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The problem: Floods and erosion on agricultural land

In most of Norway, floods typically occur during spring (snow melt) and autumn (heavy rains). Forecasted increases in the amount and intensity of precipitations event will increase the impact of soil erosion and floods on the environment. Therefore, there is a need to retain the water in the upper part of the catchment in order to: (1) suppresses the peak flow and (2) protect agricultural are from consecrated flow (gully erosion) and prolonged flooding.

About the measure

Small retention ponds, located in the forest, are dams (up to 2m height, for security reasons) made of soil, stone and/or gabions, with additional storage capacity to attenuate surface runoff during rainfall events. The ponds use local topography to provide space to store discharge peaks.

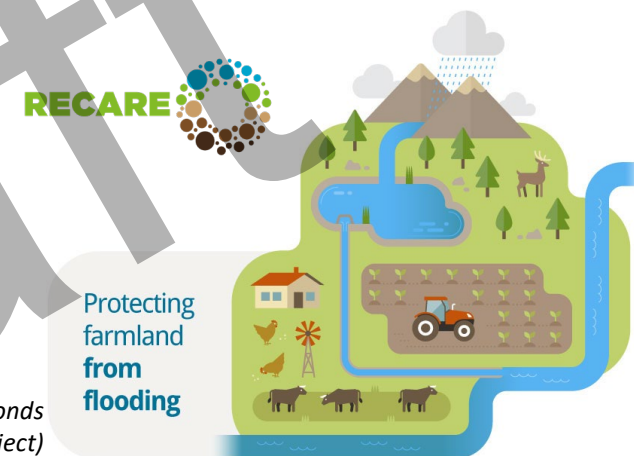


Small retention pond in Svinndal with different stages of water level in the pond: empty (left and right) and full (middle). Photos: D.Krzeminska

Different policy instruments related to the measure

Surface water retention measures, like small retention ponds are voluntary measures supported by Norwegian policy in the form of subsidies for Special Environmental Measures in Agriculture (SMIL)

Infographics showing the retention ponds concept (source RECARE project)

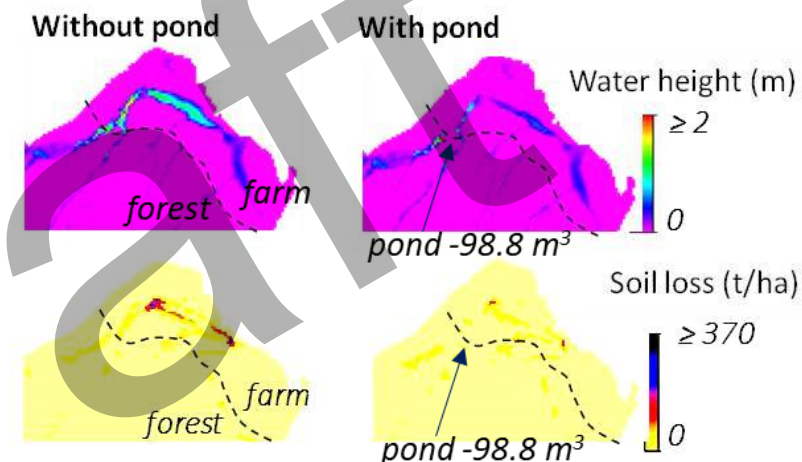


	Policy & incentive	Regulation document	Authority & support
Mandatory / voluntary	Included in the list of voluntary measures	Guidelines about SMIL rules with examples of measures to be supported within SMIL subsidy scheme <i>(following the National Environmental Program, NMP)</i>	County Governor (<i>Statsforvalteren</i>)
Economic support	Establishing	SMIL	County Governor (<i>Statsforvalteren</i>) Municipality
Advisory service	Public support, research institute support	Public agricultural advisory service	Municipality Ministry of agriculture and Food (<i>LMD</i>) Norwegian Agriculture Advisory (<i>NLR</i>), Norwegian institute of bioeconomy research (<i>NIBIO</i>)

Examples of benefits of the measure

There is a wide variety of ponds and dams and their benefits and effects may vary between contexts and types. Below some typical examples of benefits of the ponds are listed, based on the [WOCAT database](#) and <http://nwrn.eu>: [sediment-capture-ponds](#) and [basins and ponds](#).

Impact level	Benefits	Examples of beneficiaries
Local level	Reduce concentrated flow within the fields/reduced soil erosion	Farmers, soil conservation
	Reduced prolonged flooding of the fields	Farmers, water management
	Nutrient losses	Farmers
Sub-basin	Suppress the peak flow/prevent flooding	Farmers, local communities, fishers, drinking water management, local wildlife
	Prevent soil losses	Farmers, local communities
River basin	Improve water quality (eutrophication)	People in the river basin, regional food production and environment
	Runoff attenuation/flood prevention	
	Prevent land degradation	



Example from the modeling the effect of retention pond in Svinndal (RECARE project).

Resources

Advisors and other actors:

County Governor (Statsforvalteren), Norwegian Environmental Agency (Miljødirektoratet), Norwegian Agriculture Advisory (NLR), Norwegian Institute of Bioeconomy Research (NIBIO)

Examples of websites and document:

<https://nibio.no/tema/miljo/tiltaksveileder-for-landbruket/vannmilljotiltak/grasdekke-vannveier>
<https://nibio.brage.unit.no/nibio-xmlui/handle/11250/2606382>
<https://qcat.wocat.net/en/wocat/>