

Landscape features

Impact: Nutrient leaching_run-off

Reference 22

Dollinger, J; Dagès, C; Bailly, JS; Lagacherie, P; Voltz, M 2015 Managing ditches for agroecological engineering of landscape. A review AGRONOMY FOR SUSTAINABLE DEVELOPMENT, 35, 999-1020. 10.1007/s13593-015-0301-6

Background and objective

Farm ditches play a significant role in many issues of agricultural landscapes. Farm ditches are human-made linear elements that constitute the upstream parts of the permanent hydrographic networks in agricultural landscapes. Primarily implanted within farmed landscape to collect surface and subsurface water in order to drain excess water and/or to prevent soil erosion, farm ditches may also control pollution and preserve biodiversity. The main aim of this review is to determine whether and how the design of ditches and their maintenance can be useful for the agroecological engineering of landscapes. In this respect, three successive questions are addressed: 1) What is known about the ecosystem services provided by ditches and how do they depend on the processes occurring in ditches and on the ditch characteristics? 2) How can ditch maintenance improve the positive influence of ditches on ecosystem services and avoid adverse effects? 3) What are the future research needs in relation to the previous questions? Here, results on objective 1 are reported.

Search strategy and selection criteria

The available scientific material dealing with the whole chain “ditch maintenance-ditch characteristics-processes-ecosystem services” for a diversity of pedoclimatic contexts, we conducted three extensive literature searches in five different scientific databases (ISI Web of Knowledge, Science Direct, Wiley Online Library, Springer Link, and Google Scholar). A first search aimed at collecting the papers that studied the involvement of ditches in the provision of ecosystem services. A second search aimed at collecting papers describing the processes involved in the provision of ecosystem services and how they are affected by ditch characteristics. A third search aimed at collecting papers studying the nature and impact of management practices in ditches. 1) Papers gather case studies at different scales, microcosms, mesocosms, ditch and ditch networks, and numerical experiments.

Data and analysis

Data analysis is not specified.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
140	Cropland	Outflow from ditches	Inflow into ditches	Metric: Nutrients mitigation power; Effect size: Not applicable	25%

Results

- The nutrient retention power of ditches has been reported to vary greatly between 3 and 92 %.
- NA

- NA
- NA
- NA

Factors influencing effect sizes

- NA : NA
- NA : NA
- NA : NA

Conclusion

Reviewers' note: We labelled the results for ditches as uncertain due to the lack of statistical testing.