

Gammelbacka stream: WATERDRIVE Case Area in Finland



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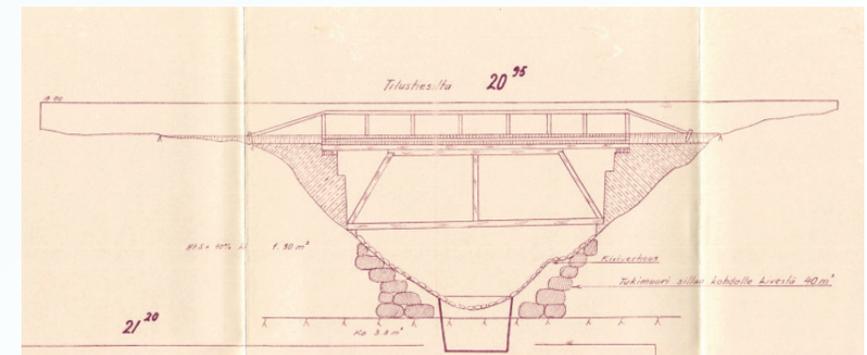
Floods and outflow of solid matter and nutrients

Well-functioning basic drainage in fields enables the functionality of local drainage and supports soil structure improvement.

When the soil structure and growth potential are in good condition, this ensures effective crop cultivation.

At the same time, nutrient loss and loading into natural water systems can be reduced.

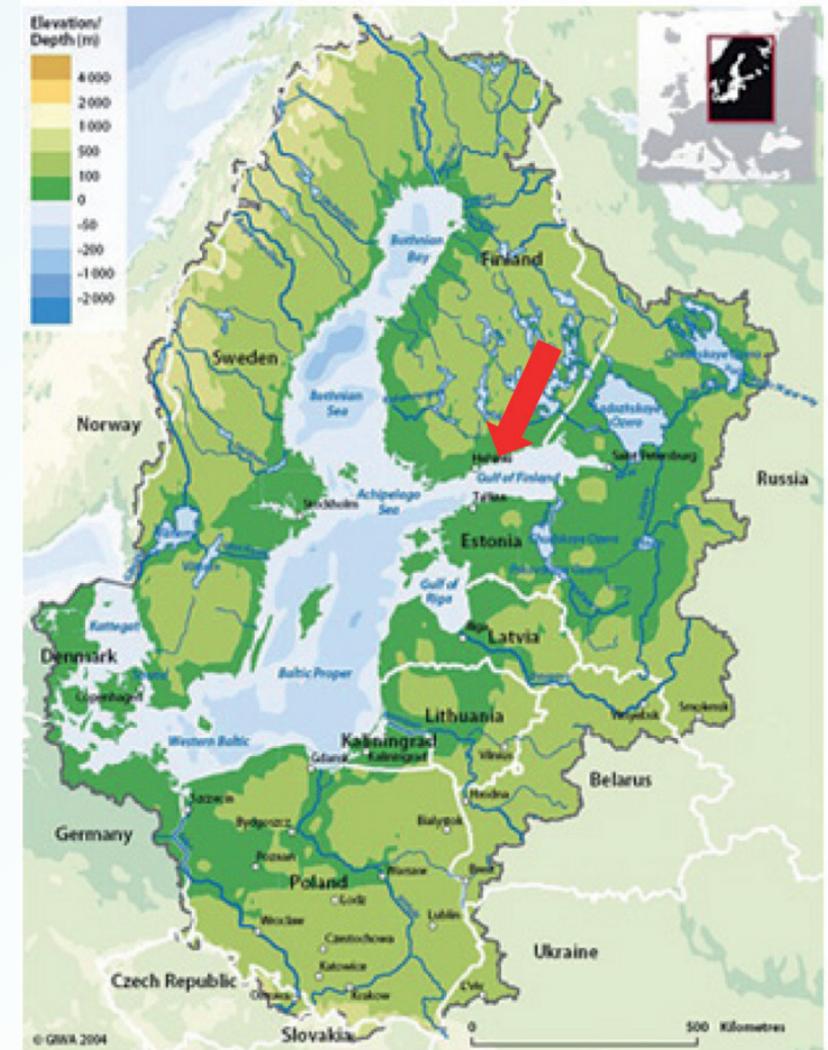
On the contrary, the bad condition of the main channel complicated the works of farmers, because floods and wetness delayed sowings, hampered harvesting, decreased the crop yields and ruined the soil structure.



Gammelbacka stream in The Baltic Sea Region

The Gammelbacka stream, also called Storängsbäcken, flows from the forests of Kuninkaanportti and Ernestas through Eestinmäki and Karjalaiskylä fields through the built-up urban area and park area of Gammelbacka to Gulf of Finland.

The length of the stream is about seven kilometers. *Salmo trutta* have been restocked in Gammelbacka stream in the urban area and park area. This part of the stream was restored in 2014 by Water Protection Association of the River Porvoonjoki.



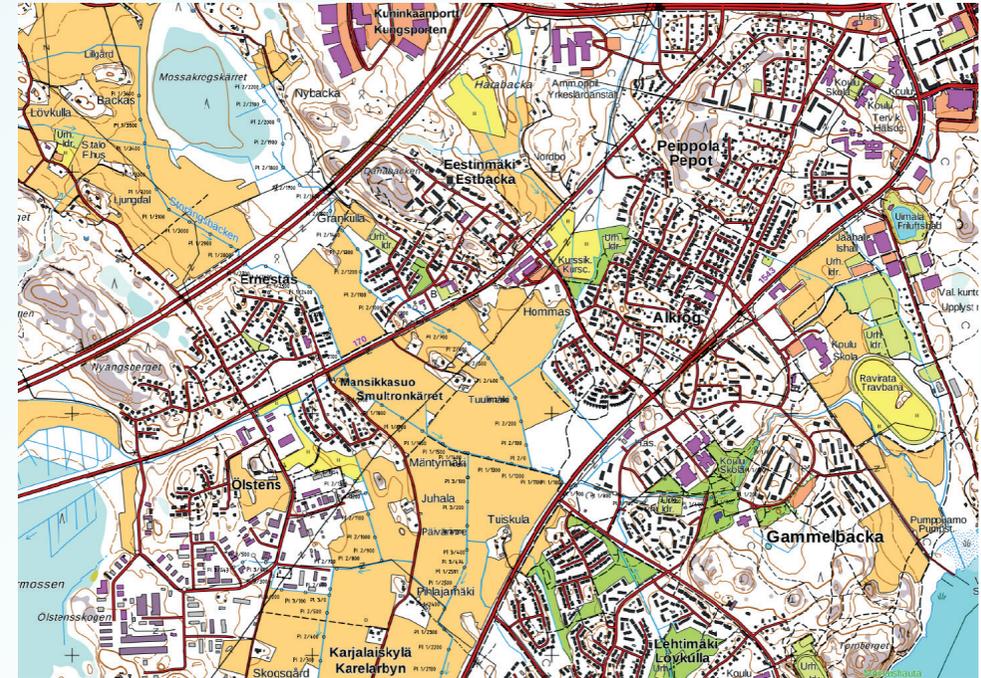
Gammelbacka stream

The main drainage channel of Storänsbäcken ditch / Gammelbacka stream is a typical case, not renovated during decades.

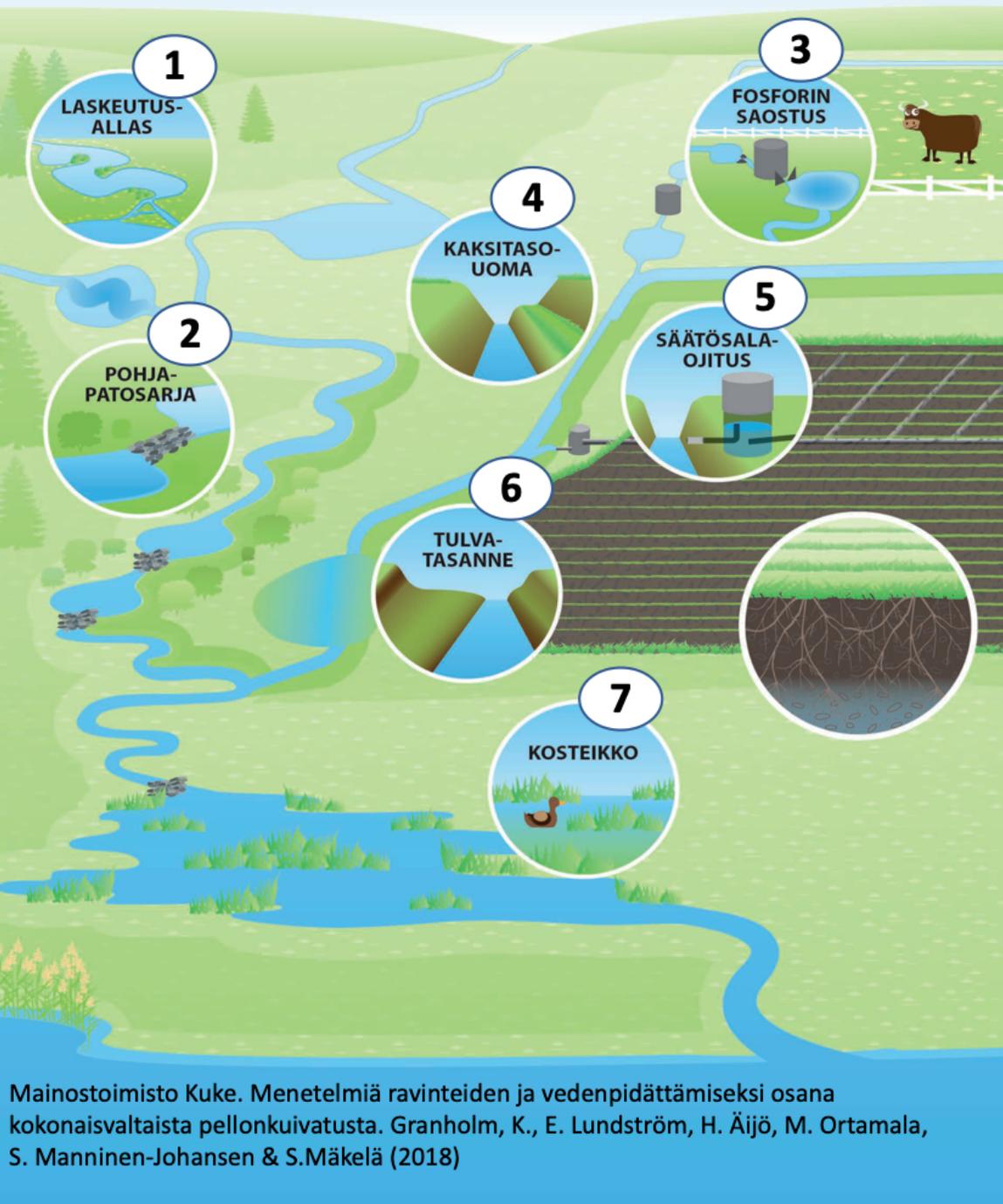
The problems consist of small difference of field surfaces and channel water level. By drainage planning norms this difference should be at least 80 cm.

This problem was caused by erosion and vegetation which resulted silt and mud accumulation to the channel and also depression of the soil.

Humidity and floods have during the years compressed and weakened soil structure and farming capacity, and also increased depression.



Actions for slowing eutrophication



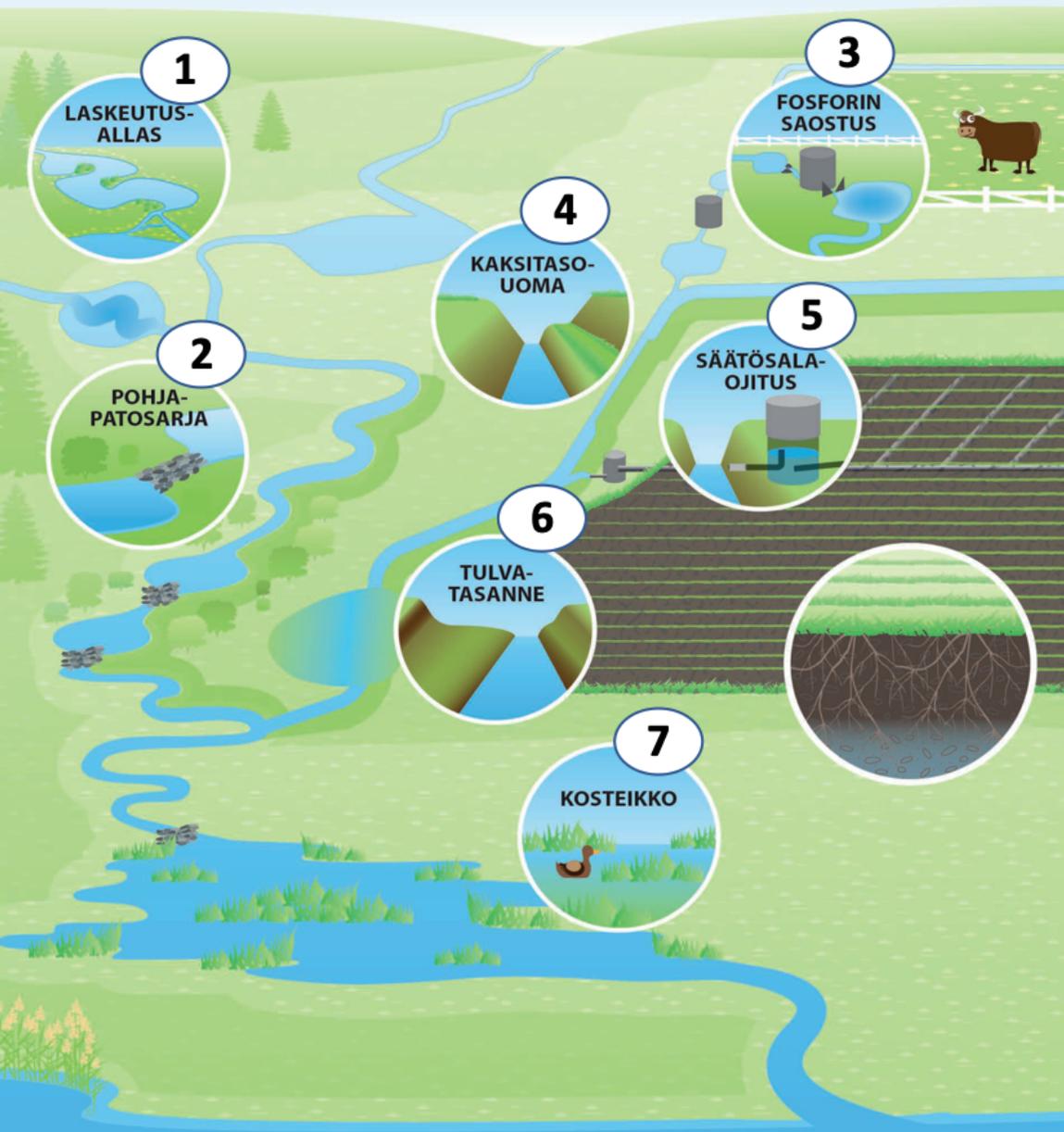
Mainostoimisto Kuke. Menetelmiä ravinteiden ja vedenpidättämiseksi osana kokonaisvaltaista pellonkuivatusta. Granholm, K., E. Lundström, H. Äijö, M. Ortamala, S. Manninen-Johansen & S.Mäkelä (2018)

Holistic catchment area renovations

- Catchment area-based holistic water management planning focuses on the development potential of agricultural production and environmental protection as being as multidimensional as possible.
- A holistic drainage approach in agricultural fields means the functionality of basic and local drainage, including control of surface flows, while taking biodiversity, water quality and fishery into account.

1. Sedimentation pond
2. Bottom dam
3. Fram level flow control
4. Two stage ditch
5. Controlled drainage
6. Flood bank
7. Wetlands

Actions for slowing eutrophication



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Holistic catchment area renovations

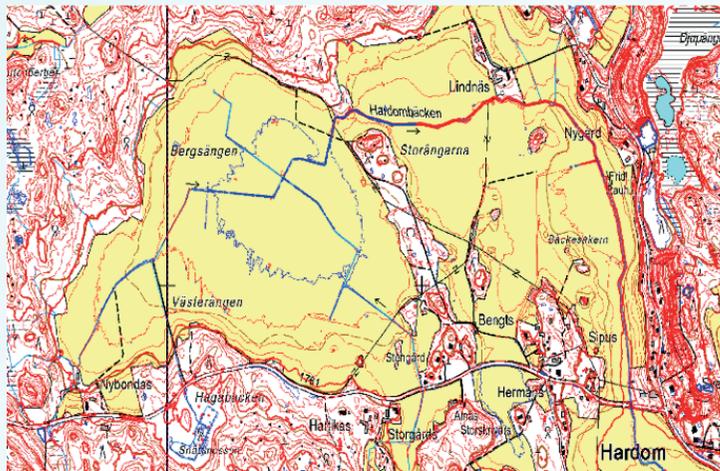
- Drainage and soil condition surveys are key factors in planning measures in an agricultural environment (professional adviser organises surveys).
- Measures should be based on the prevailing need and adapted to local conditions (topography, soil types, flow, economy and ecology, etc.).
- Cost-effectiveness, channel dimensioning/mass calculations and soil growth status (chemical, physical and biological status of the soil) must be taken into account in the design of measures.

1. Sedimentation pond
2. Bottom dam
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Field measurements identify the possibilities for implement the actions



Studies for drainage (basic and local drainage)



With airphotos and altitude models we can find the problematic areas!

Examinations:

- Difference between water level and field surface
- The discharges
- Wells
- Ditches
- Culverts
- Difference between drainage pipes and field surface
- Distance between drainage pipes
- Gradients
- Need for maintenance (flushing)
- Possibilities for water

Estimated costs of holistic main channel renovation in Gammelbacka case

Measures	Cost [Euro]
Preliminary work - Marking measurements	3 788
Excavations	25 815
Spreading of excavated sediment	5 500
Two stage ditches (excavations and spreading of excavated sediment)	9 456
Drum installations	5 000
Drum materials	4 550
Repair of broken discharges	2 400
Landscaping and unforeseen costs	800
Overheads (planning, supervision and management)	8 091
	Total cost
	65 400

Main Actors:

- **Drainage corporate bodies**

maintaining of the ditches, organization for those land owners that gets benefit or profit of the drainage, information channel for farmers for actions and methods of holistic water management

- **Advisory organizations and planners**

the link between farmers and other stakeholder groups, provide knowledge on the implementation and practical planning of measures, to improve the implementation of actions and methods of holistic water management in the area and with other stakeholder groups

- **Farmers**

to improve the implementation of actions and methods of holistic water management in their own lands, to provide information on the implementation of measures, improving the efficiency of farming areas

- **Authorities**

supervisory authority, informing and steering in agricultural, technical and environmental sector, to improve the implementation of actions and methods of holistic water management with other stakeholder groups



Having a small meetings and discussions about problems in the catchment area. Finding out the most active farmers interest for the renovation project.

Suggestions for the future

- Information about holistic water management should primarily be targeted to farmers, landowners and drainage corporate bodies in the risk areas. Activities should inspire the confidence of local actors.
- Advising (holistic approach taking into account the production economy and the environment) should be permanent and activate local actors and on a long-term basis. Catchment officer could be on a link between governmental and local level. Practice has shown that the trust is different between local actors and authorities and advisory organization.
- The activity of Catchment officer cannot be created by one person or organization. Expert teams from different organizations should be resourced for improve holistic advising and catchment area renovations. The cooperation and team thinking could work across different sectors.
- In large-scale, holistic water management planning and implementation, the role of each stakeholder needs to be clearly defined and understood. There is a need for a clear chain of operation, from the catchment-area to the waterbody, that would include drainage corporate bodies, authorities, fishery regions, (participants') associations, foundations, planners, contractors, researchers, advisors, farmers and landowners. The responsibility of implementing measures cannot lay solely on individual stakeholders, but more comprehensive collaboration is needed.

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