

Towards a collaborative learning in river restoration in Switzerland

Vers un apprentissage concerté pour la mise en œuvre des revitalisations de cours d'eau en Suisse

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RÉSUMÉ

En Suisse, les modifications de la loi fédérale sur la protection des eaux entrées en vigueur en 2011 demandent des efforts dans la revitalisation des cours d'eau. Il est prévu que le financement issu de la Confédération permette la revitalisation d'env. 4'000 km de cours d'eau sur une durée de 80 ans. Cette perspective à long terme exige un processus d'apprentissage afin d'accroître l'efficacité des revitalisations avec le temps. Jusqu'à présent, les informations sur les projets déjà réalisés sont décentralisées car seulement disponibles dans les cantons. Pour commencer le processus d'apprentissage, ces informations doivent être réunies à l'échelle nationale. Pour cette raison, une base de données centralisée sera créée pour documenter tous les projets de revitalisation réalisés depuis 2011 (contrôle de la mise en œuvre). Les données seront disponibles au printemps 2018 et mises à jour chaque année. Un projet de recherche en cours a pour objet la standardisation et la spécification de protocoles de suivi et d'évaluation des effets d'ordre biotique et abiotique (contrôle de l'efficacité) des projets de revitalisation. Un set standardisé d'indicateurs, qui dépendra des mesures réalisées et de la taille du projet, sera ainsi défini. Ces deux projets combinés garantiront à terme un processus d'apprentissage par étapes pour la mise en œuvre de la revitalisation des cours d'eau.

ABSTRACT

The revised Swiss Water Protection act from 2011 requests efforts in river restoration in Switzerland. It is estimated that federal funding allows the restoration of approx. 4'000 km streams and rivers within 80 years. This long-range perspective demands for a learning process to increase efficiency in restoration outcome over time. So far information on realized projects are only available decentralized in the cantons. To start the learning process information need to be gathered on a national scale. For this reason a central database will be set up to document all restoration projects (implementation control) since 2011. Data will be available in spring 2018 and annually updated. A research project deals with standardizing and specifying protocols to monitor and evaluate the biotic and abiotic outcome (effectiveness control) of restoration projects. A standardized set of indicators, depending on realized measures and project size will be defined. Both projects combined will allow a stepwise learning process in river restoration practice in the future.

KEYWORDS

Learning process, standardized-protocols, implementation, effectiveness

1 THE REVISED SWISS WATER PROTECTION ACT

The Swiss Water Protection Act was amended in 2011 with the goal to restore 4,000 river kilometers by 2090. This corresponds to 25% of the heavily impaired river reaches and to 6% of the entire river network (65,000 km). Apart from river restoration, sufficient room for rivers and their natural processes should be secured by 2018. Furthermore, the negative ecological effects from hydropower exploitation (sediment deficit, hydropowering, and fish passage) should be mitigated by 2030. The budget from the federal government is 40 million CHF/year for river restoration. Federal funding accounts for 35–80% of the project costs, depending on the ecological objectives followed and is allocated to the 26 cantons in 4-year funding cycles). Realizing projects is in the responsibility of the cantonal authorities and/or municipalities, depending on the cantonal organization.

A handbook defines rules and standards for the collaboration between the Swiss Confederation and the cantons and specifies the funding and general project requirements. One of the listed requirements is that projects need to be monitored and evaluated by means of abiotic and biotic indicators. However, no standardized protocols are defined and information on the outcome of rehabilitation measures is not gathered at the national scale. A 80 years lasting restoration program demands for the implementation of a learning process to make future restoration projects more cost efficient and also more efficient with respect to defined abiotic and biotic goals being set.

The evaluation of restoration projects comprises two aspects: an implementation control and an effectiveness control.

2 IMPLEMENTATION CONTROL

On the national scale information are only available on spent funds in river restoration projects. There are only limited data available on the national scale on characteristics of projects, e.g. set of measures, restored length.

For this reason a national data base on restoration projects is under construction. All 26 cantons should contribute the information on realized projects, which have been implemented since 2011, when the revised water protection act came into force.

In a preliminary study the cooperativeness of involved institutions has been evaluated, if such a national database will be supported. For this study selected representatives of the cantonal authorities, as well as researchers in the field of river restoration as well as NGO's were interviewed. The questionnaire aimed on answering questions, whether a national database is generally considered as useful and on how detailed such a database should be. The outcome of this study was, that a national database is considered to be very useful. Cantonal representatives indicate, that the database should be limited to the most important aspects, researchers and NGO's supported the idea of rather an extended data documentation to answer the most relevant question to enhance efficiency of restoration projects in the future.

From the federal perspective a national database on restoration project is necessary for the following reasons:

- To inform the public about the progress of the restoration program and spent fund
- To change the funding system towards a cost-efficiency system
- Characterizing restoration projects allows the political adjustment in the future
- The documentation and characterization of projects is the basis for implementing a learning process, when data will be combined with information on the biotic and abiotic outcome of projects.

Questions were defined to fulfill the listed tasks above. Questions could be aligned to the following four topics:

Geography:

- Where are the restored sites:
 - o Which cantons?
 - o Which altitude?

- Which drainage system?
- Urban or rural setting?

System:

- What kind of water bodies have been restored?
 - Large, medium, small rivers or lakeshores?
 - What is the natural flow regime of the stream, river (meandering, braided, stretched)
 - Which stream section has been restored, upstream, downstream or confluences?
 - In which morphological state have the water bodies been before restoration (culvertized?)

Measures:

- How can the project been characterized?
 - Combination of measures?
 - Restored length?

Finances:

- How was the project funded?
 - How much federal funding did the project receive?
 - What are the costs per linear meter?

An excel-sheet was elaborated with attributes to answer the question listed above. The excel sheet has been sent out to all 26 Swiss cantons. Results from this survey is expected to be completed by spring 2018.

3 EFFECTIVENESS CONTROL

Monitoring and evaluation (M&E) of projects is part of the funding, however, the requirements have not been specified further, thereby limiting collaborative learning and evidenced-based management. To help maximize the invested funding, the Federal Office for the Environment and the research institute Eawag launched a 2.5-year research project to develop a national M&E program for river restoration, building on standardized surveys and systematic cross-project comparison (Figure 1). Such programmatic M&E offers unique opportunities (Weber et al. 2017), including

- generalization: transfer of results across restoration projects, programs and river basins
- collaborative learning: facilitated exchange of lessons learned across stakeholders
- adaptation: continuous refinement of practical and scientific approaches
- justification of resources: increased credibility of restoration through a robust analysis of the effects
- causal understanding: towards a better understanding of mechanistic pathways and influencing factors (e.g. multiple stressors)
- beyond today's challenges: towards informed management of rivers in a changing world

Alternative strategies are being developed for both a STANDARD and EXTENDED M&E until February 2018. The STANDARD M&E aims to verify to what extent the national objectives for river restoration have been met within the restored river reach. All river restoration projects receiving federal funding will be included in the STANDARD ME. In contrast, the EXTENDED ME aims to answer specific questions from practice at selected river restoration projects. The project has been accompanied by three advisory groups to account for transdisciplinary feedback, advice and acceptance: (i) a cross-departmental Eawag-internal group, (ii) a national group with practitioners from federal and cantonal authorities and private consultancies, and (iii) an international group with researchers from different fields of river restoration.

**Learning (→) from different types of projects (● , ▲ , ◆)
within a regional or national river restoration program**

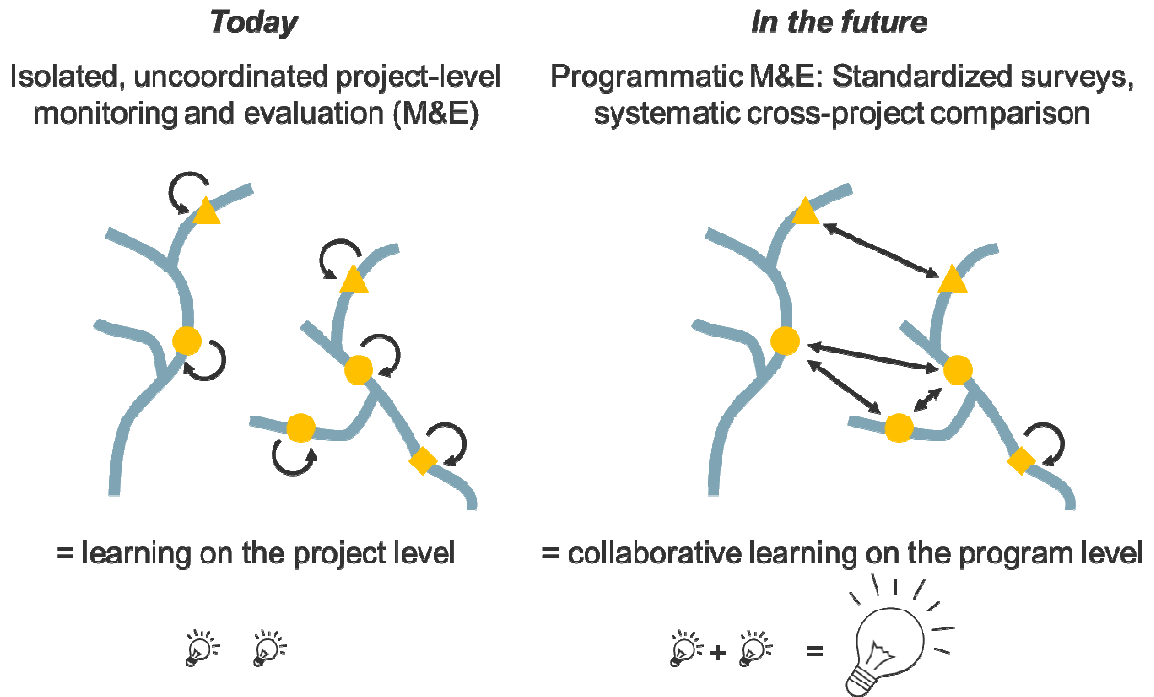


Figure 1: Programmatic monitoring and evaluation allows for collaborative learning beyond the level of an individual restoration project (modified from Weber et al. 2017).

The concept, which will be elaborated in the project, will recommend different set of indicators, depending on the measures realized in the project a project size.

4 OUTLOOK

With the combination of information gained from the implementation and effectiveness control, the basis is set to start the learning process. Insights gained from the analysis will be integrated in the strategic planning, which will be carried out in intervallic 12-year periods and which identifies stream sections with the highest ecological potential of being restored.

LIST OF REFERENCES

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