

Climate-Smart Agriculture and Mechanization in Nepal

Presentation by

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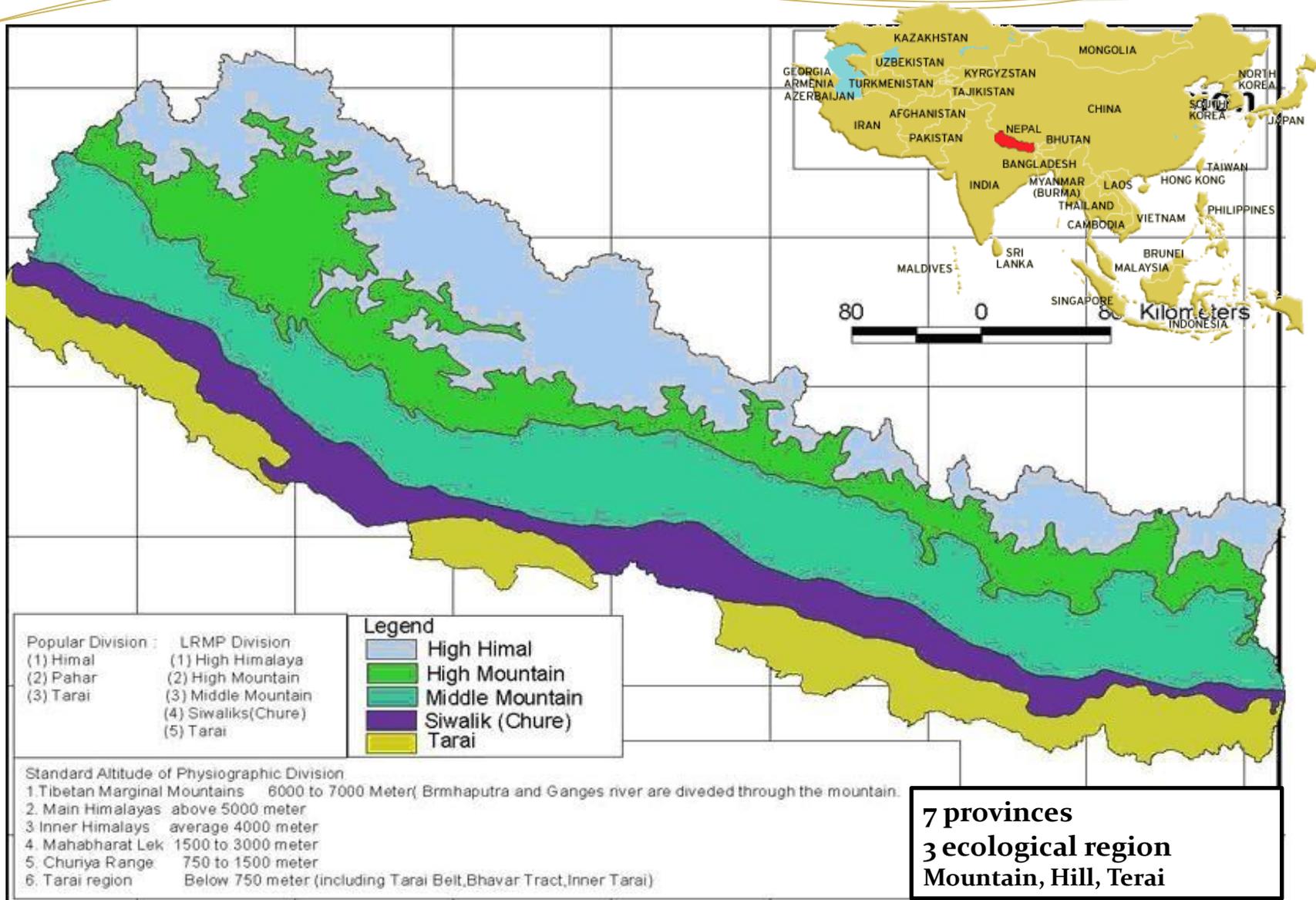
Ministry of Agricultural Development



CSAM



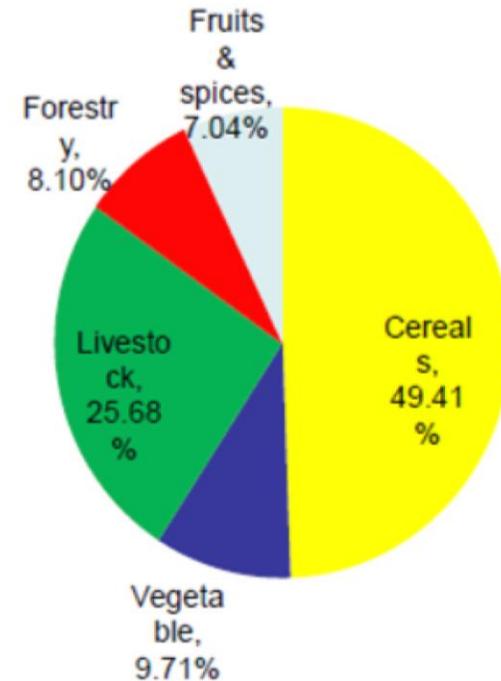
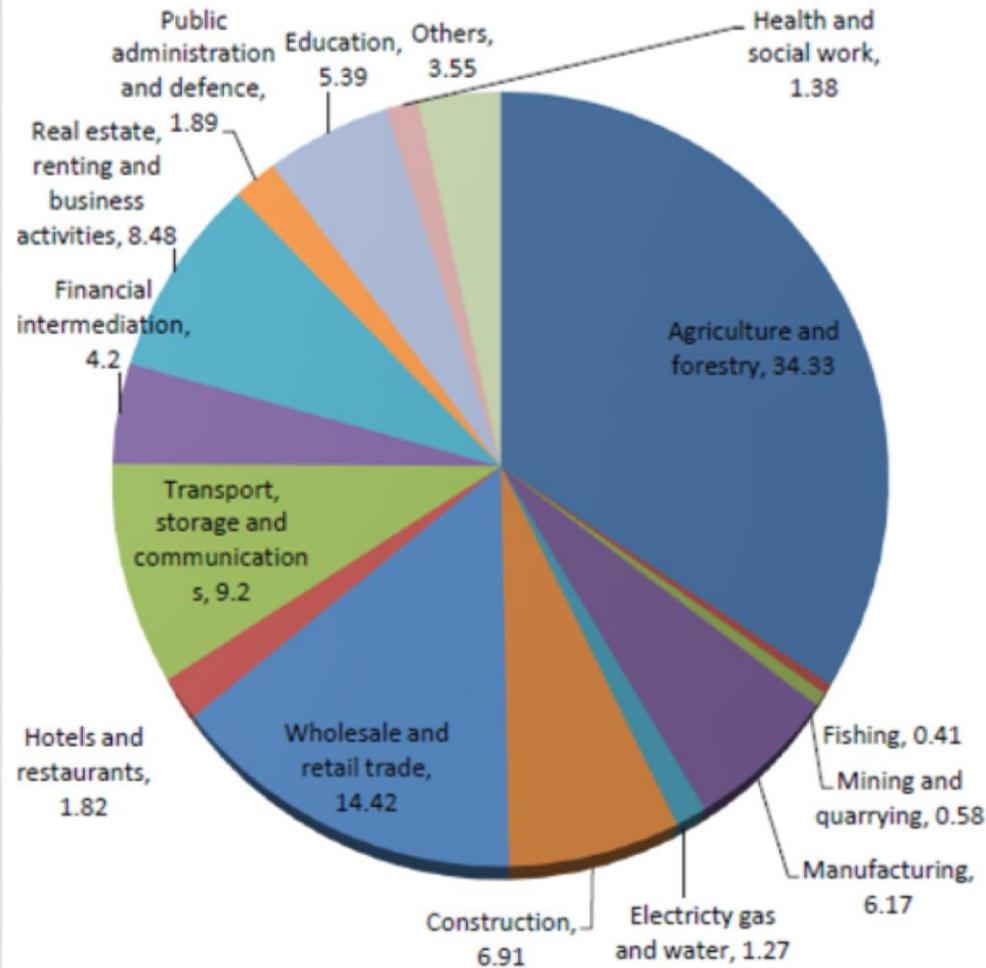
Federal Democratic Republic of Nepal



Nepal at a glance

- *75 districts, 217 Municipalities, 3200 VDCs*
- *Population 28 millions, 10 religions*
- *125 caste/ethnic groups, 123 languages spoken as mother tongue*
- *Predominantly an agrarian country*
- *About 22% people still below poverty line*
- *Agriculture contributes one-third to GDP*
- *21% of the land is cultivable (57% rain-fed)*
- *Average land holding – 0.68 ha*
- *Major crops Paddy, Maize, Wheat and Horticulture*
- *Livestock: Cattles, Buffaloes, Sheep/Goat, Pigs and Poultry*

Composition of GDP/AGDP

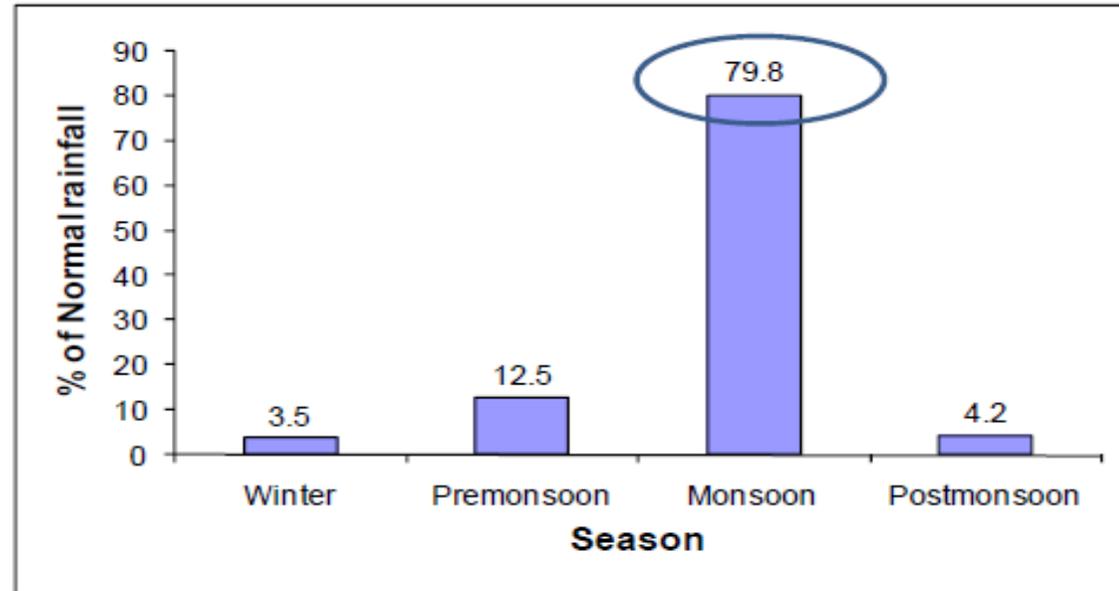


Domination of Cereal Crops followed by Livestock and Vegetables

Source: MoAD

Major Weather

Climatic condition is strongly influenced by the monsoon circulation. On the basis of monsoon phenomena, there are four seasons in Nepal.



Winter (Dec-Feb)

Pre-monsoon (Mar-May)

Monsoon (Jun-Sep)

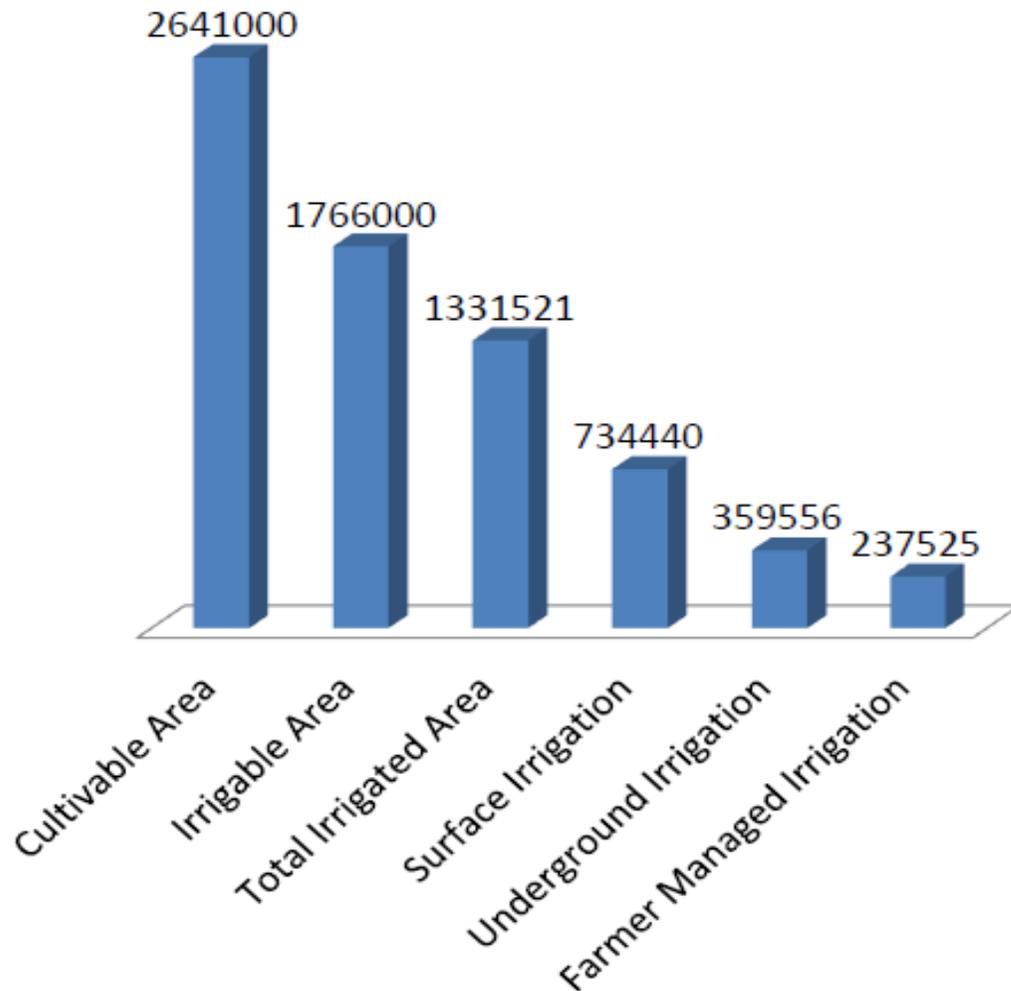
Post Monsoon (Oct-Nov)

- Country receives more than 80% of annual rainfall during summer monsoon
- Avg. Monsoonal day -102 day
- Mean Annual rainfall- 1530 mm
- July is the wettest month (~26 %)
- Nov. is the driest month (~0.6%)

Source: DoMH

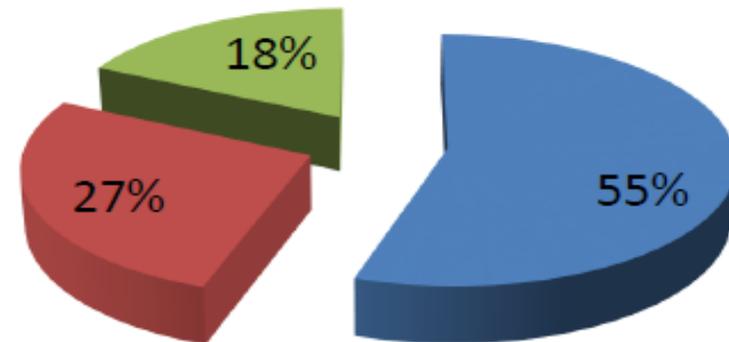
Irrigation Status-2012/13 (Area in ha)

Irrigation Status of Nepal



Share of Irrigation Types in total Irrigated area

- Surface Irrigation
- Underground Irrigation
- Farmer Managed Irrigation



Source: DoI

Risks affecting Agri Production-A Major Challenge

- Vagaries of weather
 - rainfall
 - temperature
 - humidity
 - wind
 - hailstorm
- Pest & diseases
- Fire
- Flood
- Quality of inputs
- Market prices

Risks affecting Agri Production-A Major Challenge

The climate induced natural disaster causes **Loss of agricultural land & crop by climate related extreme events (1971-2007)**

Events	Loss of agricultural land & crop(ha)
Drought	329332
Flood	196977
Hail storm	117518
Rains	54895
Strong wind	23239
Cold waves	21974
Others (forest epidemic, snow storm, firestorm, thunderstorm, avalanche, plague etc)	83336
Total	847, 648

Source: Global assessment of risk ,Nepal Country Report, ISDR, Global assessment report on poverty and disaster risk,2009

12th in the world climate vulnerable country

Status of Agricultural Mechanization

Households Using Various Machinery/Equipment for Agricultural Operations

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

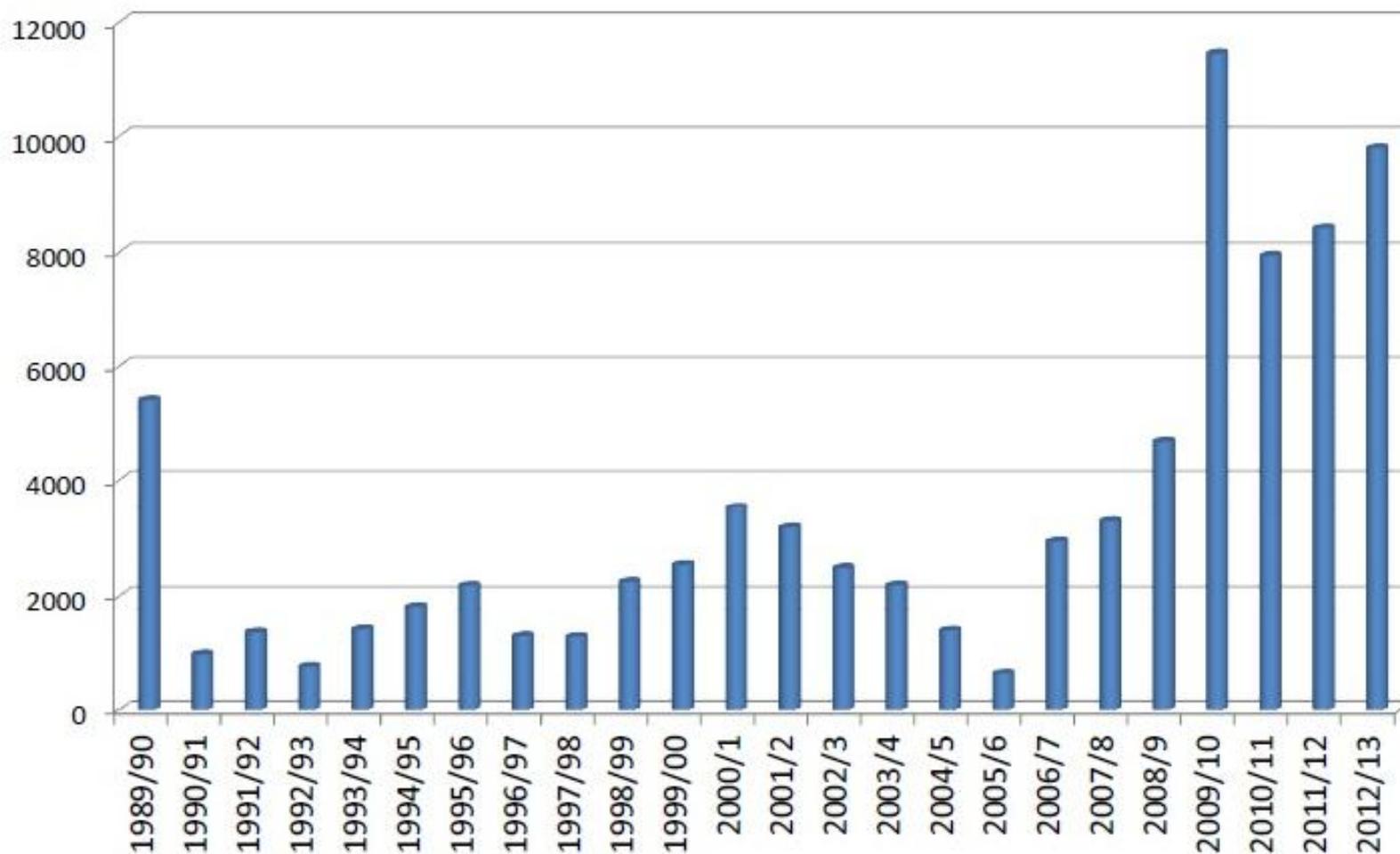
Source: National Sample Census of Agriculture, CBS, 2012

Agricultural Machinery Import, 2014/15

Item	Unit	Quantity	Values (NRs 000)	Source
Ploughs	Pcs.	41,610	8,884	China, India
Disc harrows	„	3,952	36,773	India
Cultivators/harrows	„	1,89,974	6,90,670	„
Seeder/planter/transplanters	„	6,408	14,872	India, China
Threshers	„	21,358	4,80,053	India, China, USA, Japan
Tractors	„	16,693	58,38,984	China, India
Reaper/harvesters	„	3,557	44,327	„
Fertilizer distributors	„	25,827	2,281	„
Combine harvesters	„	78	66,521	„
Cultivation machineries	„	8,063	2,212	„
Mowers	„	51	609	China, India, Taiwan
Hay making machines	„	57	750	India
Fodder balers	„	27	1,415	India, China, Japan, Korea
Cleaning, sorting and grading	„	511	4,520	China, India
Animal feed making	„	1,76,232	3,23,756	Germany, Netherlands
Grain cleaner/grader	„	24,903	3,78,556	--
Milking machines	„	207	6,629	China, India
Milling machineries	„	4,541	5,29,125	Germ, Indonesia, Turkey

Source: DoC

Trend of Tractor Registered



2014/15: 16,693 Nos.

Source: Dept of Transport

Strategies, Policies for Climate-Smart

Constitution of Nepal 2072(2015):

- Sept 20, 2015 by the house representatives of the people
- Its fundamental law of Federal Democratic Republic of Nepal
- 37 divisions, 304 articles and 7 annexes
- 7 federal provinces, Kathmandu as capital



Strategies, Policies for Climate-Smart

Constitution of Nepal 2072:

Article 51. State policies: The State shall pursue the following policies: section (h) Policies regarding the basic needs of citizens:

Point (12) Increasing investment in the agricultural sector by making necessary provisions for sustainable productivity, supply, storage and security, while making it easily available with effective distribution of food grains by *encouraging food productivity that suits the soil and climate conditions* of the country in accordance with the norms of food sovereignty.

Strategies, Policies for Climate-Smart

Agricultural Development Strategy (ADS)

20 years strategic planning 2015-2035

4 STRATEGIC FRAMEWORK

4.4.1 Food and Nutrition Security

184. Component 2 of the ADS on Productivity has an impact of food and nutrition security by (i) increasing the volume of food production in Nepal in a sustainable way through higher productivity and sustainable use of natural resources; and (ii) reducing vulnerability of farmers through improved food/feed/seed reserves, improved preparedness and response to emergencies, and climate smart agricultural practices.

Strategies, Policies for Climate-Smart

Agricultural Mechanization Promotion Policy, 2014

Approved by the GoN on 29th. August 2014

Vision

"To contribute national development through agriculture mechanization in present agriculture system to transform to modernization and commercialization."

Clause 9. Objective: 4 main point to achieving AgrilMech

➤ *Identification and promotion of women and environment friendly agriculture machineries*

Strategies, Policies for Climate-Smart

Agricultural Mechanization Promotion Policy, 2014

- Promotion of fuel efficient and environment friendly machines will be encouraged
- Promotion of technology and machines appropriate for sustainable agriculture and resource conservation will be encouraged.
- Use and promotion of the machines reducing the tedious and hard work load of women will focused.
- Agricultural machines and equipments utilized for production of organic fertilizer, organic and bio-pesticides and Integrated Pest Management (IPM), Integrated Nutrition Management (INM), Good Veterinary Practices (GVP), Good Livestock Practices (GLP), Good Agricultural Practices (GAP) and Good Fishery Practices will be promoted and extended.
- Use of renowned materials and communications technology for the promotion of appropriate agricultural machines and equipments will be focused.

Government of Nepal approved the law

Combine Harvester along with baler or Straw Chopper has to be imported for straw mgmt



Paris Agreement- United Nations Framework Convention on Climate Change (UNFCCC)

- “individualnationally determined contributions” (INDCs) has already been submitted,

Government Organization working for CSA and Mechanization

Government of Nepal

- **Ministry of Population and Environment (Focal Point)**
 - **Alternative Energy Promotion Centre (AEPC)**
- **Ministry of Science and Technology**
 - **National Information Technology Center (NITC)**
 - **Nepal Academy of Science and Technology**
 - **Pilot Program for Climate Resilience (PPCR)**
- **Ministry of Agricultural Development**
 - **PPCR: Building Resilience to Climate Related Hazards Project- Agriculture Management Information System (AMIS)**
 - **Directorate of Agricultural Engineering, Department of Agriculture**
 - **Agricultural Engineering Division, Nepal Agricultural Research Council**
- **Ministry of Irrigation**
 - **Non Conventional Irrigation Technology Project (NITP), Department of Irrigation**

Other Organization working for CSA and Mechanization

Donors Agency

World Bank

FAO

UKAID

ADB

USAID

European Union

NGO/INGO/Development organization

- International Center for Integrated Mountain Development (ICIMOD)
- CIMMYT Cereal System Initiative for South Asia in Nepal (CSISA-NP)
- iDE-Nepal
- Renewable World
- SAMARTH
- IRRI
- Winrock
- Practical Action
- SNV Nepal
- CEAPRED
- LI-BIRD
- Private Sector

Water Smart:

- Drip & Sprinkler
- Rain water harvesting
- Low cost water storage (Thai jars, Soil-cement tanks)
- Solar lift irrigation
- Papa & Barsha pump lift
- Mulching
- Precision Land Levelling
- Raised bed
- Direct Seeding
- Alternate wetting and drying
- linking tap to irrigation /conservation ponds
- zero waste of water by behavior change,

Market Access and Water Technologies for Women Project (MAWTW, 2013-16) USAID supported iDE-Nepal



Small Scale Drip Irrigation



**Solar Lift Irrigation
(Renewable World)**



Thai Jar for MUS

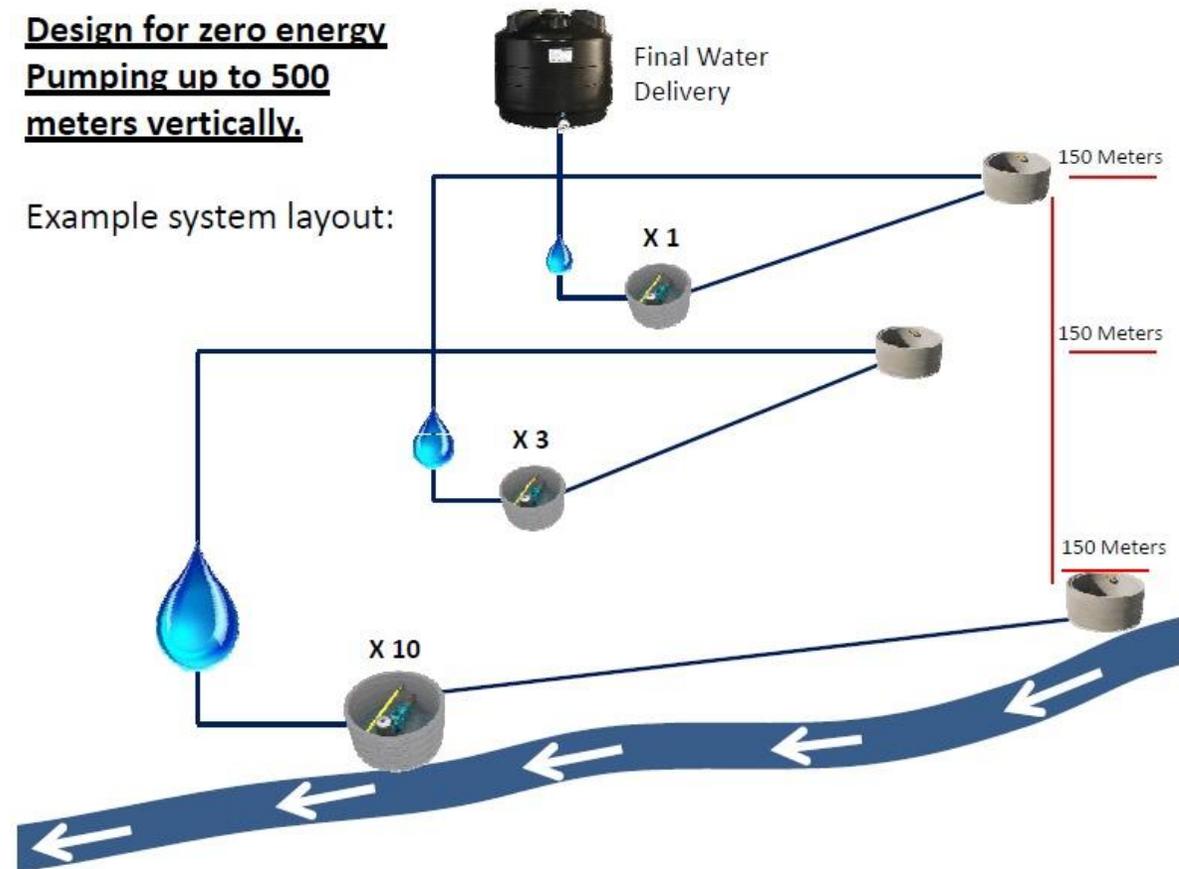
▪Papa Pump (Hydraulic Ram)



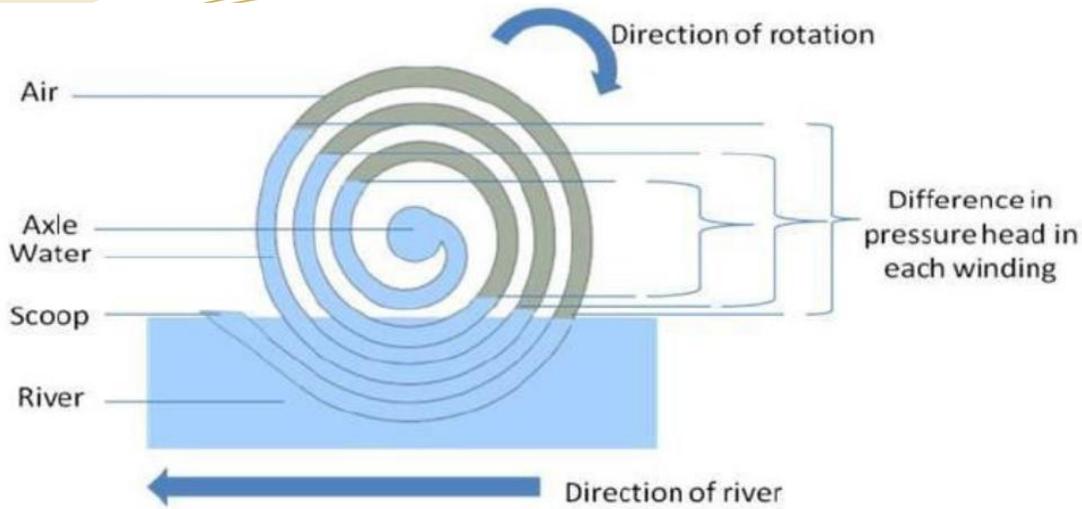
Imported and Installed by NAFSeeds

Design for zero energy
Pumping up to 500
meters vertically.

Example system layout:



Barsha Pump (Spiral)



Working principle of Spiral Pump

**Developed by aQysta
and promoted and
implemented by
Practical Action and
distributed by NAFSeeds**



Weather Smart:

- Weather Forecast
- Insurance
- Weather index based insurance
- Weather based agro-advisory,
- Plastic Tunnel for hailstorms and rains
- Crop Diversification
- Agroforestry



Climate and weather information

Nutrient Smart:

- Green Manuring
- Legume Integration
- Bio- fertilizer
- Bio-pesticide
- Cattle-Shed mgmt

Carbon Smart:

- No-Tillage
- Minimum Tillage
- Residue Management
- Planting perennials,
- Agro-forestry
- Fruit orchard

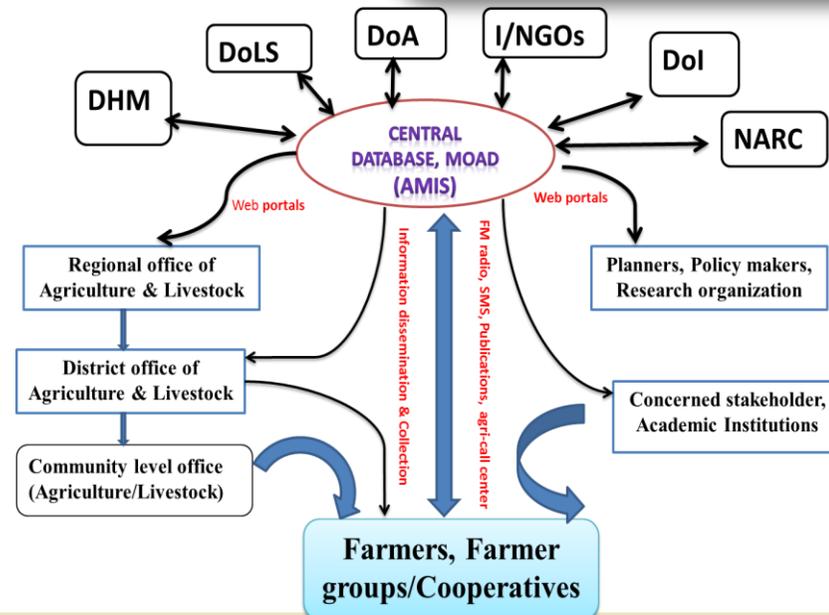
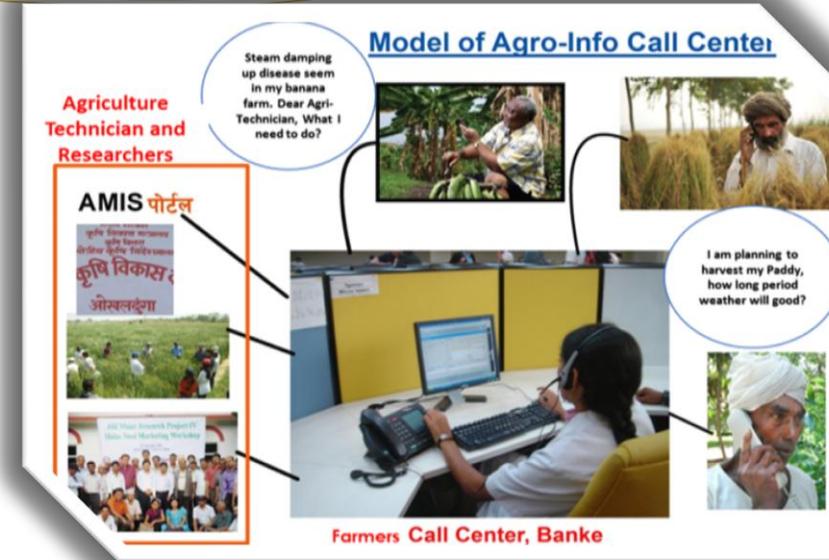
Energy Smart:

- No-Tillage
- Minimum Tillage
- Residue Management
- Direct Seeded Rice
- Biogas (CDM), Bio briquet and renewable energy
- Solar Pumping
- Papa & Barsha Pump



Knowledge Smart:

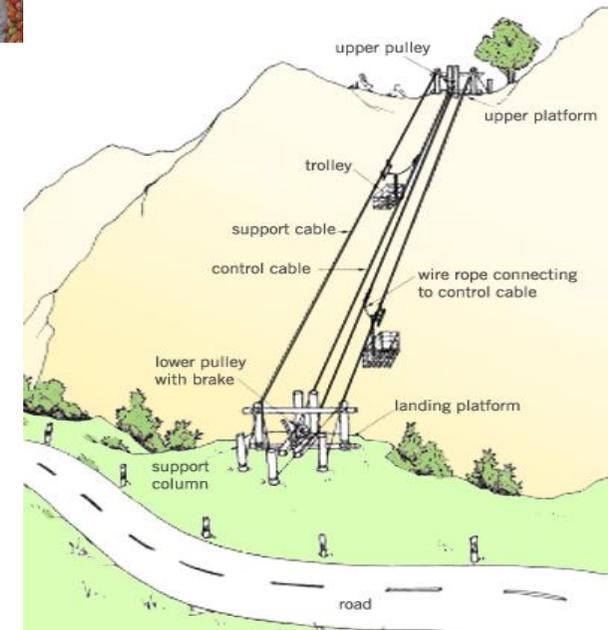
- ICTs
- Mobile Apps & SMS
- Call Center
- Toll Free Number
- Gender Empowerment
- Capacity Development
- Behavior Change
- Exposure visit



CSA and Mechanization Technology

Haulage Smart:

- Gravity Goods Rope Ways
- Cable Ways (Tow-in)



Example of CSA and Mechanization Technology

Climate-Smart Village (CSV)

- International Center for Integrated Mountain Development (ICIMOD) funded Center for Environmental and Agricultural Policy Research ,Extension and Development (CEAPRED)
- 4 sites Mahadevsthan, Nayagaun and Patalekhhet VDCs of Kavre district-key interventions
- **Water management**:-mulching, linking tap to conservation/ irrigation ponds, water retention techniques, sprinkler or drip, zero waste of water by behavior change, land leveling, raised beds
- **Crop and cropping patterns management**: right crop combination and/or cropping patterns, zero tillage, Inter cropping and multi-cropping
- **Use of crop residues**: harvest paddy and wheat 1 foot above ground
- **Energy smartness**: In combination of point 3 above

Example of CSA and Mechanization Technology

Climate-Smart Village (CSV)

- Nutrient & Fertilizer management: use of bio fertilizer, bio pesticides introduced IPM , Cowshed management
- ICT services and linking farmers to experts: farmers linked with a call centre provides them for weather and contact experts.
- Gender friendly community institutions: Group formation and capacity development, linking credit/cooperative small scale saving communities particularly for women and marginalized, in building their confidence, for gender and social inclusion, women friendly machine.
- Linking for biogas promotion: Farmers linked to APEC/Nepal Biogas Program for biogas plant installation under national biogas support and subsidy, small scale solar panel for electrification.
- Crop and cattle insurance: linked to the government's crop and livestock insurance subsidy program.
- Exposure Visit: to **Samastipur** and **Vaishali** districts of India **Borlaug Institute of South Asia (BISA) farm** and **Climate Smart Villages (CSV)**

Issues and Challenges

- **Geographical setting**
- **Low investment from public and private sector for the mechanization**
- **Limited access to machineries, spare parts and after-sales services**
- **Weak organization setup in the government system**
- **Energy supply**
- **Youth migration to urban and abroad leaving old age and women.**
- **Credit facility and high interest rates from financial institutions**
- **Monsoon dependent agriculture**
- **Unavailability of weather forecast (Weekly, Monthly, Seasonal, Annual)**
- **Natural calamities; Floods, Land Slides, Cold & Hot Weather, Drought and Earthquakes.**
- **Recurrent climate related hazards**

Conclusion

- **Nepal is highly vulnerable from climate change point of view (ranked 12th most vulnerable country in the world).**
- **It has threatened food and nutrition security of millions of people, especially women and marginalized groups of people.**
- **Nepal has conducive policy environment to address these problems/issues and government has put thrust by taking several policy initiatives, including ADS.**

Conclusion

- **Adopt suitable technology from other country and do adoptive research based in local condition.**
- **There is a need for coordinated effort to build up synergy based on lesson learnt to combat the ill-effect of climate change through climate friendly activities.**
- **MoAD is committed to work in collaboration with I/NGOs, private sector, and other development partners in the implementation of ADS for addressing the climatic variability's and climate change to achieve the ADS vision and national goal of food and nutrition security and improved livelihoods in Nepal.**

Thank you

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CSAM

