Adaptation for Climate Change by Livestock Smallholders in Gandaki River Basin

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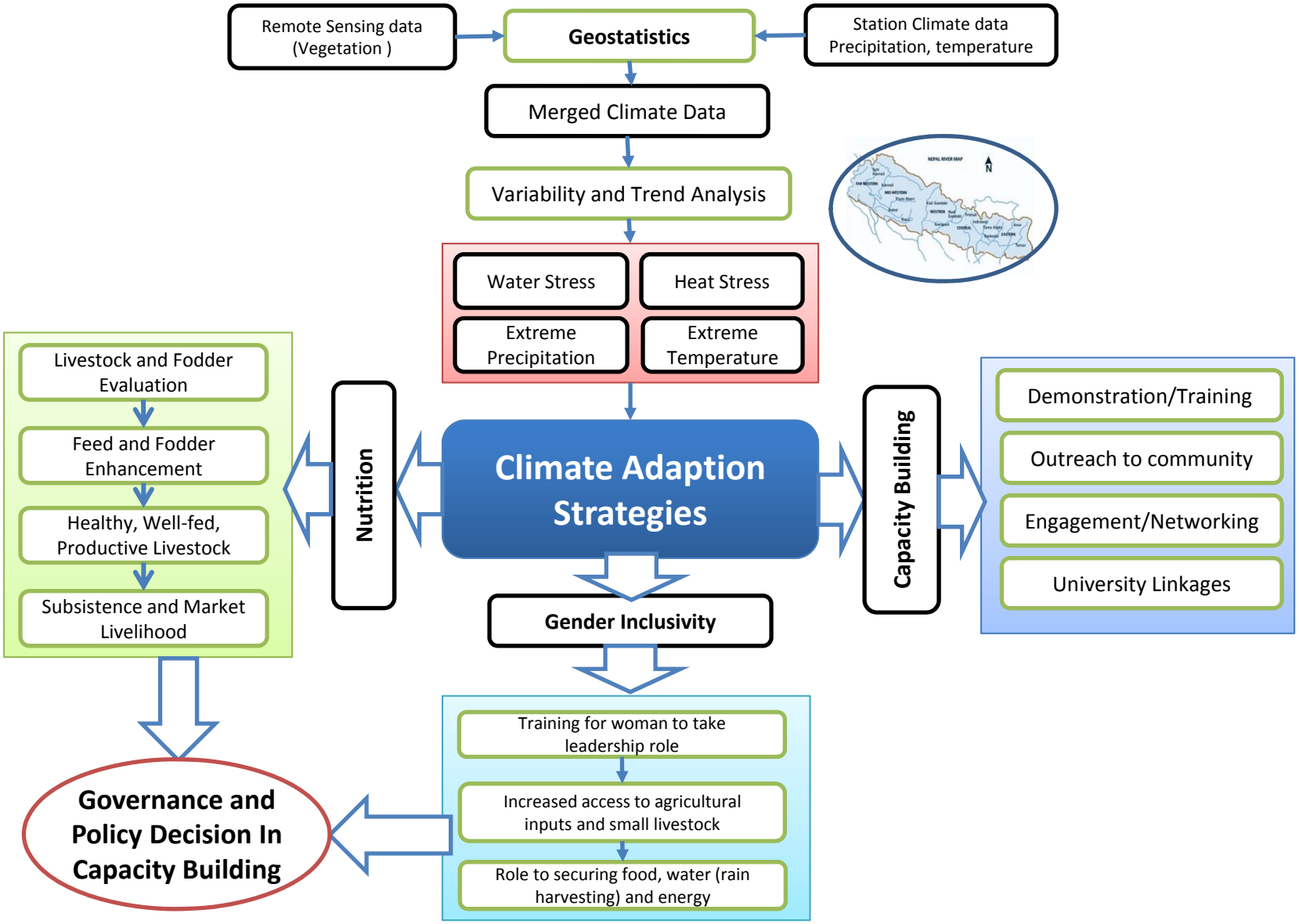
Climate Adaption Strategies



Climate hazard mapping

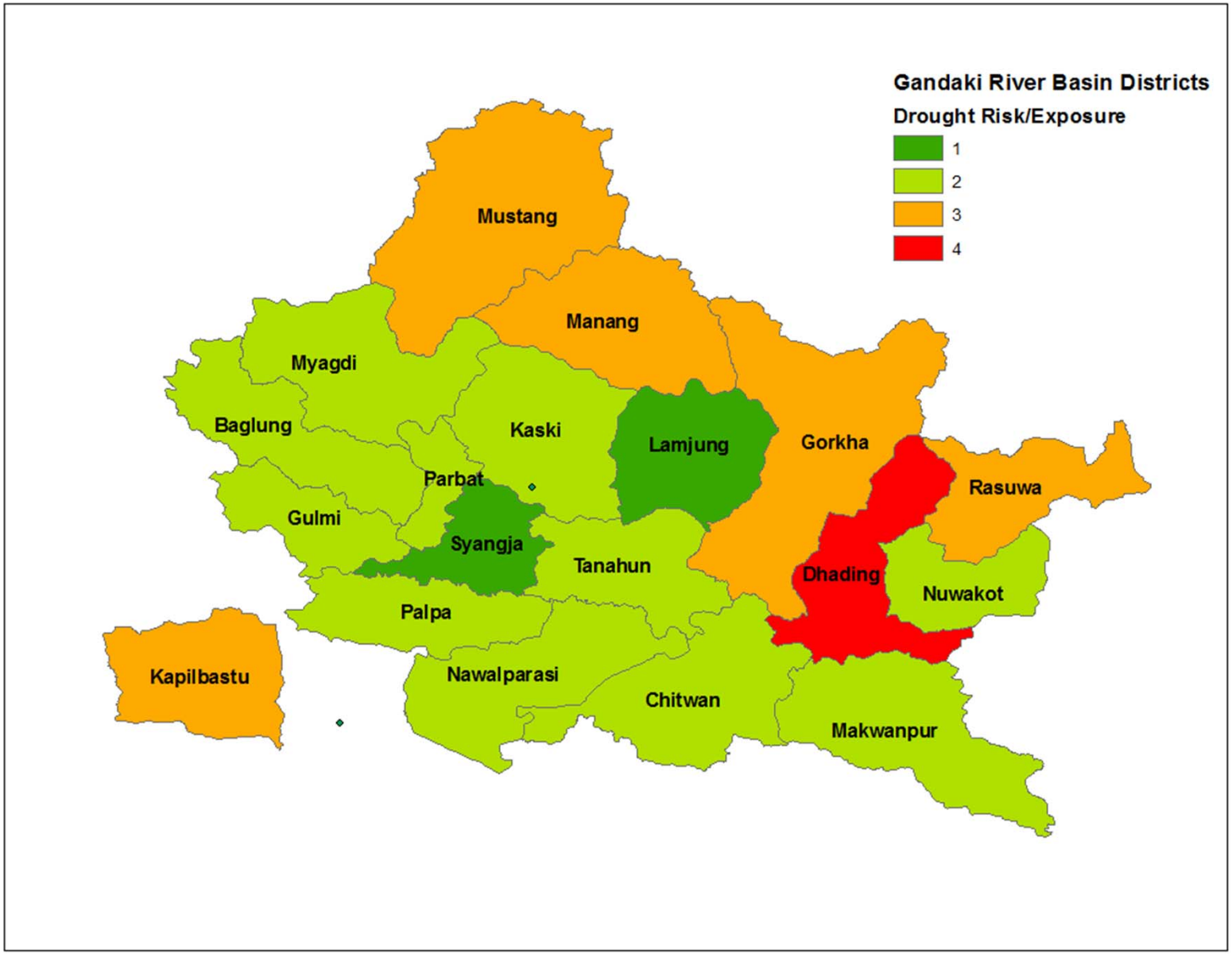
- Use remote sensing data sets together with available station records to reconstruct climate fields related to livestock health (precipitation/heat/moisture indices) at adequate spatial/topographic resolution
- Should be valuable resource to USAID, GoN, other stakeholders
- Survey small farmers across topographic gradient to decide which climate features to focus on

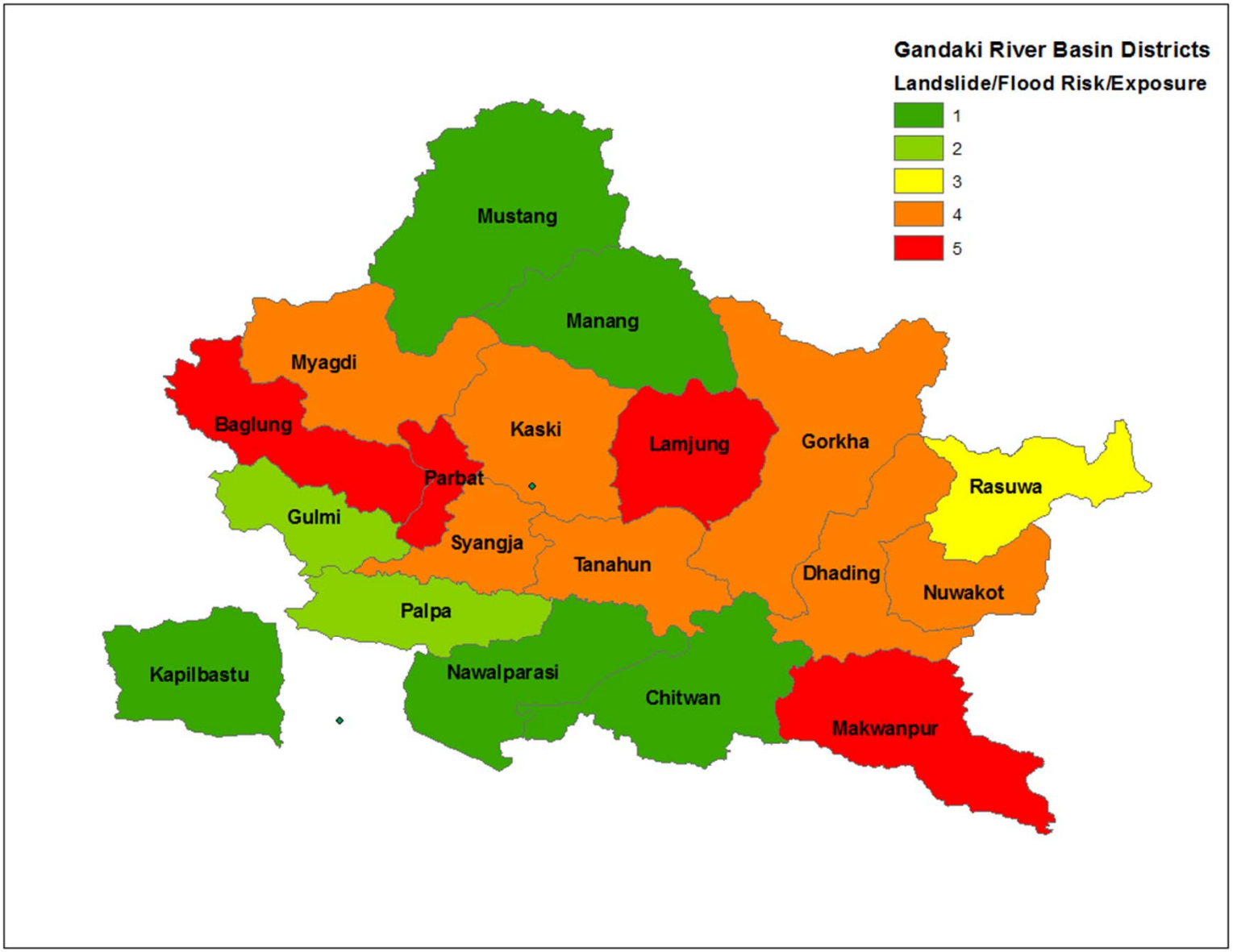
Trend Analysis on two meteorological stations in and around GRB

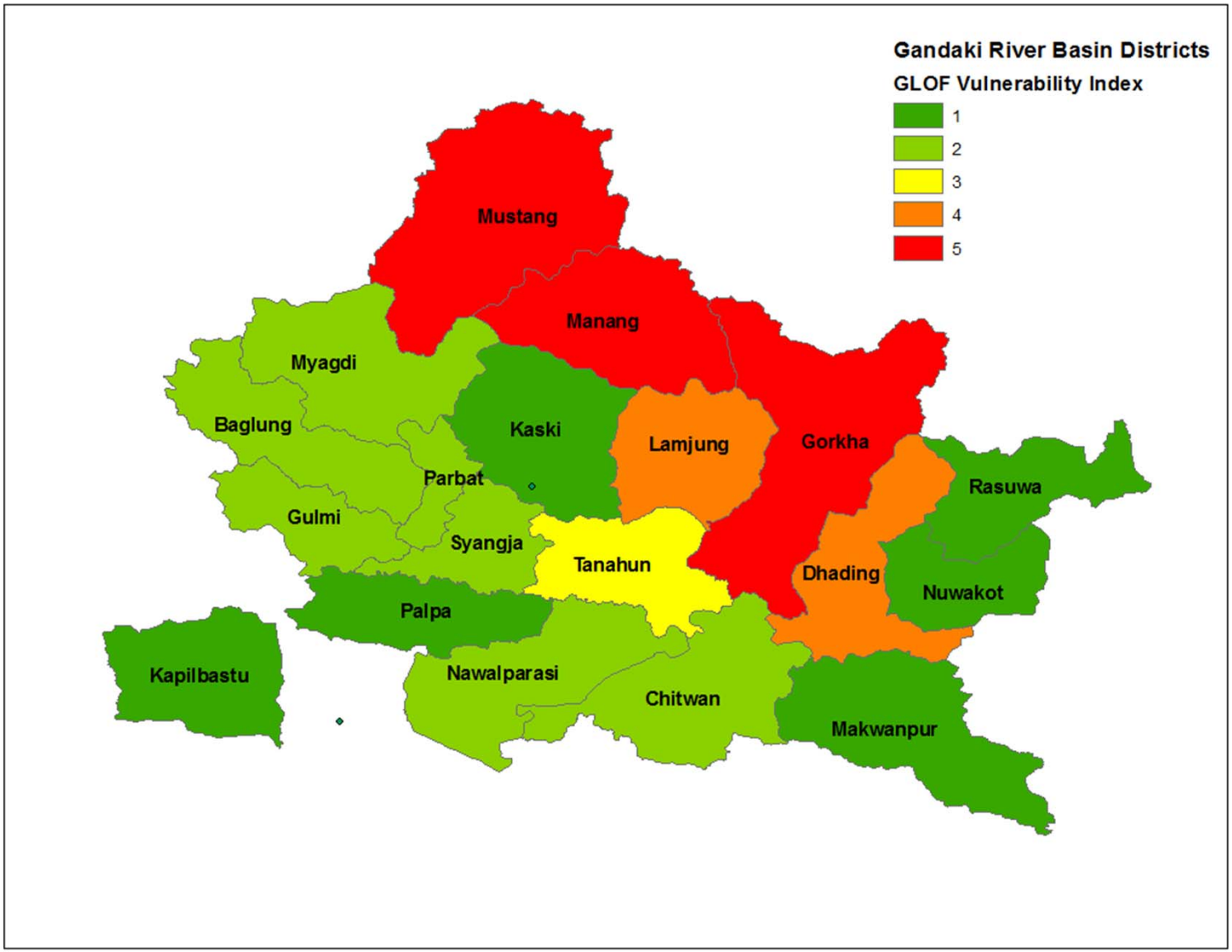
Months	Precipitation		Max Temperature		Min Temperature	
	Station1	Station2	Station1	Station2	Station1	Station2
Jan	+	+	-	+	+	+
Feb	+	--	-**	+	-	+*
Mar	-	--	-*	+	-	+*
Apr	+	+*	-*	-	-	+
May	+	+	-	-	-	+
Jun	+	-	+	+	+	+
Jul	+	-	+**	+*	+**	+
Aug	-	-	+*	+*	+**	+**
Sep	-	0	0	+	+**	+
Oct	+	+	+	+	+**	+
Nov	-	+	+**	0	+**	+*
Dec	-	-	+**	+	+**	+

*Significant at 0.05 level
** Significant at 0.01 level

Tentatively Selected Districts


Gandaki River Basin Districts
Drought Risk/Exposure
1
2
3
4
Mustang
Manang
Myagdi
Baglung
Kaski
Lamjung
Gorkha
Rasuwa
Parbat
Gulmi
Syangja
Tanahun
Dhading
Nuwakot
Palpa
Kapilbastu
Nawalparasi
Chitwan
Makwanpur


Gandaki River Basin Districts
Landslide/Flood Risk/Exposure
1
2
3
4
5
Mustang
Manang
Myagdi
Baglung
Kaski
Lamjung
Gorkha
Parbat
Rasuwa
Gulmi
Syangja
Tanahun
Dhading
Nuwakot
Palpa
Kapilbastu
Nawalparasi
Chitwan
Makwanpur


Gandaki River Basin Districts
GLOF Vulnerability Index
1
2
3
4
5
Mustang
Manang
Myagdi
Baglung
Kaski
Lamjung
Gorkha
Parbat
Rasuwa
Gulmi
Syangja
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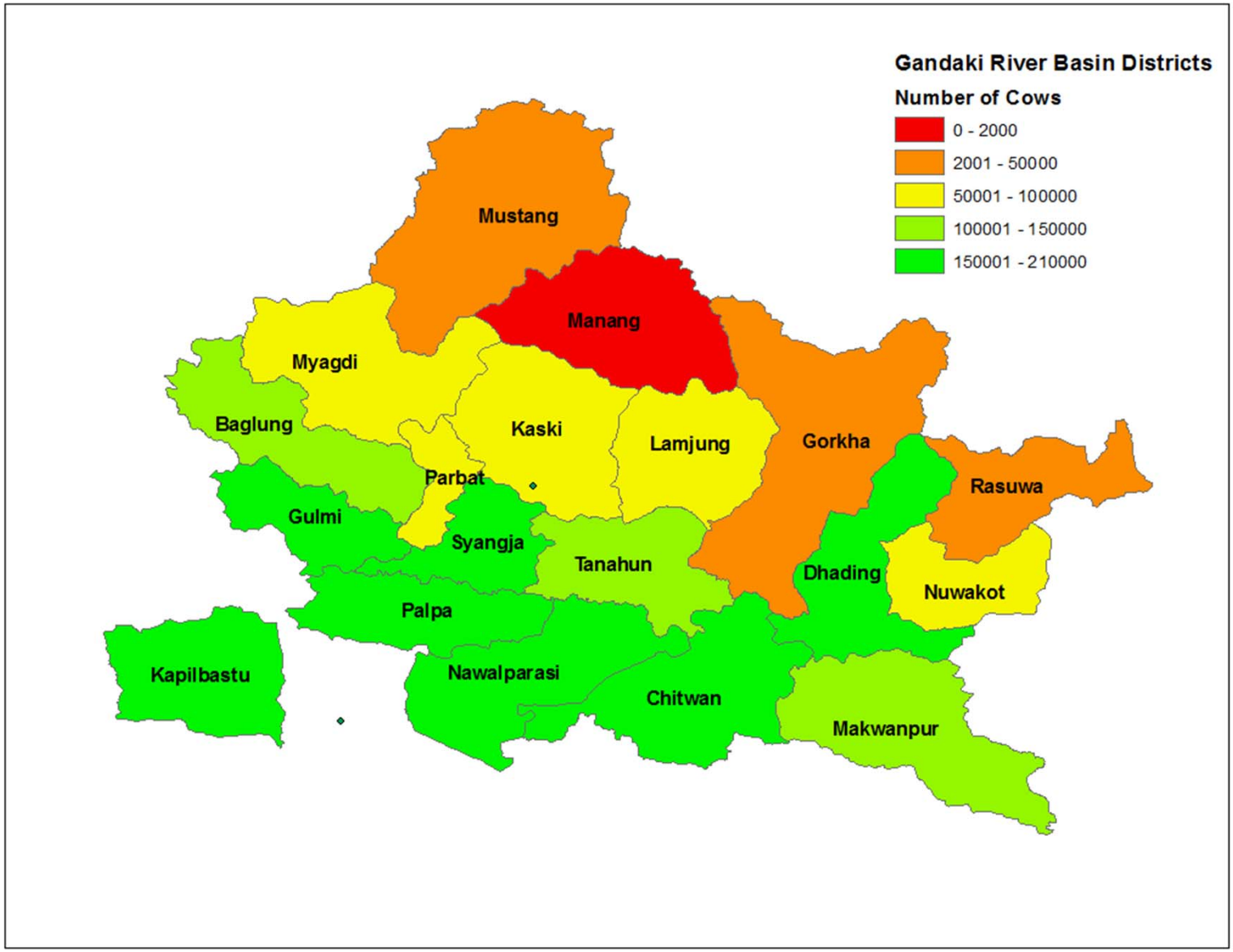
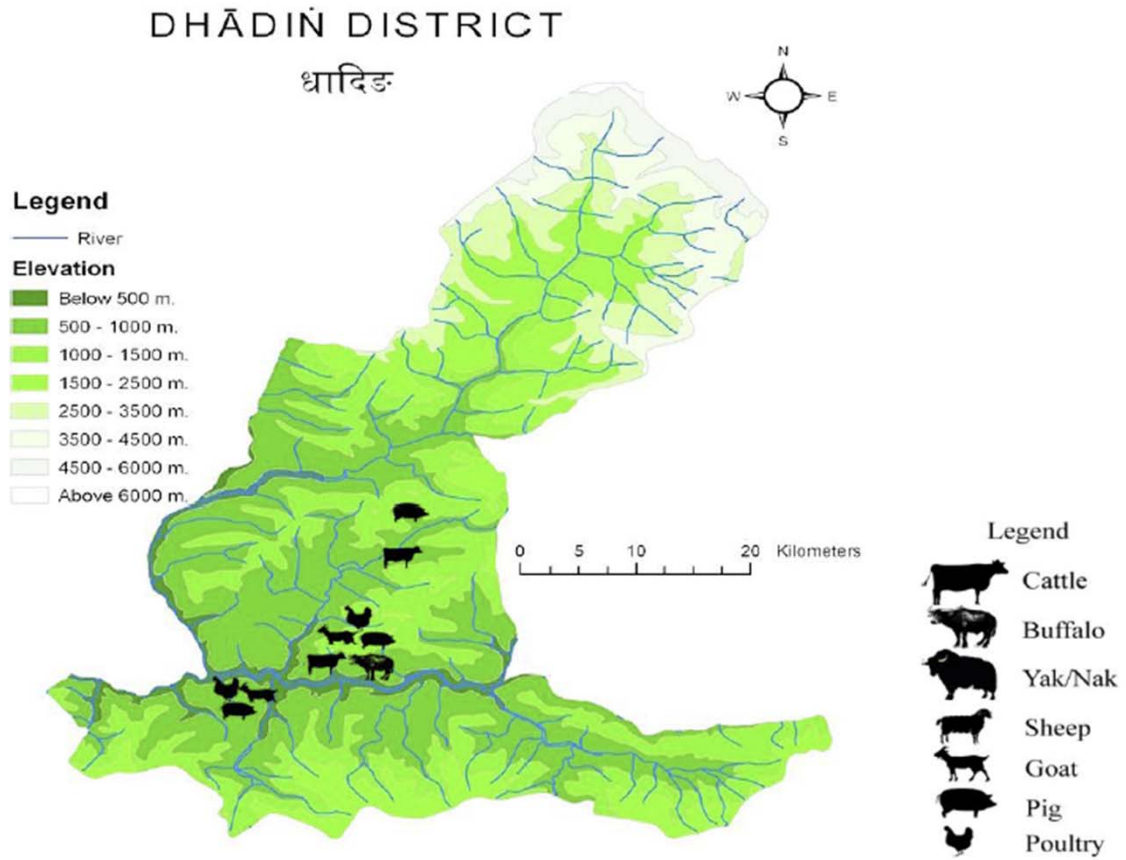
Chitwan
Makwanpur

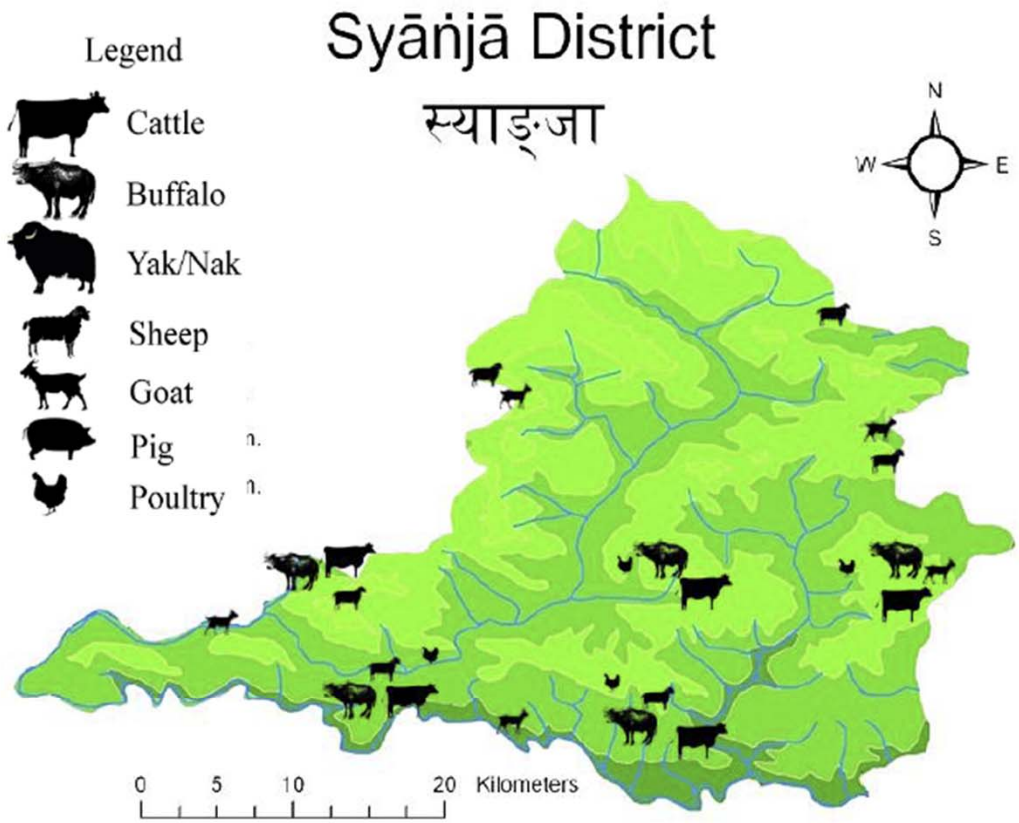
Livestock numbers by district



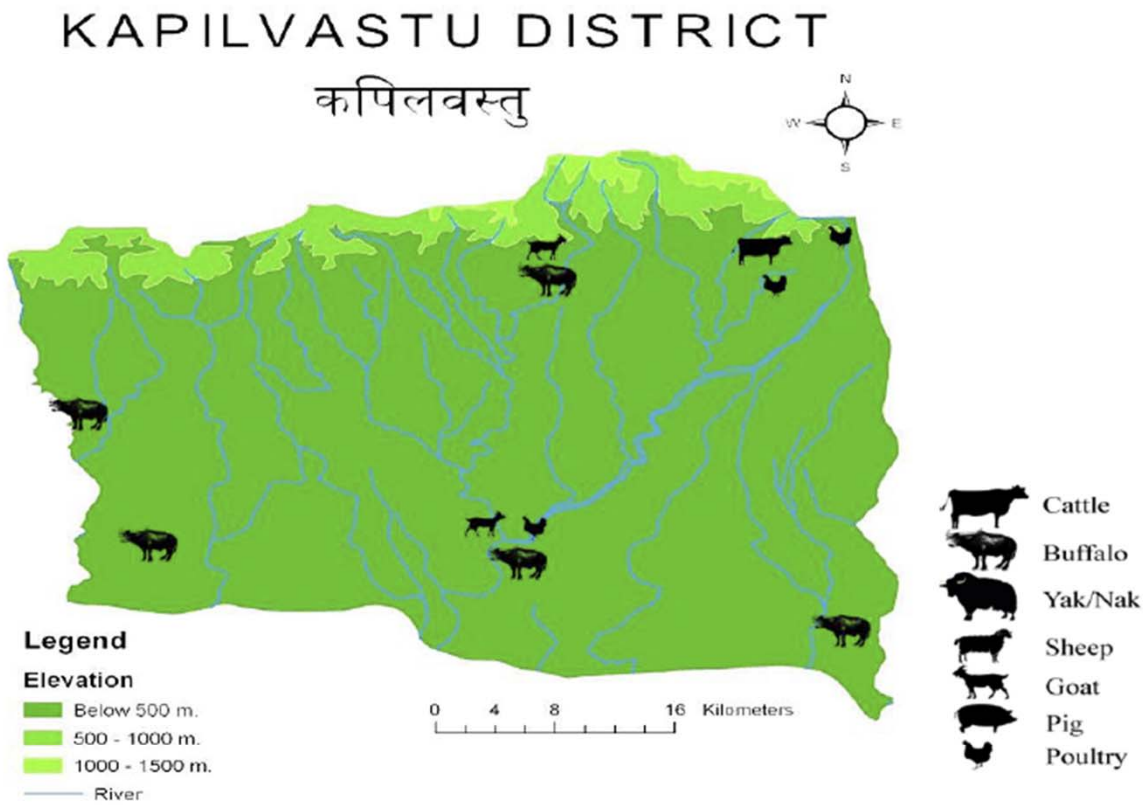
District maps and livestock holdings



Cattle	Buffalo	Yak/Nak	Sheep	Goat	Pig	Fowl	Duck
133799	94010	66	6216	139603	20586	564756	2498

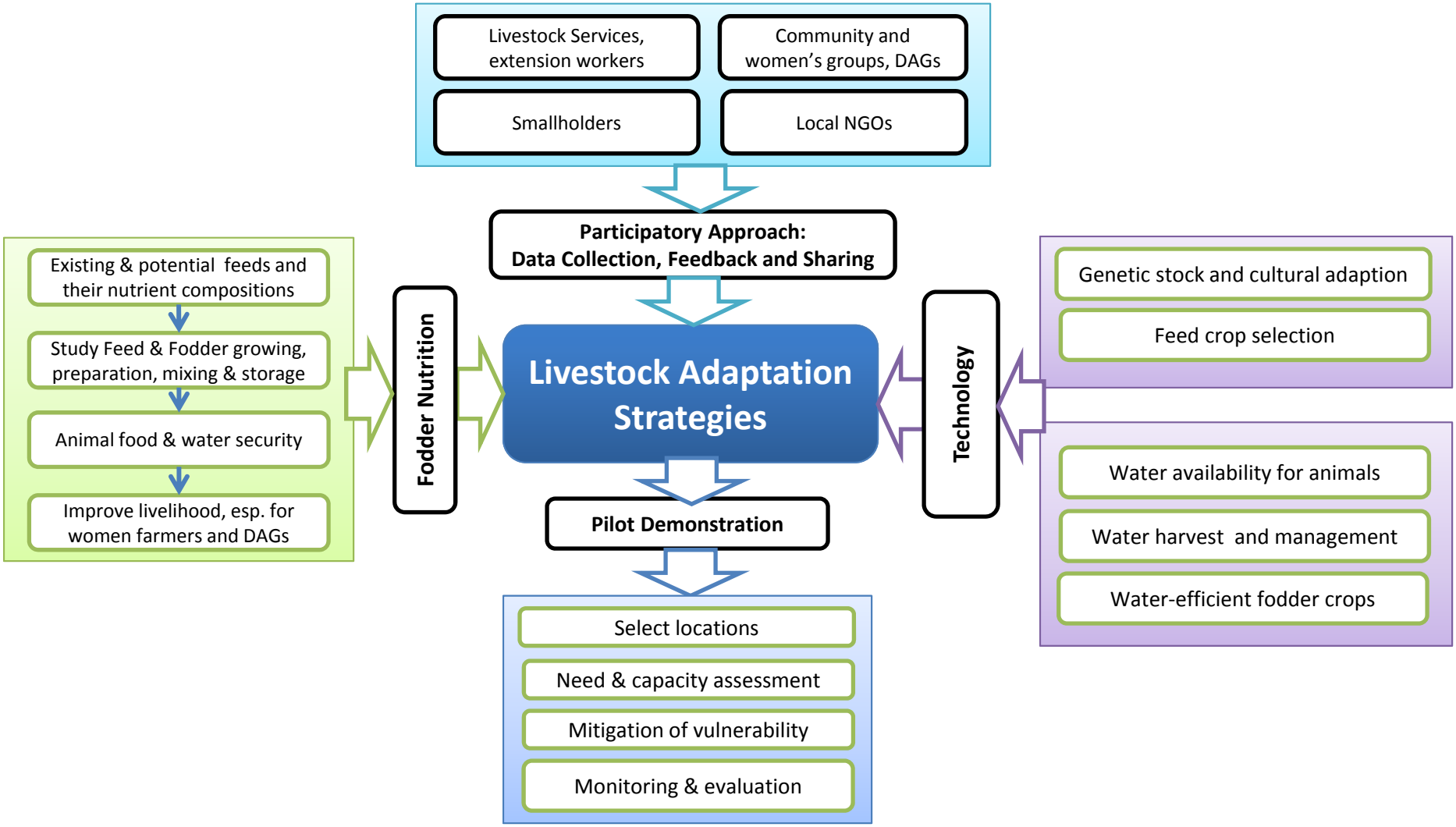


Cattle	Buffalo	Sheep	Goat	Pig	Fowl	Duck
77933	147775	5424	176211	10700	194152	2780



Cattle	Buffalo	Sheep	Goat	Pig	Fowl	Duck
127324	104550	9713	164870	9577	290205	5860

A Solution Set: Holistic Livestock Adaptation Strategies



Year 1 work plan items

- Pilot mapping of climate data (started)
  - Collect ground-based and remote sensing data sets, select potential focus areas
  - Make and validate preliminary high-resolution maps, get feedback
- Initial stakeholder workshop (~October)
  - Bring together govt., NGO, university... representatives
  - Pilot survey methods and training materials
  - Develop knowledge sharing channels and agreements
- Survey small farmers on climate adaptation experience and needs as it relates to livestock
  - Select DDCs and VDCs spanning GRB elevation gradient
  - Develop and test survey instruments for learning about climate hazard impacts in connection with nutrition, gender equity, and capacity building

Year 2 work plan

- Conduct and analyze surveys on climate hazards to livestock systems, current and projected adaptation strategies, and local organization and resilience patterns.

- Post set of preliminary climate hazard maps; hold workshop on climate mapping and applications to livestock.

- Identify feasible and effective candidate adaptation strategies based on survey findings. Prepare pilot trainings for promising adaptation strategies and demonstrate appropriate methods at the farm level.

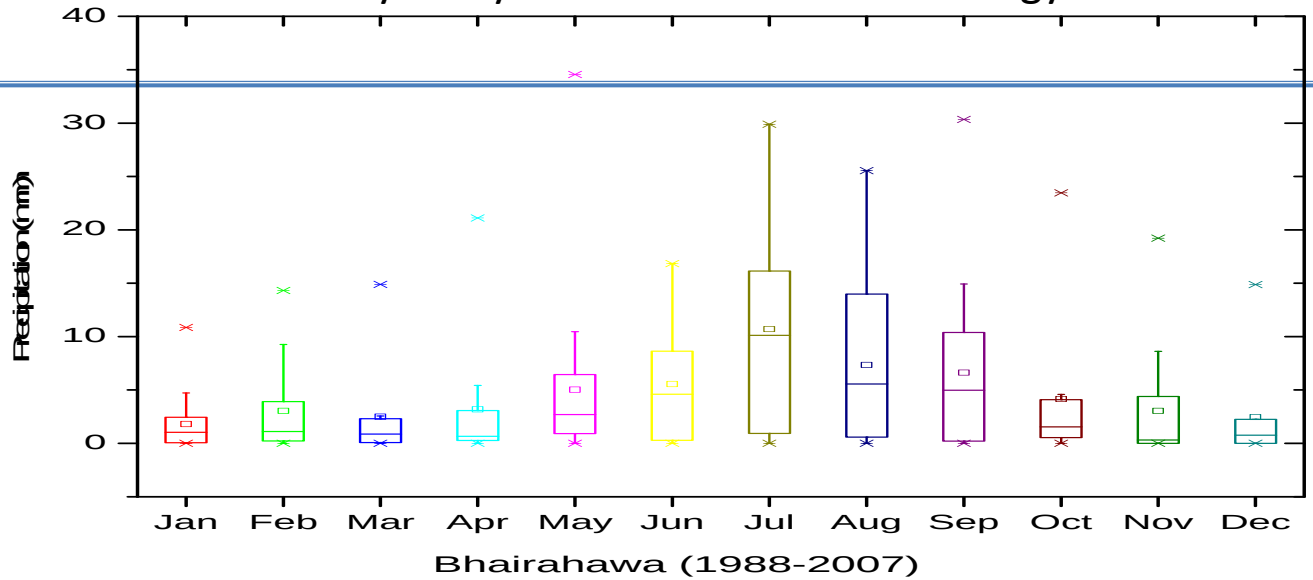
Year 3 work plan

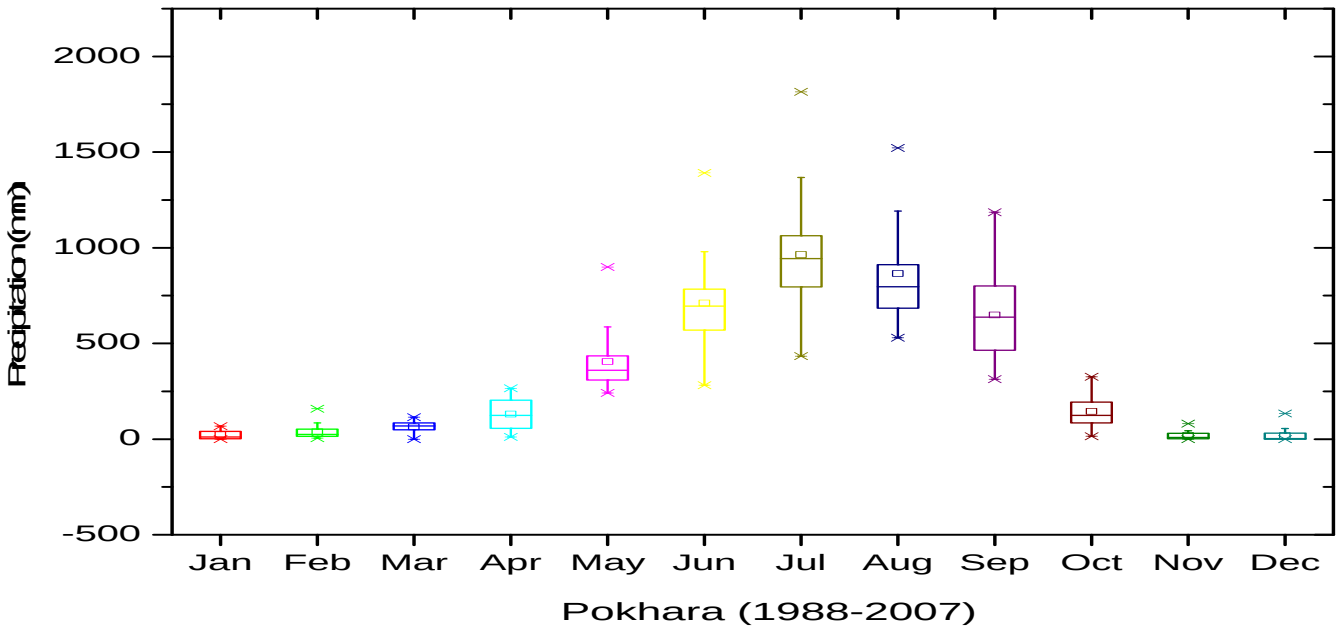
- Based on initial feedback, scale up community organizing and training projects on climate information and adaptation measures at and around the sample villages. Follow up to evaluate impact of assessment and adaptation activities.

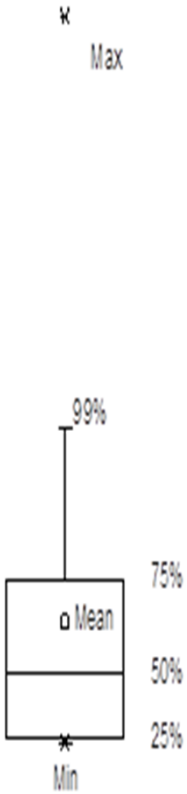
- Produce and disseminate revised training and outreach materials based on feedback and experience from the village projects.

- Hold national workshop to share project findings and recommendations with stakeholders. Prepare reports and briefing for policymakers.

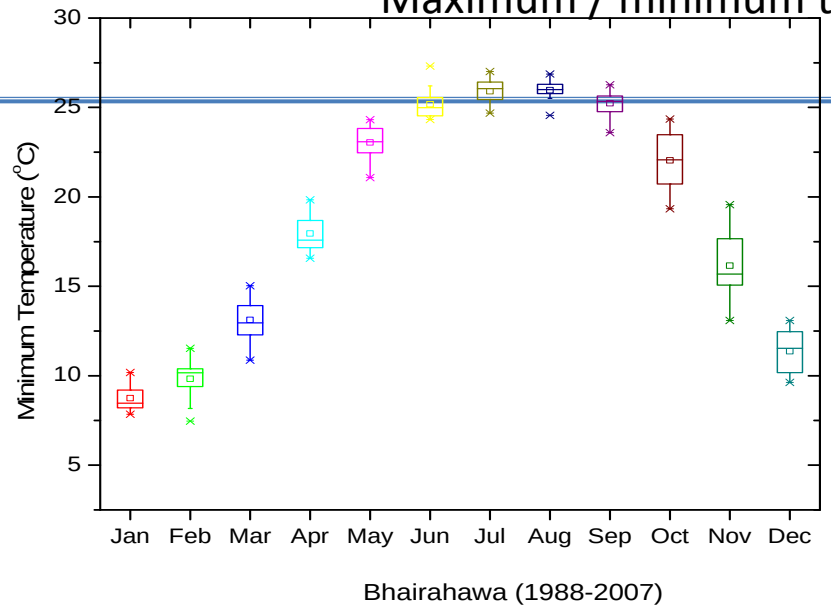
Preliminary analysis: GRB stations climatology and trends

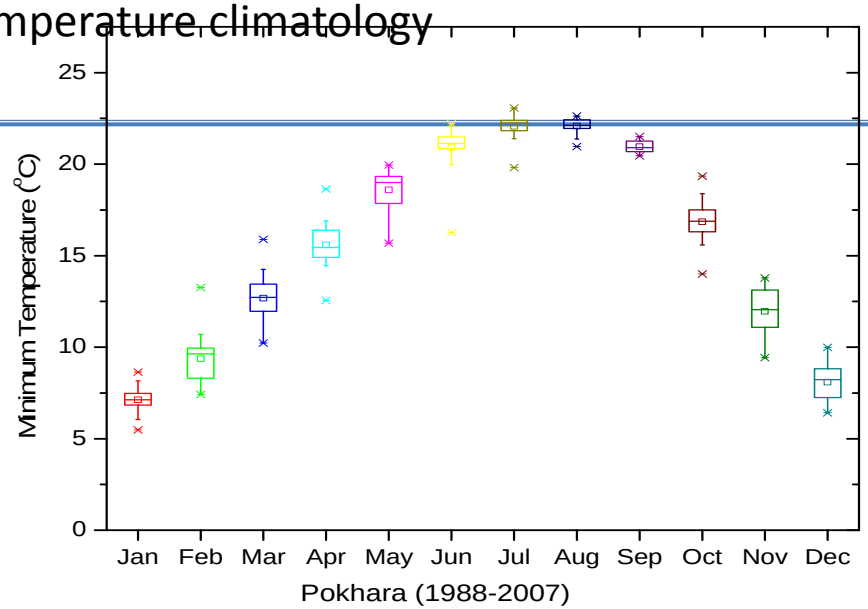


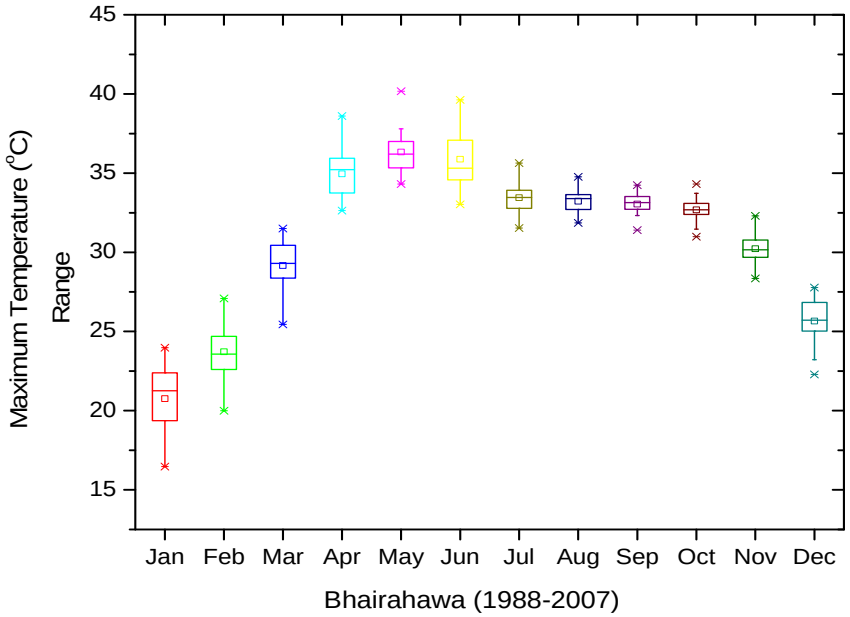


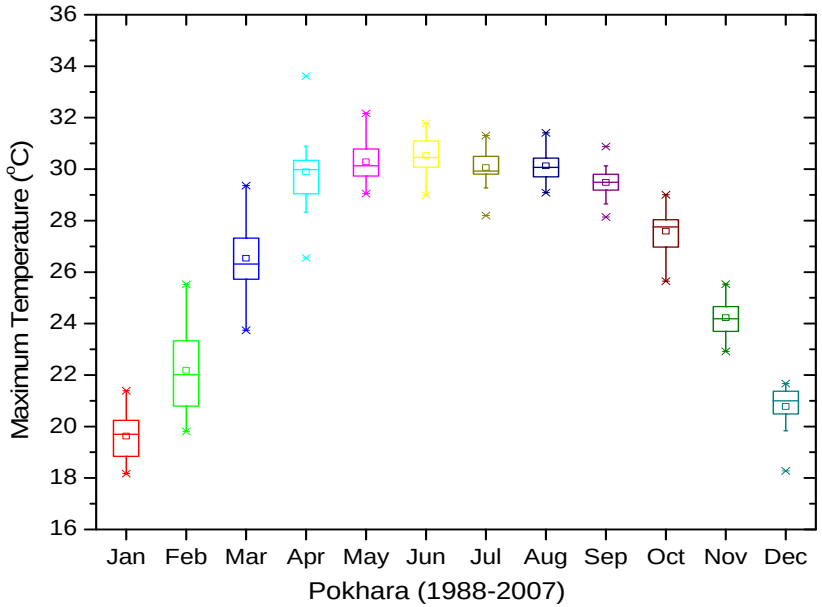


Maximum / minimum temperature climatology









Potential adaptation strategies: Improving water and soil management

- Community self-assessment of alternative water management and conservation technologies using participatory tools
- Model farms to demonstrate low-impact technologies to better make use of water and soil resources
- Analysis of key informant and survey data to identify regularities in natural hazards management and vulnerability/adaptability to climate hazards

- Understanding of the general nutritional properties of feed groups
- Identification of various feeds and their nutrient concentrations
- Discussion of milling practices and their effect on feeds
- Investigate harvesting and storage options and their effects
- Factors regulating feed intake
- Many other important aspects of diet formulation

Improving livestock management and scarce natural resources

- Pilot village based nutritional fodder production demonstration
- Efficient water management as a participatory tools
- Farm budgeting to assess impact of irrigation on farm profitability for the livestock farmers.
- Programming models of crop-livestock systems to assess the optimal mix of enterprises and effect of irrigation and agronomic practices on production risk
- Develop a sustainable and scalable livestock-crop program as a climate change mitigation roadmap which can be replicable as a participatory and collaboratory project for Nepal.
- Partnership with other regional program for a sustainable project.

Progress Chart

Monitoring table (with Quarters for projected completion)	July-Sept, 2012	Oct-Dec, 2012	Jan-Mar 2013	Apr-June 2013	July-Sept, 2013	Oct-Dec, 2013	Jan-Mar 2014	Apr-June 2014
Baseline climate data collection and survey	X							
Stakeholder workshop		X						
Synthesis of climate data and share with stakeholders/partners		X	X					
Predicted critical climate change assessment on fodder yields, cropping practices and identification of genetics of fodder/nutritional feeds			X	X				
Selection of the on farm demonstration sites and villages at each regions			X	X				
Establish On farm fodder, feed and water use efficiency demonstration plan				X				
Research data collection at the village level demonstration				X	X			
Outreach and extension plan with Nepal partner/CRSP stakeholder					X	X		
Research synthesis of village data for first year						X		

*** Progress will be monitored by varying that key outputs have been delivered by target quarters as indicated**

Possible synergies with other CRSP Livestock activity in Nepal

- Workshop/survey together for climate change data collection, assessment and share information
- Information sharing and joint stakeholder meeting
- Yearly meeting with the Nepal Stakeholder and CRSP team to share the lesson learned and accomplishment
- Database and research collaboration with the Institute from Nepal
- Developing fact sheet, technical bulletin and the best CC impact and CC mitigation strategies with the Nepal stakeholder.