



EFIB AEIP 2016 Conference conclusions

Fluvial bioengineering has played a leading role throughout the conference since the event was framed within the "Hidrologikak, ibaitik badiara, from the river to the bay" DSS2016 European Capital Project. In this project, from the perspective of the landscape understood as territory, culture and society, a rapprochement between the fluvial functioning and the society has been tried. Particularly, in the overall "From the river to the bay" project, the conference represents the Culture and for doing so internationally renowned experts were present in the event coming from many different countries (mainly from Europe). There were more than 150 attendees of which half of them came from the Basque country. The other half came from the rest of the Iberian Peninsula and Europe.

1- Soil and water bioengineering offers hydraulic solutions allowing for fluvial ecosystem recuperation

A river is a complex system comprising multiple geomorphological, biotic and social elements whose functional unit is the catchment area. Hence, it is justified both the necessary multidisciplinary nature of any teamwork intervening in such complex scenarios and the importance of a good coordination between the different Administrations, practitioners and citizenship when intervening in fluvial systems. This coordinated organisation can allow for river ecological state improvements and, where necessary, integrate into the intervention design both flood risk control works and fluvial restoration principles. In this dual approach, soil and water bioengineering accompanied with a deep fluvial dynamic knowledge turns out to be a very useful tool allowing for both hydraulic and fluvial ecosystem recuperation solutions.

2- The importance of an active citizenship involvement in both fluvial management and fluvial ecosystem conservation

For the purpose of achieving improvements in the ecological state of our rivers, a well informed citizenship must be involved in the decision-making processes. Great

efforts are being made by the Administrations in order to engage Councils and citizens into fluvial management tasks. Particularly, the bioengineering workshops, carried out by the AEIP with international experts throughout this year, have been proven to be very useful for sensitising the population, for environmental education activities and for changing the way to see the river system. The population participation into the fluvial management and its conservation is crucial and the river contract tool, which is a formula used in other European countries but still seldom implemented in Spain, could be an interesting path to take into account.

3- An integral river restoration plan requires dedicating part of the project budget for negotiating and ensuring fluvial space.

One of the most important points when trying to improve fluvial geomorphology is the available riparian space, usually occupied by anthropic activities. In urban areas, where the space is very limited, fluvial intervention strategies usually aim at improving longitudinal and vertical connectivity, improving flora and fauna associated to the river system. From this point of view, it has been proven from many examples the great potential of soil and water bioengineering both as a tool for fluvial restoration in urban areas and as an element for conflict resolution tools in these environments.

In respect of the rural environment, preserving the necessary fluvial space will require demarcating it, involving farmers and analysing the necessary financial rewards. In this sense, an integral river restoration plan will demand dedicating part of the overall budget for negotiating and obtaining the necessary fluvial space.

5- The soil and water bioengineering application criterion is “just as necessary but as soft as possible”

In Spain, the scepticism around soil and water bioengineering techniques existing is progressively fading away. As an example of this, several Administrations (e.g. Basque Water Agency) are changing their attitudes by including them into interventions of flood risk control and river maintenance tasks. Soil and water bioengineering is acknowledged as having a great potential as tools for improving both riverbed and riverbanks ecological state. It is important to keep in mind that the use of these techniques must include a detailed and comprehensive analysis in which the intervention premise is to intervene “just as necessary and as soft as possible”, and whenever possible letting the river to recover its own functionality by itself.

In this sense, there is a clear need for enlarging the analysis spectrum of the soil and water bioengineering works. The typical erosion, hydraulic and stabilisation analysis must be completed with the biochemical improvements as for example, the water quality improvement and the river regeneration capacity increase as well as the self-depuration capacity enhancement.

It was proven the soil and water bioengineering techniques capacity to accelerate the natural fluvial recuperation dynamics.

6- Soil and water bioengineering work design can be enriched by means of a more detailed analysis of the beneficial effects in ecosystem services terms.

There are clear possibilities of integrating soil and water bioengineering into an Ecological Restoration overall framework. The existing synergies between ecological restoration principles and soil and water bioengineering works raises the need for more integral analysis approaches of the interventions. The latter need can be translated not only in terms of combining the corresponding approaches but also in terms of connecting professionals and associations so current challenges (e.g. Climate Change, 2011-2020 Biological Diversity Strategic Plan and Aichi objectives) can be faced altogether.

Soil and water bioengineering work design can be enriched by means of a more detailed analysis of the beneficial effects in ecosystem services terms. The new research lines presented in the conference show that a more effective soil and water bioengineering design can be achieved by taking into account other factors such as: the river or soil regeneration capacity enhancement possibilities, the CO₂ sequestration capacities, etc.

In this sense, soil and water bioengineering fits very well into new planning figures such as the Green Infrastructure concept as we discussed in our previous conference in Vitoria Gasteiz 2014.

7- Soil and water bioengineering is in a constant evolution with new research lines offering a deeper technical knowledge and favouring the use of nearby materials: the circular economy.

Regarding the research point of view, it should be highlighted the existence of interesting research fields that are trying to define a more complete scheme embracing the overall beneficial effect of vegetation over the stability and conservation of soils. There are still many aspects to be specified but the advances of how vegetation improves soil geotechnical properties in terms of cohesion and angle of internal friction allows assessing the safety factor increase in a vegetated slope. The soil and water bioengineering work design requires the incorporation of data regarding the deterioration of the inert materials used (e.g. untreated timber) and the evolution of the utilised living materials.

In respect of the materials used in bioengineering interventions, there is an important research field related to the use of plant fibres obtained from forestry, agricultural production and plant residues. The use of these materials connects with the circular economy idea and philosophy.

8- A more intense contact and interaction with the media is necessary in order to improve the dissemination of both soil and water bioengineering techniques use and the accumulated sector experiences and background. This is a clear outstanding task within the soil and water bioengineering sector.

It is necessary to spread through the media how these techniques not only improve the river hydraulic functioning and help in developing an environmental awareness (as widely proved throughout the conference) but also provides means for saving money, in the mid- and long- term, in the river system conservation and maintenance tasks. The saved money could be used in other investments or social projects.

