

<b>Name of project:</b> The water, land and carbon footprint of new protein-rich food items	
<b>Project number:</b> 27.18	<b>Internal/external:</b> Internal
<b>Thesis supervisor:</b> Prof.dr.ir. Arjen Y. Hoekstra	<b>Daily supervisor:</b> Charlotte Verburg
<b>Names of involved institutions:</b>	<b>Start of project:</b> Flexible
<p><b>Short project description</b> There is an increasing interest in the impact of changes in diet on natural resources use and greenhouse gas emissions. Various alternative sorts of food are in development, like vegetable meat replacements/substitutes (imitation meat), insects, and cultured meat. They are protein-rich foods with a supposed smaller environmental footprint than meat, i.e. less appropriation of land and water and less greenhouse gas emissions. The possible environmental saving through these sorts of meat alternatives has been studied to a limited extent, although some research has been done (e.g. Smetana et al. 2015; Ercin and Hoekstra 2012).</p> <p><b>Research objective</b> The research aims to estimate the land, water and carbon footprint of a number of new protein-rich food items, including vegetable meat replacements, insects, and cultured meat.</p> <p><b>Approach</b> The work will consist of the following steps:</p> <ul style="list-style-type: none"> <li>• Determine the basis for comparing alternative food items, e.g. on the basis of caloric or protein content.</li> <li>• List and select the meat alternatives to be studied and identify the ingredients and production process per meat alternative.</li> <li>• Assess the water, land and carbon footprint for each of the selected meat alternatives.</li> </ul> <p><b>Background material</b> Alexander, P., Brown, C., Arneth, A., et al. (2017) Could consumption of insects, cultured meat or imitation meat reduce global agricultural land use? <i>Global Food Security</i>, 15: 22-32. Ercin, A.E., Aldaya, M.M. and Hoekstra, A.Y. (2012) The water footprint of soy milk and soy burger and equivalent animal products, <i>Ecological Indicators</i>, 18: 392-402. Hartmann, C., Siegrist, M. (2017) Consumer perception and behaviour regarding sustainable protein consumption: A systematic review, <i>Trends in Food Science and Technology</i>, 61: 11-25. Hoek, A.C., van Boekel, M.A.J.S., Voordouw, J., Luning, P.A. (2011) Identification of new food alternatives: How do consumers categorize meat and meat substitutes? <i>Food Quality and Preference</i>, 22(4): 371-383. Smetana, S., Mathys, A., Knoch, A., Heinz, V. (2015) Meat alternatives: life cycle assessment of most known meat substitutes, <i>International Journal of Life Cycle Assessment</i>, 20(9): 1254-1267. Tuomisto, H.L., Teixeira De Mattos, M.J. (2011) Environmental impacts of cultured meat production, <i>Environmental Science and Technology</i>, 45(14): 6117-6123</p>	