Integrated Local Risk Management

Participatory risk assessment and monitoring

(Draft 19.06.09)

Guidelines for baseline assessment and monitoring

CAMPkuhiston
NGO for sustainable mountain development

Strengths and limits of ILRM and its participatory risk assessment and monitoring

Generally there is a need to distinguish between two types of risks:

a) Risks, the causes of which lie outside the area inhabited by the population at risk (e.g. overgrazing, deforestation of large areas in the upper part of the catchment)
b) Risks, the causes of which lie within the area inhabited by the population at risk (e.g. inadequate irrigation technologies, road construction, or settlements that could cause landslides or floods).

In the first case, the people at risk have limited options for contributing to eliminating the causes. However, they can protect themselves against the risks by taking adequate measures.
In the second case, the people at risk can reduce or eliminate the causes by taking responsible action. At the same time they can also protect themselves against the risks by taking adequate measures.

Integrated Local Risk Management (ILRM) concentrates efforts on the second type of risks. Nevertheless risk potentials that are subject to external factors should be taken account of and pointed out in the baseline assessment and monitoring. However, this should only include risk prevention and mitigation measures that can be implemented by the local inhabitants themselves with support from small grant projects.
Measures that require more comprehensive and extended assessments and measures (e.g. regulations for and control of land use management, large control structures, etc.) in the catchment are not covered by ILRM and need to be implemented through specialised projects. This constraint must be clearly stated in every assessment.

Objectives

Participation of local stakeholders

- To involve local community leaders and local authorities in the base line assessment and monitoring

Base line assessment

- To assess hazards, vulnerability, implemented prevention and mitigation measures and risks in prone area

Identification of additional appropriated prevention and mitigation measures

- To propose appropriated measures to be implemented for prevention and mitigation of identified risks

Monitoring of implemented structural and non structural measures

- To monitor impact of implemented structural and socio economic measures

Elaboration of concrete project proposal

- Community based projects proposals which will be funded by small grants

Methodology

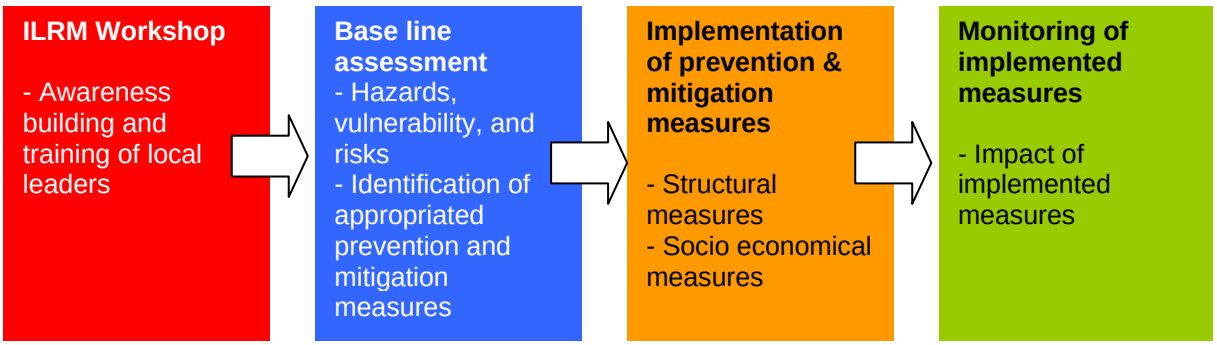
- Mapping of the investigated area with help of Google earth
- Photo monitoring (documentation of findings with photos and short written explanations)
- Interviews with inhabitants
- Compilation of data (e.g. geological, hydro meteorological, biophysical, socio economical, etc.) from different sources

Establishment of assessment and monitoring team

Composition of a team

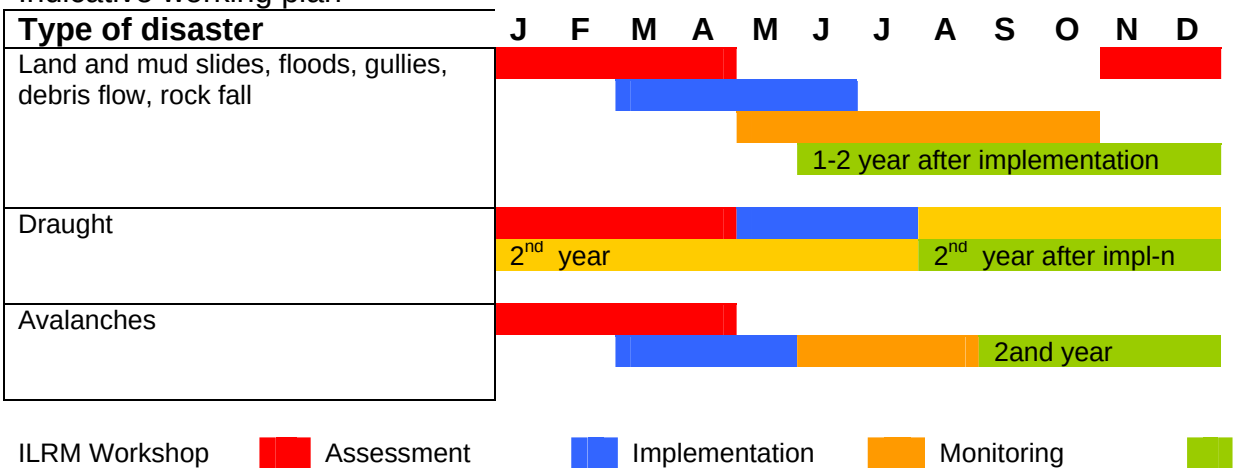
- Moderator of ILRM workshop (team leader)
- 2-4 representatives of the village (participants of the previous ILRM workshop)
- Specialist of Khukumat of district and / or representatives of NGOs / projects implementing its activities in the village

Stage of ILRM implementation and working plan



Organisation of activities during the year (the most appropriated period for implementing activities)

Indicative working plan



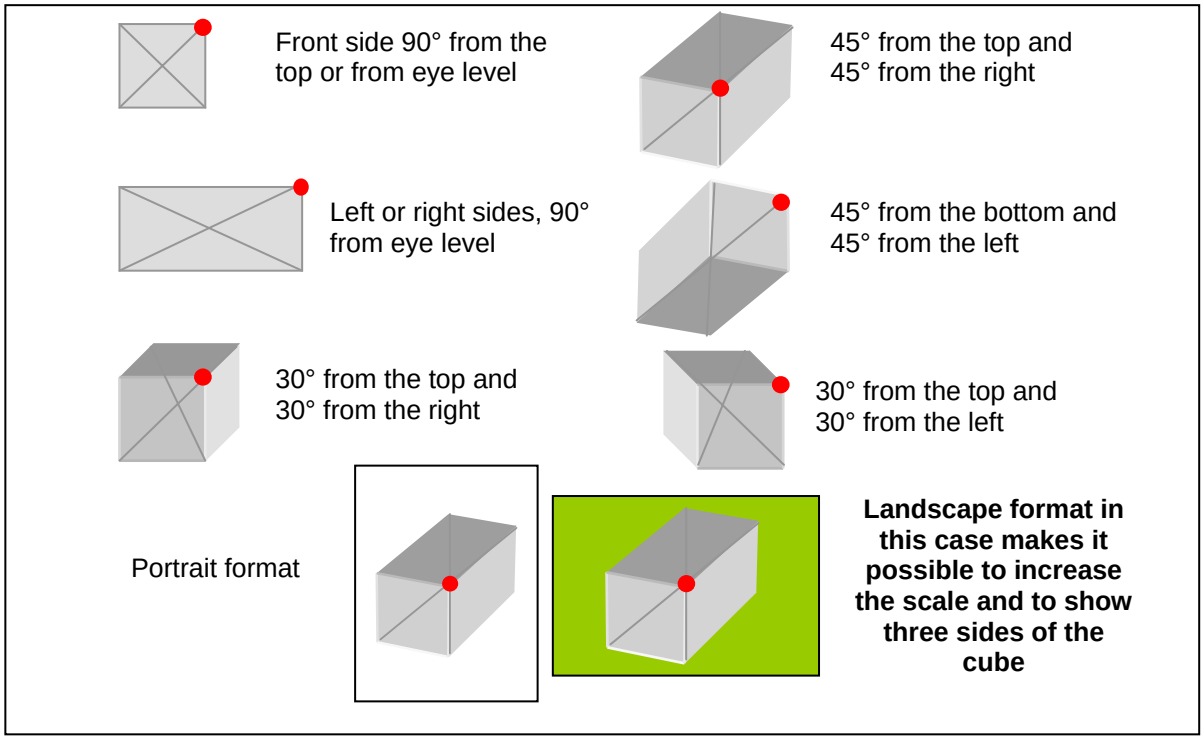
Instructions for photo monitoring

Basic rules

In order to document the assessment and monitoring with meaningful photos it is recommended to use a good quality digital camera (high photo resolution). High photo resolution allows for enlarging parts of the photo showing interesting details.

The photographer should avoid taking photos against the light (sun, openings, etc.). At the same time they should pay attention that their shadow does not affect the quality of the picture. Furthermore, it is recommended to take photos in the morning or afternoon, when light is soft and contrasts become more apparent.
It is important that the photographer has a clear idea of what they want to document. According to this idea they should find the most appropriate perspective (distance, angle to the object to be documented) and format of the photo (landscape or portrait).

Which perspective and photo format are most appropriate for showing details in the corner marked with the red dot?



Whenever possible it is best to document the obvious problem as well as related causes and effects. (Example: for a land slide, one possible cause could be inappropriate land use, and effects could include endangered assets).

A useful documentation includes several photos showing both the general situation (overview, context) and important details.

Location of the hazard area: village, valley, coordinates. **Land use:** pasture and pistachio trees **Topography:** medium to steep slopes **Geology:** deep and unstable soils	**Hazard:** landslides and mudflow **Indicators:** cracks in the soil **Size of affected area:** 5 ha **Causes:** runoff from higher slopes and strong water infiltration in-between trees, overgrazing.	**Size of cracks:** 3–15 m long and 5–60 cm large
Coordinate of photo taken	Coordinate of photo taken	Coordinate of photo taken

Illustration of chain of causalities (cause – effects – causes – effects) and direct or indirect drivers allow to document links between hazards and vulnerability.

Hazard	**Subsequent Hazard**	**Vulnerability**
Landslides =>	...encumber water flow and form backwater =>	... causing floods in the backwater area as well as flash and debris flows downstream. Endangered houses: 13 Endangered persons: 87 Assets: 300 000 C
Affected area: 150 ha		
Coordinates of photo taken	Coordinates of photo taken	Coordinates of photos taken

Photos and maps should be stored in an appropriate database so that photos made during the assessment are available in good quality and A4 format for the monitoring.

If the quality of satellite photos (resolution) is sufficient, assessment and monitoring maps can be elaborated on Google Earth photos. In case of insufficient quality, Google Earth photos can be used for drawing sketches indicating watershed boundaries, water bodies, infrastructure, settlements, etc. Sketches must then be completed by drawings indicating different land use areas, areas of hazards, vulnerability, risks, etc.
CAMP Kuhiston coordinators will be trained in mapping based on Google Earth.

Part 1 PARTICIPATORY BASE LINE ASSESSMENT

Steps of implementation

Selection of the area

- Recognition mission in selected areas particularly exposed to natural disasters
- Identification potentially endangered villages, record coordinates and name of the village as well as addresses of contact persons

How: According to demands of local communities, authorities and donor organisation
Who: CAMP coordinator In collaboration with authorities, donor organisations and local communities
When: Before ILRM workshop

Mapping of the selected area

- Identification of the investigation area (village with surrounding areas and watershed in which the village is located)
- Identification of selected locations (highest and lowest point, altitude of the village, river bed, declination of slopes, etc.)
- Recognition of the topographical characteristics of the area
- Print 1 overview map with village and surrounding areas (scale about 1:15000)
- Print 1 map with focus on the village (scale about 1:3000 to 1:5000)
- Identification of predominant types of land use (e.g. forests, pastures, cropland, settlements, industrial land)
- Identification of potential risks areas

How: With help of Google Earth & GPS
Who: CAMP coordinator with ILRM moderator
When: Before ILRM workshop.

Collection of information about the village and surrounding areas

- Past disasters (type, date, location, frequency, magnitude, impact)
- Geological data (seismic activities, soil properties, etc)
- Hydro-meteorological data (rainfall in mm per month, discharge of rivers, temperatures, wind, etc.)
- Socio-economic data (number of inhabitants and households, demographic growth of population, gender aspects, livelihoods / poverty, social and physical infrastructures, employment, potential vulnerable groups, land use)
- Activities / specific events which can lead to subsequent hazards (e.g. water contamination, fire, explosion, etc.)

How: Desktop survey and workshop
Who: CAMP coordinator with ILRM moderator
When: Before and during the ILRM workshop

Preparation for the field work

- Establishment of assessment team (ILRM moderator, participants of the workshop, specialists)
- Identification of key areas to visit (hazard area, vulnerable areas, areas where already mitigation measures implemented)

How: Assessment of desktop information
Who: ILRM moderators
When: At the end of the ILRM workshop

Assessment of hazards

- Take pictures of different hazards (e.g. landslides, mudflow, gullies, debris flows, floods, rockfall, etc.)
- Accurate location of pictures taken on the map (GPS)
- On a sheet of paper, note the major topic of photos taken (reason why you have taken the photo)
- Assess documented hazards with help of the proposed tools

How: See figure 1: Hazard assessment and instructions for photo monitoring (page 3)
Who: Monitoring and Assessment team.
When: During the fieldwork

Assessment of vulnerability

- Take pictures documenting vulnerability (endangered settlements, physical and social infrastructure)
- Accurate location of pictures taken on the map (GPS)
- On a sheet of paper, note the major topic of photos taken (reason why you have taken the photo)
- Assess documented hazards with help of the proposed assessment tool

How: See figure 2: Assessment of vulnerability and risk and instructions for photo monitoring (page 3)
Who: Assessment and monitoring team.
When: During the fieldwork

Assessment of risks

- According to the formula Risk=Hazards x Vulnerability

How: See figure 2: Assessment of vulnerability and risk
Who: Assessment team. Assessments should be checked by CAMP coordinator
When: At the end of the field work

Assess existing prevention and mitigation measures

- Location of implemented measures on the map
  - ILRM Awareness building and training workshop
  - Disaster Management Plan
  - Rescue team
  - Rule and control of land use (settlement, pasture, forest, industrial, agriculture areas)
  - River bank protection, channel cleaning, reforestation, dam construction
  - Communication facilities
  - Medical services
  - etc.

- Assess current condition of implemented measures (follow up, maintenance, efficacy, etc.)

How: Listen, visit and discuss implemented measures
Who: Assessment and monitoring team
When: During ILRM workshop and fieldwork

Rating and selection of prevention and mitigation measures

- Compare rating of different assessed risks and bring them in a list of priorities
- Discuss with concerned stakeholders the list and select the most urgent case where prevention and mitigation measures should be implemented.

How: Compare score of each assessed risk (hazard and vulnerability)
Who: Assessment and monitoring team with concerned stakeholders
When: During field work

Propose adequate prevention and mitigation measures for assessed risks

- Take overview photos from the risk area
- Discuss about different possibilities to prevent or mitigate risks (structural measures such as reforestation, river bank protection) and/or non-structural measures such as training, rules, control land use, plans etc)
- Photo processing: Composition of photomontages illustrating proposed measures on the background of photos showing the concerned risk area

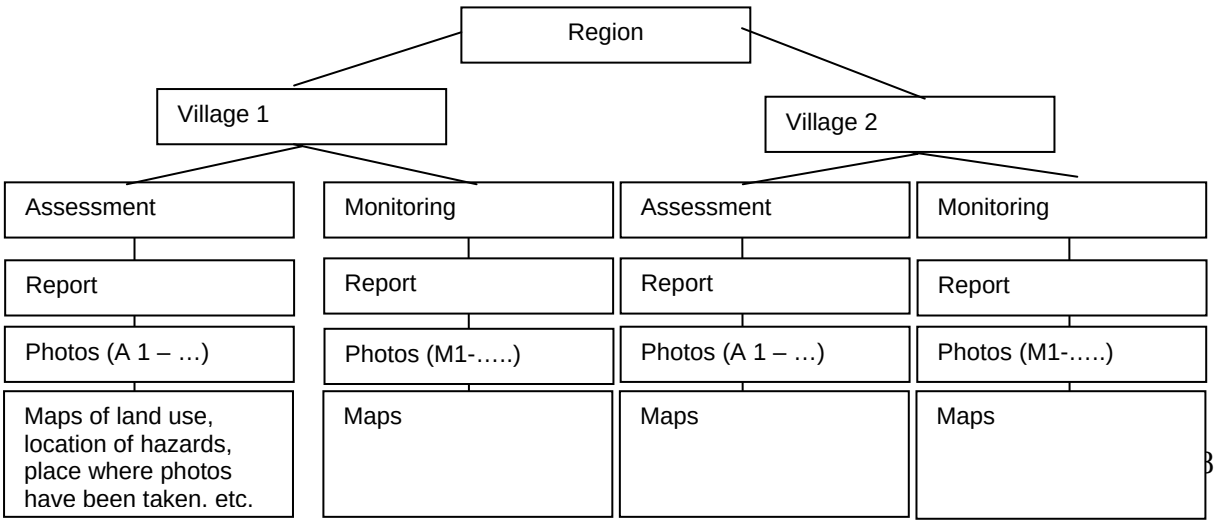
How: Adobe Illustrator programme
Who: Assessment and monitoring team.
When: In the office after assessment

Elaboration of assessment report

How: Structure, content, layout and volume according to example
Who: Moderator and CAMP coordinator
When: Within 2 weeks after the field visit

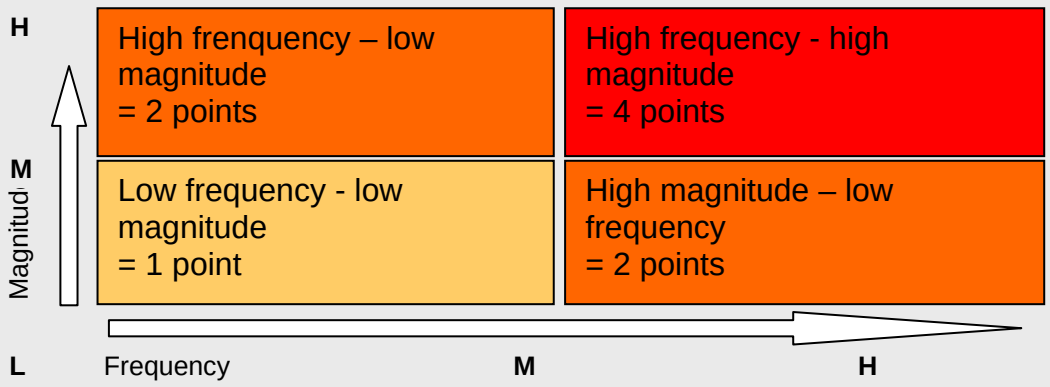
Store collected information in a database

- Establishment of a database (
- Compilation of collected information per region, village, maps



How: According to example
Who: CAMP coordinator
When: permanent task

Figure 1: Frequency and magnitude of hazards



Frequency
High (H) = once or more in 5 years
Medium (M) = once and more in 6-19 years
Low (L) = once and less in 20 years

Magnitude (depending on hazard type and specific situation)
Movement of high / medium / low volume of water, mud, debris, snow, high water scarcity, etc. during a short time

Rating of frequency and magnitude

Low frequency and low magnitude	= 1 point
High frequency and low magnitude	= 2 points
High magnitude and low frequency	= 2 points
High frequency and high magnitude	= 4 points

Figure 2: Rating of vulnerability

Number of endangered persons

One low endangered person	= 0.5 point
One medium endangered person	= 2 points
One highly endangered person	= 8 points

Endangered assets

less then 100 000 Somoni	=1 point
1000 000 – 1million Somoni	=2 points
more then 1 million Somoni	=3 points

Endangered infrastructure
Number of affected persons (number, impact and duration)

low affected	= 1 point

medium affected	= 2 points
high affected	= 3 points

Figure 3: Example: Assessment of hazard vulnerability and risk – case No 1

Hazard

Location: Upper part of Duoba village and settlements located in the north, down streams of the school building (coordinates)

Type of hazards: floods and mud flow
=> flooding school building due to unfinished channel
=> run off in pasture land due to unfinished and damaged channel
=> gully building and mud flow in pasture land down streams the school
=> destruction of road and orchards down streams the gully

Causes: Sealed soil in the settlement area (1sq km) leads during heavy rainfalls (1-3 per year) to increase of run off (1-4 m3 / sec.)

Affected areas / Infrastructures / settlements: School buildings, 1 electro pylon, 100m road, 4 individual houses, orchards

Rating

Frequency: high: 1-3 time per year	2 points
Magnitude: high: Run off 1- 5 m3 per sec. depending of intensity of rainfall	2 points
Score:	**4 points**

Vulnerability

Type of hazard flood and mud flood
Affected areas / infrastructures / settlements: School buildings, 1 electro pylon, 100m road, 4 individual houses, orchards

Endangered persons 400 school children 400x 0.5= 200 points 10 inhabitants of 1 individual house medium endangered, 10x2= 20 points 5 inhabitants of 1 individual house highly endangered, 5x8= 40 points	260
Endangered assets: school building, electro line pylon, 4 individual houses, road, orchards, animals, equipment= about 1 million Somoni	2
Endangered social and physical infrastructures: Affected infrastructure: 200m of feeder road to the lower part of Duoba village 500 persons concerned during 10 days	3
Score	**265**

Calculation of risk assessment

Risk = score of hazard x score of vulnerability = 4 x 265 = **1060 points**

Figure 4: Assessment of hazard, vulnerability and risk – case No 2

Hazard

Location: left side of Chomaghzakon river and right side of Varzob river 100 m right after the bridge from Chari Surkh to Duoba village (coordinates)

Type of hazards: Flash flow, debris flow
=> Flash flow with high volume of debris
=> Deviation of water flow by debris
=> Destruction of gardens, orchards and endanger 3 individual houses

Causes: Sealed soil in the upper part of the watershed due to inappropriate land use leading to strong run off during heavy precipitation leads to soil erosion, land slides, mud flows, debris- and flash floods affecting mainly the lower part of the watershed.

Affected areas / Infrastructures / settlements: 100m road, 4 individual houses, orchards

Rating

Frequency: high: 1 time per year	2 points
Magnitude: high: flash floods of up to 100m3 of water per sec. causing high debris flows	2 points
Score:	**4 points**

Vulnerability

Type of hazard: flash flood and debris flow
Affected areas / infrastructures / settlements: 4 individual houses, orchards, 200 m road

Endangered persons 8 inhabitants of 2 houses 8x 0.5= 4 points 12 inhabitants of 1 individual house medium endangered, 12x2= 24 points 5 inhabitants of 1 individual house highly endangered, 5x8= 40 points	68
Endangered assets: 4 individual houses, road, orchards, animals, equipment= about 150 000 Somoni	2
Endangered social and physical infrastructures: Affected infrastructure: 200m of feeder road to the lower part of Duoba village 500 persons concerned during 10 days	1
Score	**71**

Calculation of risk assessment

Risk = score of hazard x score of vulnerability = 4 x 71 = **284 points**

Part 2: Participatory Monitoring

Principles of monitoring

Monitoring is based on the baseline assessment
Monitoring should be done by the team conducted baseline assessment
Monitoring will be done after 1–2 years after baseline assessment and then periodically re-assessed
Monitoring will be consisted of 3 parts:

- General monitoring at the village level according to the assessment report
- Monitoring of new risk area (new hazards and point of vulnerability)
- Monitoring of implemented prevention and mitigation measures

Review the assessment report

How: Review & discuss the assessment report including maps
Who: CAMP coordinator with assessment and monitoring team
When: Before field work

Check if there are new maps from this village

How: Google Earth or other sources
Who: CAMP coordinator with assessment and monitoring team
When: Before field work

Prepare field work

- Print out assessment photos
- Print suitable assessment maps and new maps

How: A4 photos and A3 maps
Who: CAMP coordinator with assessment and monitoring team
When: Before field work

Monitoring of at the village level according to the assessment report

- Review general settlement information
- Visit and review key risk areas as documented in assessment report
- Note and document qualitative and quantitative changes observed in key areas

How: Comparison of the previous situation to the current situation with help of maps, photos and notes
Who: Assessment team with the representatives of local authorities & villagers
When: During field visit

Assessment of new risk areas

How: According to the procedures described in assessment guideline
Who: Assessment and monitoring team
When: During field visit

Monitoring of implemented prevention and mitigation measures

- Review of project proposal
- Compare planned and implemented activities
- Compare indicated outcome with concrete results and impacts
- Take photos of implemented measures & describe qualitative and quantitative impact (decrease of vulnerability, hazards)

How: Discussion with concerned stakeholders, make notes and document with photos
Who: Assessment and monitoring team and **c**oncerned stakeholders
When: During field visit

Redaction of Monitoring report

Structure

- Introduction (date of assessment, date of the monitoring, etc.)
- Monitoring of assessed risk areas (map and photos)
- Monitoring of new risk areas (map and photos)
- Monitoring of implemented prevention and mitigation measures (map and photos)
- Conclusions and recommendations

How: Layout identical to assessment report, content according to above example (figure 5)
Who: CAMP Kuhiston coordinator
When: At least 2 weeks after the field work

Store collected information in a database

- Establishment of a database
- Compilation of collected information per region, village, maps

How: According to
Who: CAMP Kuhiston coordinator
When: After monitoring

Figure 5: Structure and layout of monitoring report

Integrated Local disaster Management (ILRM)

Monitoring report 2011

Name of settlement ……
Jamoat…….
District …….
Coordinates…… …Altitude (place)…….

Head of settlement: ……

Members of the assessment and monitoring team
……

	Year of assessment 2009	Year of monitoring 2011
Number of households	>300	321
Number of inhabitants	4000	4311

Photo: Overview of the village (coordinates)

Map: village with surrounding areas

1. General monitoring at the village level according to the assessment report

1.1 Changes observed

Map: Location of assessed and monitored key areas and indication of places where photos have been taken

Assessment (A)	**Monitoring (M)**	**Main changes**
Photo 1A (causes)	Photo 1M	Indication of observed changes (e.g. cause of hazards, hazards, vulnerability, risks
Photo 2A (causes)	Photo 2M	
Photo 3A (hazard)	Photo 3M	
Photo 4A (vulnerability)	Photo 4M	

1.2 Conclusions and recommendations

2. Monitoring of new risk area (new hazards and point of vulnerability)

2.1 Documentation of new risk areas

Map: Location of new risk areas and indication of places where photos have been taken	
Photo 5M (causes)	Description of causes, hazard, vulnerability and risks
Photo 6M (hazards)	
Photo 7M (vulnerability)	

2.2 Conclusions and recommendations

3. Monitoring of implemented prevention and mitigation measures

3.1 Documentation of implemented prevention and mitigation measures
(structural and no structural measures)

Map: Location of implemented measures and indication of places where photos have been taken		
Plans: Detailed plans of structural measures and activity planning of no structural measures i		
Assessment (A)	**Monitoring (M)**	**Main changes**
Photo 8A causes of hazard	Photo 8M development of causes	Description of implemented measures and observed impacts (changes of magnitude and frequency of hazards,
Photo 9A hazard area	Photo 9M development of the hazard area	
Photo 10A vulnerability (endangered persons, assets, infrastructures)	Photo 10M development of vulnerability	
Photo 11A proposed measures (photo montage)	Photo 11M implemented measures	
Photo 12A	Photo 12M ownership and maintenance of implemented measures	

3.2 Conclusions and recommendations