BRIEF 5 LOG SHEET: Green infrastructure within agricultural landscapes strengthens the supply of ecosystem services

IEEP was contracted on behalf of BiodivERsA by the Royal Belgian Institute of Natural Sciences (RBINS)/Belgian Science Policy Office (BELSPO) to produce a series of policy briefs based on the results of research projects funded by the BiodivERsA calls 2010-2011, 2011-2012 and 2012-2013, and the joint BiodivERsA FACCE JPI call 2013-2014, as well as other EU-funded research projects where relevant.

Knowledge and methodology used

The Policy Brief "Green infrastructure within agricultural landscapes strengthens the supply of ecosystem services" is based on the scientific results of five projects funded by the BiodivERsA Partnership, one by FACCE-JPI and one by the European Commission DG Research FP7 programme. The Brief extracts and summarizes some key results of the projects and provides a list of relevant policy recommendations linked to current EU policy processes.

The Brief was drafted by the Institute for European Environmental Policy (IEEP), in consultation with the BiodivERsA Policy briefs Working Group, and with researchers from the respective projects. The project team of IEEP initially consulted all relevant BiodivERsA project reports from the relevant time period (2013 - 2018) as supplied by the BiodivERsA secretariat. Some potentially interesting project findings were identified from these reports and the IEEP team then identified the most relevant peer-reviewed scientific articles produced by the projects. Project leaders and researchers were then contacted to request additional publications and project findings. All sources used are listed below.

Quality control and validation was done by all parties (co-authors) involved:

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Sources of information consulted for key research findings

Project reports used:

EC21C final project report (BiodivERsA-funded)

FarmLand final project report (BiodivERsA-funded)

ECODEAL final project report (BiodivERsA/FACCE-JPI –funded)

APPEAL final project report (BiodivERsA-funded)

SmallForest final project report (BiodivERsA-funded)

CONNECT final project report (BiodivERsA-funded)

STEP final project report (European Commission-funded)

Peer-reviewed scientific publications used:

- Bosem Baillod, A, Tscharntke, T, Clough, Y and Batáry, P (2017) Landscape-scale interactions
 of spatial and temporal cropland heterogeneity drive biological control of cereal aphids.
 Journal of Applied Ecology Vol 54, 1804-1813. (FarmLand)
- Hauck, J, Schmidt, J and Werner, A (2016) Using social network analysis to identify key stakeholders in agricultural biodiversity governance and related land-use decisions at regional and local level. Ecology and Society Vol 21, n.2, art.49. (EC21C)
- Holzschuh, A, Dainese, M, González-Varo, J P, Mudri-Stojnić, S, Riedinger, V, Rundlöf, M, Scheper, J, Wickens, J B, Wickens, V J, Bommarco, R, Kleijn, D, Potts, S G, Roberts, S P, Smith, H G, Vilà, M, Vujić, A and Steffan-Dewenter, I (2016) Mass-flowering crops dilute pollinator abundance in agricultural landscapes across Europe. Ecology Letters vol 19, 1228-1236. (ECODEAL)
- Jonsson, M, Bommarco, R, Ekbom, B, Smith, H G, Bengtsson, J, Caballero-Lopez, B, Winqvist, C and Olsson, O (2014) Ecological production functions for biological control services in agricultural landscapes. Methods in Ecology and Evolution vol 5, 243-252. (APPEAL)
- Kalda, O, Kalda, R, and Liira, J (2015) Multi-scale ecology of insectivorous bats in agricultural landscapes. Agriculture, Ecosystems & Environment vol 199, 105-113 (SmallForest)
- Magrach, A, Holzschuh, A, Bartomeus, I, Riedinger, V, Roberts, S P, Rundlöf, M, Vujić, A, Wickens, J B, Wickens, V J, Bommarco, R, González-Varo, J P, Potts, S G, Smith, H G,

- Steffan-Dewenter, I and Vilà, M (2018) Plant–pollinator networks in semi-natural grasslands are resistant to the loss of pollinators during blooming of mass-flowering crops. Ecography vol 41, 62-74 (ECODEAL)
- Martin, E A, Dainese, M., Clough, Y., Báldi, A., Bommarco, R., Gagic, V., Garratt, M. P., Holzschuh, A., Kleijn, D., Kovács-Hostyánszki, A., Marini, L., Potts, S. G., Smith, H. G., Al Hassan, D., Albrecht, M., Andersson, G. K., Asís, J. D., Aviron, S., Balzan, M. V., Baños-Picón, L., Bartomeus, I., Batáry, P., Burel, F., Caballero-López, B., Concepción, E. D., Coudrain, V., Dänhardt, J., Diaz, M., Diekötter, T., Dormann, C. F., Duflot, R., Entling, M. H., Farwig, N., Fischer, C., Frank, T., Garibaldi, L. A., Hermann, J., Herzog, F., Inclán, D., Jacot, K., Jauker, F., Jeanneret, P., Kaiser, M., Krauss, J., Le Féon, V., Marshall, J., Moonen, A., Moreno, G., Riedinger, V., Rundlöf, M., Rusch, A., Scheper, J., Schneider, G., Schüepp, C., Stutz, S., Sutter, L., Tamburini, G., Thies, C., Tormos, J., Tscharntke, T., Tschumi, M., Uzman, D., Wagner, C., Zubair-Anjum, M. and Steffan-Dewenter, I. (2019), The interplay of landscape composition and configuration: new pathways to manage functional biodiversity and agroecosystem services across Europe. Ecology Letters. (ECODEAL)
- Riedinger, V, Mitesser, O, Hovestadt, T, Steffan-Dewenter, I and Holzschuh, A (2015) Annual dynamics of wild bee densities: attractiveness and productivity effects of oilseed rape.
 Ecology vol 96, 1351-1360. (STEP project)
- Riedinger, V, Renner, M, Rundlöf, Steffan-Dewenter, I and Holzschuh, A (2014) Early massflowering crops mitigate pollinator dilution in late-flowering crops. Landscape Ecology vol 29, 425-435. (STEP Project)
- Schmidt, J and Hauck, J (2017) Implementing green infrastructure policy in agricultural landscapes – scenarios for Saxony-Anhalt, Germany. Regional Environmental Change. (EC21C)
- Schulp, C J E, Lautenbach, S and Verburg P H (2014) Quantifying and mapping ecosystem services: Demand and supply of pollination in the European Union. Ecological indicators vol 36, 131-141. (CONNECT)

Interviews carried out

None

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