

Appendix 1: Questionnaires for Household Survey

Hello! We are from ICIMOD, an international organisation that works to coordinate projects in mountain resources management and disseminate knowledge about mountain development the in Hidu Kush Himalayan (HKH) region and by doing so to ensure the continued livelihood of mountain communities. Currently, we are conducting a research project ‘Study Rangeland Resources and Ecosystem Management in Nepal’ to search for effective managerial measures to sustain rangeland resources and ecosystems in Nepal. In a recent assessment, we found that indigenous practices have played important roles in sustainable rangeland development in the past. On this basis, we have come to collect information about local use of rangeland resources and learn of your suggestions for better rangeland resource and ecosystem management. To achieve this objective, we wish to ask you a number of questions. Your participation in any or all parts of this survey is completely voluntary and your answers are confidential. However, your participation in this survey is important to us as we try to understand indigenous knowledge and expectations and receive suggestions from you and your community. Your cooperation will be highly appreciated. Thank you very much for your time and attention!

Please use ‘√’ to tick the answers that you want to choose.

I Grazing management

1. Which kind of grazing systems are you using?

- Traditional transhumance from highland pasture in summer in to lowland community forestry in winter
- b) Migratory grazing within different areas of rangeland
- c) Forestry grazing whole year round
- d) Stall feeding
- e) Others (please specify)

2. Which members of the household are engaged in grazing?

- a) Husband/household head

- b) Wife
 - c) Children under 16 years old
 - d) Elders over 60 years old
3. Where have your family learnt about the grazing systems and techniques that you use?
- a) Forefathers
 - b) Relatives
 - c) Neighbours
 - d) Friends
 - e) By self-practice
4. How efficient is your grazing system in your opinion?
- a) Very efficient
 - b) Moderately efficient
 - c) Moderately inefficient
 - d) Very inefficient
 - e) No idea
5. How can rangeland resources be more efficiently used for animal grazing?
- a) Keeping appropriate stocking rate
 - b) Seasonal trans-human grazing
 - c) Rotational grazing with fences
 - d) Others (please specify)
6. Which kind of indicator do you usually use to control grazing intensity on rangeland?
- a) Sward height
 - b) Grass cover
 - c) Days grazed in a particular site

d) Others (please specify)

7. How do you control your animal numbers on grazing lands?

a) Take-in and take-out according to forage production

b) Fix the animal number for a certain area of pasture

c) No control

d) Others (please specify)

8. Do you supplement your livestock with additional feeds?

a) Yes, supplement with both roughages (hay/straw) and concentrates (corn/barley) in winter season

b) Yes, supplement with only concentrates (corn/barley) in winter season

c) Yes, supplement with only roughages (hay/straw) in winter season

d) Yes, supplement with concentrates (corn/barley) in both summer and winter seasons

d) No supplementation at all

9. Do you harvest and preserve your surplus feeds from grazing sites?

a) Yes, harvest and preserve as hay

b) Yes, harvest and preserve as silage

c) Yes, harvest and preserve as both hay and silage

c) No, no harvest and preservation

10. How can you keep the feed balance between winter and summer grazing?

a) Harvest and preserve surplus feeds from summer grazing sites

b) Grow and harvest some cultivated fodders (oat, barley, corn etc.) in croplands for winter supplements

c) Preserve some native pastures for winter grazing

d) No solution

11. What are the major problems on your rangeland related to your grazing system?

- a) Overgrazing
- b) Under grazing
- c) Poisonous plants and weeds increasing
- d) Rodents and pests increasing
- e) Others (please specify):

12. How has the conditions of your grazing lands been during the past ten years?

- a) Improved
- b) Deteriorated/degraded
- c) Stayed the same

13. In the past ten years, have there been any changes in your grazing practices?

- a) Yes
- b) No

14. What are the major changes in your grazing practices in the past ten years?

- a) From transhumance (rangeland-community forestry) to migratory grazing within rangelands
- b) From rotational grazing to fixed grazing
- c) From grazing to stall feeding
- d) Others (please specify):

II Rangeland improvement and production

1. How do you maintain soil fertility of your rangeland?

- a) Chemical fertiliser
- b) Livestock manure
- c) No attention
- d) Others (please specify)

2. How do you deal with manure/dung on your grazing pasture?

- a) Collected for fuel
- b) Used as construction materials for houses
- c) Naturally left on the rangeland as fertiliser
- d) Others (please specify)

3. Have you irrigated your rangelands?

- a) Yes, very often
- b) Yes, sometimes
- c) Rarely
- d) Never

4. Which kind of irrigation system you used for your rangelands?

- a) Canal
- b) Pipe
- c) Rainfall collection
- d) Others (please specify)

5. What do you usually use to control the weeds/poisonous plants on your rangelands?

- a) Herbicides
- b) Manual control
- c) No control
- d) Others (please specify)

6. What do you usually use to control the rodents and insects on your rangeland?

- a) Chemicals
- b) Mechanical control
- c) Biological predators (like hawks)
- d) No control

e) Others (please specify)

7. What do you usually use to control epidemic diseases of herbage?

a) Pesticides

b) Burning

c) No control

d) Others (please specify)

8. How do you usually mitigate rangeland degradation at your campsites?

a) Frequent movement

b) Nursing the livestock far from the campsites

c) Reseeding the campsite on leaving

d) No treatments

e) Others (please specify)

9. Which measures do you usually use to restore degraded rangeland?

a) Prevent grazing using fences

b) Reseeding

c) No treatment

d) Others (please specify)

10. Do you grow fodder for winter feed in the field?

a) Yes

b) No

11. Which kind of fodder do you normally grow?

a) Oats

b) Corn

c) Legumes

d) Grasses

e) Others (please specify)

12. How do you preserve these fodders?

a) Hay

b) Silage

c) Haylage

d) Meals/powders/particles

13. Do you have problems in rangeland maintenance and fodder production?

a) Yes

b) No

14. Which are the major problems for you in rangeland maintenance and fodder production?

a) Lack of scientific information

b) Lack of budget to maintain rangeland

c) Labor shortage

d) Others (please specify)

15. What are the solutions for these problems in your opinion?

a) Public/government support

b) Institutional cooperation

c) Herders' capacity building

d) Others (please specify)

In the past ten years, have there been any changes in your rangeland maintenance practices?

a) Yes

b) No

III Rangeland conservation and development

1. Are part or all of your rangelands situated in national or regional conservation areas (for example, National Parks)?
 - a) Yes
 - b) No
2. Are there any conflicts between the resource conservation strategies and rangeland resource utilisation (especially grazing)?
 - a) Yes
 - b) No
3. How do you minimise these conflicts?
 - a) Give priority to conservation and move out from conservation areas
 - b) Utilise rangeland following guidelines provided by the park manager or conservation agencies
 - c) No choice
 - d) Others (please specify)
4. Do you think rangeland conservation can benefit your livestock production?
 - a) Yes
 - b) No
5. Which kind of benefit do you think rangeland conservation can produce for your pastoral production/livelihood?
 - a) More feed resources for livestock
 - b) More markets for pastoral products associated with increasing eco-tourism
 - c) More requirements for livestock for recreation and as pack animals
 - d) Unseen benefits
6. Do you support/approve of national or regional rangeland conservation plans?

a) Yes

b) No

7. Are there any wildlife on your rangelands?

a) Yes

b) No

8. Are there any conflicts in food and habitat sharing between wildlife and your livestock?

a) Yes

b) No

9. How do you reduce conflicts between wildlife and livestock in food sharing?

a) Reduce livestock number

b) Kill wildlife

c) Let them compete naturally

10. Do you think wildlife and their habitat protection is important?

a) Yes

b) No

11. What is the best way to protect the wildlife and their habitats?

a) A special committee in the community made responsible for wildlife monitoring and protection

b) Wildlife is strictly protected by religious groups in the community

c) Each household voluntarily or compulsorily monitors and guards the wildlife and their habitats in turn

d) Others (please specify)

12. Are there any eco-tourism programs in your rangeland?

a) Yes

b) No

13. What do you think about the influence of eco-tourism on rangeland resources protection and development programs?
- a) It is a good way to replace the pastoral production system and benefit resource conservation by reducing pressures for overgrazing
 - b) It is a supplementary system for pastoral production development through fully using rangeland resources
 - c) It can negatively affect pastoral production due to conflict in resources sharing
 - d) It can negatively affect resource conservation because the demands of tourism can be dominant
 - e) No idea
14. Do you think that medicinal and aromatic plant collection activities can affect rangeland resource protection and development?
- a) Yes
 - b) No
15. What is the major influence of medicinal and aromatic plant collection activities on rangeland resources protection and development?
- a) Supplement pastoral production through fully using rangeland resource
 - b) Destroy the rangeland condition and reduce the forage resources
 - c) Reduce the biodiversity of rangeland ecosystem
 - d) No idea
16. What is your own way to manage medicinal and aromatic plant collection activities?
- a) Limit these activities by charging a high tax for collectors both from your own community and from outside
 - b) Strictly prohibit outside collectors by (community members) guarding the rangeland and inside collectors by signing Ban Regulations

c) Allow only the community member to collect a prescribed amount of medicinal and aromatic plants according to community agreements

d) Others (please specify)

e) No control

17. In the past ten years, what are the big changes in your rangeland conservation and development?

a) Increased resource conservation

b) Increased eco-tourism

c) Increased medicinal and aromatic plant collection

d) Increased pastoral production

e) Decreased pastoral production

f) Others (please specify)

g) No changes

V Land tenure and ownership

1. What is the ownership of your rangeland resources?

a) Public/government

b) Community

c) Private

d) Religious authority

2. Who is the major decision-maker for communal rangeland utilisation?

a) Government officials

b) Community committees

c) Community authorities

d) All community members

- e) Others (please specify)
3. Who will participate in meetings in which the community makes decisions for some issues in rangeland management?
- a) All family members in each household
 - b) Only representatives of each household
 - c) Only committee members
 - d) Only Community leaders
4. How do you share communal pastures with your neighbors when you herd animals?
- a) Set up a contract signed by both sides
 - b) Orally negotiate each other
 - c) Get decision from community committee/leaders
 - d) Get decision from local governments
 - e) Others (please specify)
5. Do you have conflicts with your other herders in your community when you graze the communal pastures?
- a) Yes, very often
 - b) Yes, sometimes
 - c) Seldom
 - d) Never
6. How do you mitigate these conflicts?
- a) Ask help from local governments
 - b) Ask help from community authorities/village head
 - c) Self negotiation
 - d) Others (please specify)

7. What are your and your community members' responses when people from another community graze your rangeland?

- a) Against (go to question 9)
- b) No response (go to question 9)
- c) Accept on the basis of certain agreements

8. What are these agreements?

- a) Payment of tax
- b) Oral/documented Statement of sharing rangeland resources each other
- c) Free use for friendship
- d) Others (please specify)

9. Do you graze animals in communal forestry for transhumance?

- a) Yes
- b) No (go to question 13)

10. Do these communal forests belong to your community?

- a) Yes
- b) No

11. Are there any conflicts between communal forestry management and transhumance grazing?

- a) Yes
- b) No

12. How do you mitigate these conflicts?

- a) Pay some tax to the communal forest owner as compensation
- b) Ask local officials to allocate the forage resources for grazing
- c) Free grazing under guarantee of non-damages on tree or shrubs
- d) Others (please specify)

13. In the past ten years, have there been any changes in your land tenure and ownership?

a) Yes

b) No

14. What are the major changes in your land tenure and ownership in past ten years?

a) More private land than before

b) More communal land than before

c) More public land than before

d) Others (please specify)

e) No changes

15. What are the major causes of these changes?

a) Changes in national/regional planning and policy

b) Changes in community-based management systems

c) Influences from other communities and groups

d) Others (please specify)

Appendix 2: Guideline of PRA group discussion

1. What are the most successful practices of rangeland utilisation and management in your case?
2. What are the serious problems you have faced/are facing in rangeland utilisation and management?
3. What are the institutional arrangements in your area for rangeland resource utilisation and management?
4. What are the land tenure and ownership/right systems of your rangeland resources? Are they effective?
5. What are the government interventions on rangeland conservation and development? What are the lessons learned from these interventions?
6. What are the significant changes of your rangeland utilisation and management practices in past years? And what are the causes?
7. Other specific questions: How do you protect rangeland resources and wildlife? How do you share the rangeland resource with your own and outside communities? How do you maintain the rangeland productivity and health? How do you cope with natural disasters? How do you market your livestock production (animals, beef, butter and cheese)? etc.