

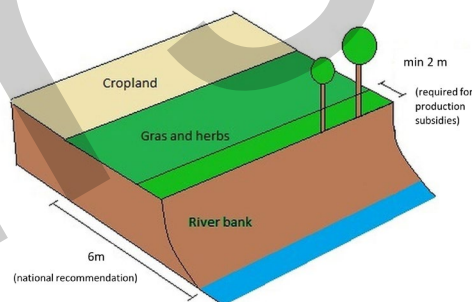
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## The problem: Agricultural runoff to waterways and stream bank stability

Fertilizers and pesticides contribute to the pollution of water resources. The areas along streams are affected by climate change as stream bank failures often occur following floods or during prolonged rainfalls. In addition to BMP (best management practices) on the fields, grassed cover buffer zones are one of the most common measures for improving water quality in Norway's agricultural catchments.

### About the measure

Natural buffer zones (NBZ) are strip of natural vegetation (grass, trees, bushes, etc.) alongside waterways. Grass covered buffer zones (BZ) are 'additional' strips of grass established to reduce the rates of surface runoff and loads of sediment, nutrients and pesticide delivered to waterways. The processes involved in both NBZ and BZ are filtration, sedimentation, infiltration and absorption. Moreover, the plants in the zone may also function as habitats for insects, birds and animals, contributing to increased biodiversity.



Examples of buffer zones from Hobøl catchment (photos: D.Krzeminska) and schematic representation of buffer zones.

## Different policy instruments related to the measure

The national environmental program (NMP) provides requirements for having buffer zones along streams and lakes. The Water Resources Act and the Regulation of Agricultural Subsidies include legal requirements (for NBZ) while Regional Environmental schemes (RMP) and locally managed support schemes for special environmental measures in agriculture (SMIL) support 'extension' of buffer zones as voluntary measures (BZ). *NOTE:* the rules vary between different regions in Norway.

	Policy & incentive	Regulation document	Authority & support
Mandatory / Voluntary	Obligation to maintain 'sufficient' buffer zone (size not defined)	Water Resource act. § 11 (Vannressursloven)	Norwegian Environmental Agency The Norwegian Water Resources and Energy Directorate (NVE)
	min. 2 meters width and min 6 meters when establishing new fields (NOTE: this refers to NBZ)	Regulation of agricultural subsidies § 6 (PT forskrift)	County Governor (Statsforvalteren)
Economic support	Production subsidies depends on maintenance of buffer zones	Regulation of agricultural subsidies § 6 (PT forskrift)	County Governor (Statsforvalteren) Municipality
	Subsidies to establish and maintain buffer zones	RMP	County Governor (Statsforvalteren) Municipality
	Erosion prevention and vegetation zones and zones for pollinators	SMIL §5	Municipality
Advisory service	Public support, research institute support	Regulation on RMP §35.Climate advisory Public agricultural advisory service	Municipality Ministry of Agriculture and Food Norwegian Agriculture Advisory Norwegian institute of bioeconomy research (NIBIO)

## Examples of benefits of the measure

The efficiency of vegetation cover is composed of a variety of factors; therefore, effectiveness of these measures are to a large degree site specific<sup>1,2</sup>. For more examples of buffer zones benefits and effects go to: <http://nwrn.eu/> and/or [WOCAT database](#).

Impact level	Benefits	Examples of beneficiaries
Local level	Reduce sediment and nutrients loads to the waterways	Farmers, water management, tourism
	Reduce (stream bank) erosion and soil losses	Farmers
	Increase soil water retention	Farmers, water management
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 status	People in the river basin, regional food production and environment
	Improve resilience	
	Prevent land degradation	



Retention effect of buffer zones based in research (Blankenberg et al. 2017)

## Resources

### Advisors and other actors:

County Governor (Statsforvalteren), The Norwegian Water Resources and Energy Directorate (NVE), 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/kantsoner>  
[https://publikasjoner.nve.no/veileder/2019/veileder2019\\_02.pdf](https://publikasjoner.nve.no/veileder/2019/veileder2019_02.pdf)  
<https://qcat.wocat.net/en/wocat/>

### Reference:

<sup>1</sup> Blankenberg A-G.B. et al. 2017. NIBIO RAPPORT;3(14)  
<sup>2</sup> Krzeminska D. et al. 2019. CATENA 172, 87-96