

Synthesis by: D. Krzeminska & A-G. B. Blankenberg

The problem: Runoff from agricultural catchments

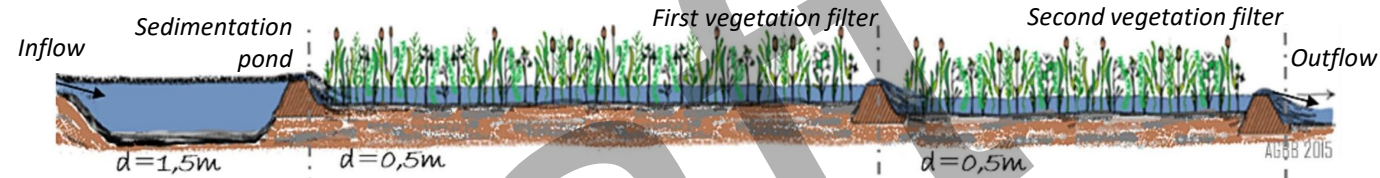
Runoff from agricultural areas are one of the main sources of phosphorus (P) and sediments (SS) transport into streams and lakes. P are traditionally the main cause of eutrophication in Norwegian lakes. Small Constructed wetlands (CWs) in agricultural streams can prevent P to reach the lakes and thereby reduce the risk of eutrophication.

About the measure

CWs are designed mainly to remove P and S through sedimentation and filtration. Generally, CWs include a deeper sedimentation pond at the inlet, followed by one or more shallow vegetated zones. The sedimentation pond decreases the water velocity to allow particles to settle, while the vegetated, shallower zones act as filters for particles passing the sedimentation pond and protect trapped sediments from re-suspension.



Skuterud CW: sedimentation pond and measuring station (left) and first vegetation filter (right). Photos by A-G.B.Blankenberg.



The components of the typical small CW in small agricultural catchments in Norway (A-G.B.Blankenberg)

Different policy instruments related to the measure

CWs are voluntary measures and can be supported by Norwegian subsidy systems: RMP (Regional Environmental Regional Environmental Program) and SMIL (Special Environmental Measures in Agriculture) subsidy scheme.).

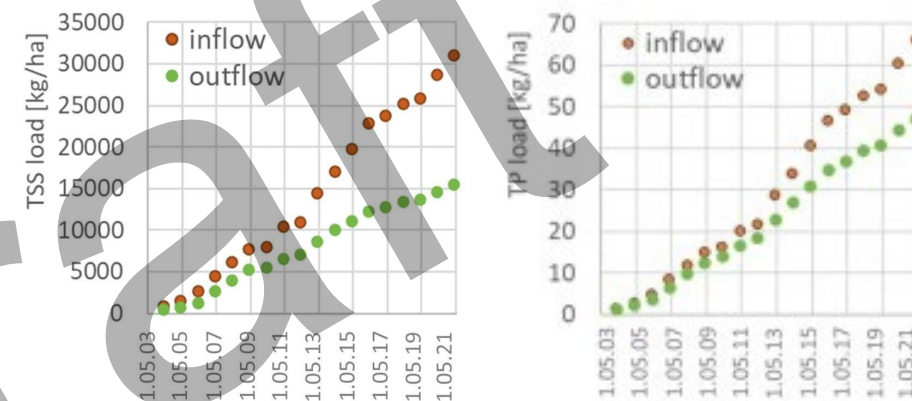
	Policy & incentive	Regulation document	Authority & support
Mandatory / Voluntary	voluntary measures	Guidelines from directorate Group for implementation of water regulation <i>(following the Water Resources Act and the Watercourse Regulation Act)</i>	Norwegian Environmental Agency <i>(Miljødirektoratet)</i>
Economic support	Maintenance of the vegetation in and around CW	RMP	County Governor <i>(Statsforvalteren)</i> Municipality
	Establishment and 'bigger' maintenance, e.g. emptying sedimentation pond	SMIL § 5	County Governor <i>(Statsforvalteren)</i> Municipality
Advisory service	Public support, research institute support	Regulation on RMP §35. Climate advisory 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

Some typical examples of CW benefits are presented in the table below. For more examples check: <http://nwrn.eu/> and [WOCAT database](#)

Impact level	Benefits	Examples of beneficiaries
Local level	Reduce sediment and nutrients loads from the (sub-)catchment	Farmers, water management, tourism
	Improve biodiversity	Farmers, water management, tourism
Sub-basin	Improve water quality	Farmers, local communities, fishers, drinking water management, local wildlife
	Create terrestrial habitats	Local wildlife, NGOs, fishers, nature protection
	Improve biodiversity	Local communities, Local wildlife, NGOs, fishers, nature protection
River basin	Improve water quality (eutrophication)	People in the river basin, regional food production and environment
	Improve resilience	
	Prevent land degradation	

NOTE: CWs can have different designs and goals



Sediment (left) and phosphorous (right) loads at the inlet and outlet of the Skuterud CW, presented in kg/ha of agricultural area (Krzeminska et al, 2023)

Resources

Advisors and other actors:

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

Websites and document (examples):

<https://nibio.no/tema/miljo/tiltaksveileder-for-landbruket/vannmilljotiltak/fangdammer-og-renseparker>
<https://qcat.wocat.net/en/wocat/>

Reference:

¹Krzeminska D. et al. 2023. CATENA 223, 106962