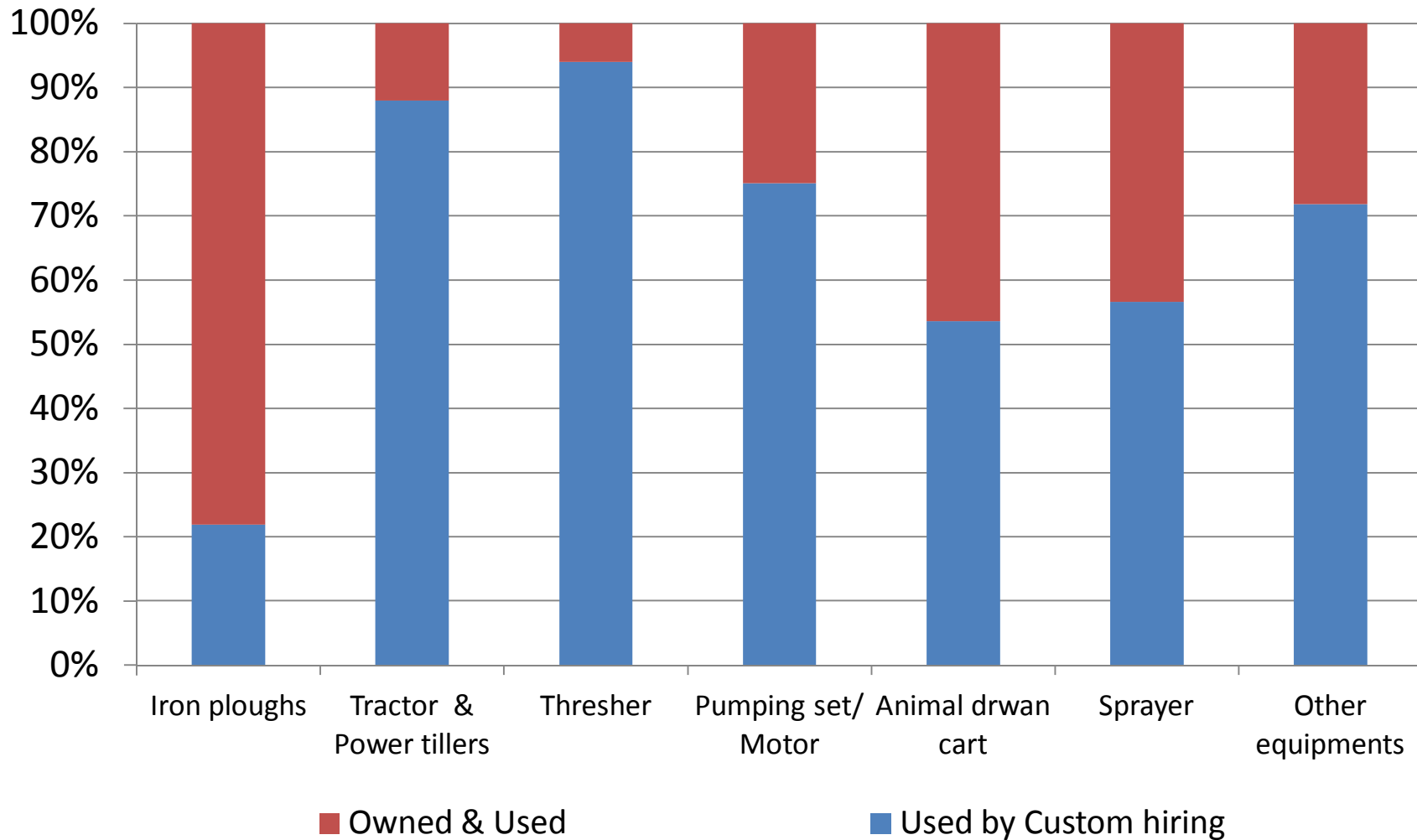
- **Small land holding**
- **Low purchasing capacity**
- **Less technical capability**
- **Economy in renting in of agricultural machinery than self owning**



# Custom Hiring of Equipment

	Used HH	Owned HH	Custom Hiring HH	Used/ Owned
Iron ploughs	1073441	838176	235265	1.28
Power tillers	75671	9123	66548	8.29
Tractor	844700	36158	808542	23.36
Thresher	803154	48157	754997	16.68
Pumping set	548203	136607	411596	4.01
Animal drawn cart	334978	155272	179706	2.16
Sprayer	574014	248790	325224	2.31
Other equipment	290084	81684	208400	3.55

# Share of HH Using Custom Hired Agricultural Equipment and Self Owned Equipment



# Characteristics of Custom Hiring of Agricultural Machinery

- “ **Informal business** (not recognized by government)
- “ Various types
  - . **Means of Livelihood** (animal drawn Plough, traditional water mill)
  - . **Partially commercial** (power tiller, pedal operated thresher, winnower, pumping set, sprayer etc.)
  - . **Commercial business** (Tractor, power tiller, tractor operated thresher, combine harvester, grain processing mills etc.)
- “ Mainly **Individually owned machinery**, group and cooperative owned machinery not that successful
- “ **Lack of capacity** on technical maintenance, management including record keeping
- “ **Wide range of renting charge** of same equipment service in various location.
- “ Most of the **service is provided in same village** except tractor, power tiller, tractor PTO driven thresher and combine harvester



# Custom Hire Charge of Agricultural Operation

Custom Hiring Service	Eastern	Central	Western	Mid Western	Far Western
Tractor with Cultivator (Rs. Per hour)	1200 to 1500	1200 to 1500	1200	1000 to 1200	1100 to 1500
Tractor with rotovator (Rs. per hour)	1600 to 2000	1500 to 2000	2000	1400 to 2000	-
Power Tiller (per hour)	500 to 600	500- 600	600	300 to 500	400 to 600
Animal Drawn Plough (Rs. Per day)	450 to 1000	1000	1000	700 to 1000	1300
Sprayer (per day)	25 to 100	80 to 100	25 to 40	80 to 100	15 to 50
Pump set (Rs. Per hour)	300 to 400	250 to 350	300 to 500	250 to 400	250 to 300
Thresher ( grain: grain threshed)	1:20 to 1:10	1:12 to 1:8	1:15 to 1:10	1:13 to 1: 8	1: 9 to 1:07
Combine Harvester (Rs./hr)	5000	5000	4800 to 5000	-	4500

*1USD= Rs. 98*

# Farmer's Perspective on custom hiring service provided

- “ Monopoly of custom hiring service provider
- “ High rate but quite cheaper than traditional practice
- “ Service not available at right time and have to wait for long time
- “ Some case poor quality of service ( grain cracking in threshing)
- “ Some times operation at night
- “ Difference in rate from one service provider and other
- “ Straw burning after harvester led to lack of fodder for livestock farmers

## Custom Hiring Service Provider's Perspective

- “ Lack of spare parts and repair and maintenance service
- “ Difficult in credit availability and high interest rate from bank
- “ High competition in same location
- “ Lack of technicians/ operators
- “ Farmers not demanding service in advance
- “ Difficulty in collection of service charge specially during tillage
- “ No support from government
- “ Obstruction of use of agricultural tractor in non agricultural use
- “ Government's inconsistent approach

# Some Custom Hiring Innovative Service Providers

- “ Collection of **service charge in terms of kind** during threshing, milling etc.
- “ Innovative service provider promoting Laser land leveling service, rice transplanter, zero till drill, straw harvester, micro hydro powered grain processing mills etc.
- “ Organized machine service provider in Biratnagar **“Nepal Krishi Company”** Promoting agricultural cooperative to provide custom hiring service through cooperatives.
- “ It has successfully demonstrated that 1 cooperative can provide service to 135 ha of rice-wheat/ lintel farming by using 2 tractors, 1 tractor trolley, 2 rotovator, 2 cultivators, 2 levellers and 1 combine harvester. It is found that annually Rs. 6.4 million can be saved from 135 ha by mechanized farming (tillage and harvesting). It has been adopted in 4 cooperatives in eastern terai.
- “ **Gravity ropeway** for transportation in the hills
- “ Custom hiring **in collaboration with farmer’s group**



# Major Findings of Survey

- “ Custom hiring service providers has **major role in promotion of agricultural mechanization** among small holder farmers in Nepal.
- “ Among the agricultural machinery used household the custom hired agricultural machinery used HH for **metallic animal drawn plough is 22%, power tiller and tractor is 88%, thresher 94%, sprayer is 57%, water pump is 75% and other agricultural equipment is 72 %.**
- “ **Privately owned agricultural machine custom hiring service is found to be more successful** than the group owned agricultural machinery service provider.
- “ Increased use of machinery has caused **increased accidents.**
- “ Custom hiring service in **tillage, water pumping, harvesting and threshing has been successfully used in terai region of Nepal milling and transportation all over Nepal.**
- “ Almost all the custom service providers are providing their service informally, as **none of them are registered.**
- “ There are several **important issues raised by custom hiring service provider and the farmers** which is needed to be addressed by the government for promotion of agricultural mechanization in Nepal.

# Suggestions and Recommendations

## Government's Role:

- “ **Custom hiring service provider should be well recognized** as major and strong stakeholder in promotion of sustainable agricultural mechanization in Nepal.
- “ Government as **facilitator** and should **create enabling environment** for custom hiring service provider in following area
  - . **Recognition of service provider** through registration. (Nominal registration fee and tax waived).
  - . Create a **database and monitoring of service**.
  - . **Innovative and best custom hiring service provider should be awarded**
  - . **R & D on appropriate models** of custom hiring
  - . **Capacity development of service provider** on selection, procurement, operation and maintenance of agricultural machinery, record keeping and service management and marketing skill
  - . Policy for **easy access to credit and subsidy in bank interest**.
  - . **Selective, targeted and sustainable subsidy** on agricultural machinery
  - . Promote **custom hiring service providers** for competitive renting.

# Government's Role (contd.)

- . As custom hiring service provider can also be promoter of improved agricultural technology, they should also be **trained in improved agricultural technologies**
- . **Human resource development to develop the operators and technicians**
- . Facilitate to **fix maximum rate of service** in consultation with leader farmers and service provider ( new agri mechanization policy)
- . **Demonstration of innovative and efficient agricultural machinery through custom hiring service** providers
- . Preparation & implementation of **law, regulation and standard of custom hiring service. Testing and Standardization of Agricultural Machinery.**
- . **Other subsidiary policy and regulation viz. land consolidation, rural development, agricultural credit, rural energy, agricultural road, market storage facilities , custom duty, etc favorable for SAMS**
- . **Support / policy incentives for green technologies viz. energy efficient technologies, conservation agricultural technologies, GAP , RETs etc.**
- . **Insurance in agricultural machines/ operators**

# Role of farmers

- “ Plan the agricultural operation in advance inform the service provider in advance
- “ Block approach/ group approach for small holders
- “ Record keeping
- “ Get information about the new technology, available custom hiring service providers.
- “ Maintain farm roads, irrigation, field condition in advance
- “ Pay immediately after service. Commercialize their production system with direct access to the market
- “ Primarily processing in farm itself – value addition.



# Role of custom hiring service provider

- “ It is their business **it should be profitable** to be sustainable . Preparation of complete updated **business plan** ( technical, financial, marketting, human resource etc.) and seasonal planning.
- “ **Record keeping** financial, customer, maintenance, service etc.
- “ Focus on **Quality service, competitive price and customer’s satifaction**
- “ Custom hiring service provider should **use ICT for communication to customer and other service providers for timely and quality service**
- “ Custom hiring service provider should **diversify their service** through the introduction of new and innovative agricultural machinery.
- “ **Other agriculture technology and input service be linked** with machinery service (marketting strategy)
- “ **Take care of safety with primary responsibility** (operator, environment and consumer)
- “ **Custom hiring service provider should be organised** and create a network to share the problems and lobby the government for favorable policy.

***Sustainable Agricultural  
development in Nepal is possible  
only through competitive,  
innovative, efficient and reliable  
custom hiring of agricultural  
machinery in business model by  
the young farmers***



Thank You