Module 9: DRM measures in the upper watersheds

Introduction

In this module we will explore how human activities in the upper watershed impact the lowlands. The module provides an overview on technical DRM measures related to the uplands and options to embed them in a participatory planning and management approach.

Upper watershed activities impact the lowlands

Watersheds are a complex system where ecosystems and human activities interact and sometimes conflict. Rural livelihoods are highly dependent on availability of water resources within the watershed. Settlements, fields and other infrastructure related to agriculture and livestock are therefore usually concentrated in the fertile but also flood prone areas along the valleys. However, due to limited land resources in the valleys, landless and poor people in particular, have to complement their incomes from other sources. These activities often rely on the uplands, such as pasture for sheep rearing, rain fed agriculture or shrub collection. Overuse of natural resources, inappropriate agriculture practices and overgrazing in the uplands directly compromise the lowlands, leading to more frequent and severe floods and droughts, damaging valuable and critical community assets such as fields, houses, roads, irrigation and other infrastructure, but also lives of people and livestock (cf. Modules 3 and 8).

However, conservation measures, sustainable agriculture and pasture practices in the uplands can substantially reduce floods and other disaster risks for the lowlands. This module focus on possible DRM measures in the uplands (cf. Modules 4 and 10).

Risk reduction measures in the uplands

Overall disaster risk management (DRM) capacities are key for successful risk reduction. Figure 1 illustrates DRM measures that need to be taken up in the whole watershed (in grey) and specific measures for the uplands (in yellow).

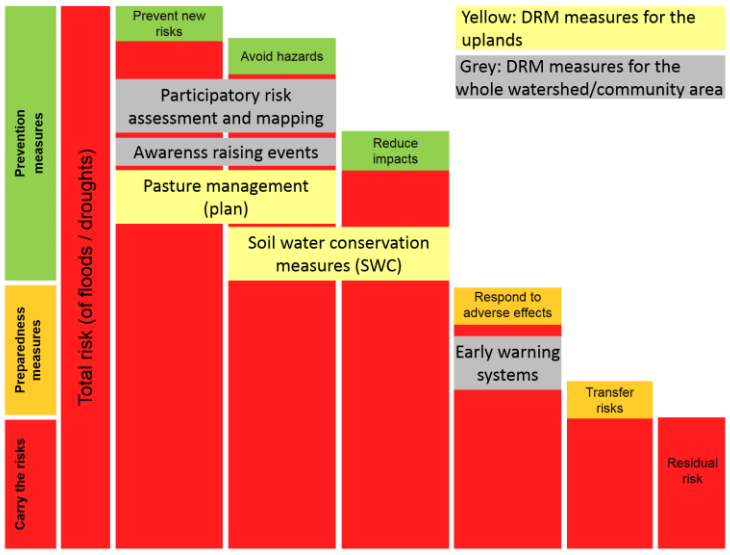

Figure 1: Stair case model for DRM measures (SDC adapted)

The planning, implementation and maintenance of any DRM measure requires that local **institutions and structures** have clear **strategies, policies and action plans** in place. A **participatory risk assessment** of activities in the upland and lowland areas is an important entry point for understanding the problems and finding a solution.

Awareness raising events might address challenges of upland activities (e.g. overgrazing, shrub collection) and its relevance for the lowlands, such events might be organized for the whole community or only address farmers, herders and shrub collectors active in the uplands.

Pasture management plans address the challenges linked to the high demand for pastures and its consequent overgrazing. Such plans define areas and conditions for herders: where, when grazing is possible for which herder and with how many animals etc. This requires a reconciliation between the objectives of natural resource conservation and income generation, through environmentally friendly and socially acceptable sustainable practices. Rules for the access and use of pasture have to be jointly defined and accepted by all involved parties; herders, farmers, land owners etc. For its enforcement guards or sanction measures might be defined (cf. Grazing Management).

Soil and water conservation (SWC) measures are mainly implemented in the upper watersheds. These structures built with local construction material, can effectively reduce the impacts of frequent small scale floods and droughts.

Preparedness measures require an early and coordinated preparation. For example, **early warning systems** include monitoring in the upper watersheds for an effective response in the lowlands during a disaster. Well-structured and trained local **preparedness committees** are key to their success.

Figure 2: SWC measures (trenches) to reduce floods

Structural "hardware" measures for soil and water conservation (SWC)

Soil and water conservation measures (SWC) refer to structural measures which decrease water runoff and therefore **reduce extensive flash flood risks** for the lowlands. Additionally, SWC measures reduce the erosion through increased water retention, which conserves soil fertility and reduce droughts.
SWC measures rely on **local natural resources,** also called bio-engineering measures, since concrete, steel or other hard engineering material is not used. Structures are built with local material, such as stones, wood, soil. SWC measures use simple methods to employ as much as possible local labour force for its construction and maintenance. SWC measures are generally implemented in the middle and upper watershed areas, since the run off of these areas directly affect the productive lowlands valleys. Typical structural SWC measures are trenches, bounds, terraces, check dams, fascines. Vegetative and agronomic SWC measures are implemented in the middle and lower watersheds such as grass strips or live fences, which can be combined with fields for agricultural production.

A wide range of SWC measures are documented in the international data base WOCAT (World Overview of Conservation Approaches and Technologies). Examples of the Afghan SWC experience are summarized in separate modules on structural SWC measures, vegetative and agronomic SWC measures and an Afghan WOCAT publication. The following table provides an overview with selection criteria for some typical SWC measures.

Table 1: Key characteristics and selection criteria for SWC measures in the upper watersheds

Criteria	**Main function**	**Placement**	**Implementation requirements**	**Construction cost**	**Time span**	**Co-benefit from agriculture**
SWC measure	⇓*reduce* ⇑*increase*	*(-) moderate* *(+) steep slopes*	*(-) time intensive, complex* *(+) quick, simple*	*(-) expensive* *(+) cheap construction*	*(-) short* *(+) long time span*	*(-) non relevant* *(+) important potential income*
*Contour tied trench	⇑ infiltration ⇓ floods	++	--	--	++	--
*Contour trench bund		+	-	-	++	-
*Staggered contour trench		++	-	-	++	--
*Terraces	⇓ erosion ⇑ soil fertility	-/+	--	--	++	++
*Stone wall lines		-/+	-	-	+	+
**Fascines		-	+	+	-	+
**Live fences		-	+	+	-	+
**Grass strips		-	++	++	-	++

* Cf. Afghanistan fact sheets SLMP ** cf. global WOCAT data base

Participatory SWC measures and the "soft elements"

SWC measures are effective measures to address flood and drought risks. However, these are not isolated activities; in order to ensure ownership and quality they should be embedded in a participatory approach involving community based civil society organisations (CBO, CSO) and other relevant local stakeholders with clearly defined roles and responsibilities of the local actors (cf. Community-based watershed management, Participatory planning for watershed management, Good governance, Working with groups, Working with women and men, Module 7).

Besides disaster risks, communities usually face various other livelihoods challenges related to land, water, agriculture etc. Therefore to be successful, a community based DRM approach has to be integrated in a sustainable participatory planning process, where following approaches can be a useful guidance (cf. Integrated Watershed Management, Sustainable Land Management, and Modules 4 and Module 6).

Table 2 shows an overview of the main processes and outcomes for the implementation of SWC measures based on Helvetas' long-lasting experience in two livelihoods projects (ILRC, Green Saighan).

Table 2: Process and results of participatory planning and implementation of SWC measures

	Process and main actors	Outcome, intermediate result
1	Analysis of community's challenges, resources and development priorities by the community development committee (CDC).	Community development Plan (CDP)
2	Participatory analysis of disaster risks (flooding, droughts etc.), water resources and needs involving a DRM committee with its task forces. Prioritisation of short and long term mitigation and adaptation options incl. SWC measures in close collaboration with a water user TF and SWC committee.	Watershed management master plan (WSMM) incl. technical data for location and dimensioning of SWC measures
3	Joint implementation SWC measures by the SWC committee with skilled and non-skilled labourer.	Implemented SWC measures
4	Definition of saving box mechanisms to ensure financial resources for maintenance of SWC measures.	Saving box agreement
5	Definition of roles and responsibilities for operation and maintenance of SWC measures for O&M task force in close collaboration with the DRM committee.	Maintained SWC measures

Figure 3 illustrates the main actors involved in the planning process. The CDC has a central role for the local planning in the overall management and coordination of the SWC measures, but also of other community plans and concerns (cf. Module 10). For the implementation and other operational aspects committee with specific task forces (TF) are in charge.

Box 1 illustrates contributions from different actors for the maintenance costs of SWC measures.

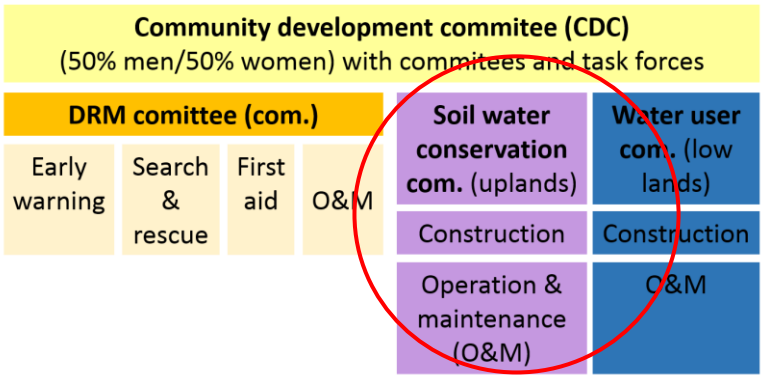

Figure 3: CDC, its committees and task forces for participatory implementation of SWC measures

Box 1: Saving box for SWC measures

The saving box scheme refers to community-agreed rules of a **fund to cover the maintenance costs** of SWC measures. Below the example of contributions from different actors:

- 10 % of salaries paid for labour force from workers.
- 10 % of overall SWC budget from the project.
- 50 AFN = 1 USD per year from each beneficiary family in the village.
- 1000 AFN = 17.5 USD from people returning from the Haj.
- 1000 AFN from each family of a new bride.
- 1000 AFN from each family of a newborn baby.

Co-benefits of SWC measures

SWC measures are most effective when combined with other DRM measures and embedded in a participatory planning and implementation process, which relies on local communities' resources and collaboration with other actors. DRM measures, which reduce risks and offer **additional livelihoods benefits** are particularly interesting. These 'co-benefits' are incentives for the necessary efforts and costs of DRM measures. Such benefits of SWC measures might be the following ones:

- **Collaboration, technical and management capacities:** Through joint implementation of SWC measures technical experts, skilled and unskilled worker share technical know-how for its replication and maintenance. Joint planning and implementation increase linkages amongst local actors and communities' management capacities.
- **Migration:** Based on specific selection criteria of a 'cash for work' scheme, most poor and vulnerable community members can be actively involved in the implementation of SWC measures. The earned wages can bridge periods of income gaps and reduce distress migration.
- **Women's involvement:** The participatory planning of DRM measures is an opportunity to actively discuss and include women's priorities and local knowledge. Women bring important observations and concerns regarding flood prone locations, areas requiring specific protection, impacts of poor water quality and availability on health etc.
- **Income from SWC measures:** SWC measures can be combined with biological measures such as regeneration or cultivation of plants, which prevent erosion and also contribute to incomes. On terraces forage (e.g. alfalfa) or other cash crops (e.g. cumin) can be harvested. Trenches can be stabilized with fruit or nut trees (e.g. almond). Hing (*Ferula asafoetida*) has a strong resin, preventing it from being eaten by animals. It has a good market and can also be used locally for medical or culinary purposes.

Box 2: SWC measures to protect from intensive disaster risks

Extensive risks or disasters refer to disasters of low impact and high frequency e.g. yearly floods or droughts. Contrary to **intensive risks**, which tend to be infrequent but cause significant damage e.g. earthquakes or major flash floods. People are generally more aware of intensive disasters, since these are better documented by the media and statistics. However, various studies (UNISDR, GNDR) indicate that the cumulative losses of frequent extensive events are at least as relevant as large scale events, especially for remote rural areas, where communities and households rarely benefit from external support.

In the HELVETAS project area in Saighan district **SWC measures** have been implemented since 2010, successfully reducing the impacts of extensive flood risks. Earlier, villages faced 4 to 7 flood events yearly. Since the implementation of SWC measures, during past five years no damaging flood have occurred. However, it is important to keep in mind that neither SWC structures nor hard engineering measures can withstand the force of an intensive major flood. **Awareness and the ability to live with these remaining risks** is therefore crucial.

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Confédération suisse
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Federal Department of Foreign Affairs FDFA
Swiss Agency for Development and Cooperation SDC

Further reading

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