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The Barcelona Challenge for Good Food and Climate

Methodological notes to The Barcelona Challenge's Toolkit

1. What is *The Barcelona Challenge for Good Food and Climate*?

The Barcelona Challenge is a call for cities and their residents to engage in a series of commitments related to the transformation of their food systems to tackle the climate emergency. It is embedded in the international movement which is addressing the food-climate nexus, drawing on the *Milan Urban Food Policy Pact-MUFPP* (2015) and the *Good Food Cities Declaration* (launched by C40 in 2019). It was presented in the context of the *7th MUFPP Global Forum*[1], in Barcelona, 19-21st October 2021.
The Barcelona Challenge for Good Food and Climate addresses two key issues: the mitigation of and adaptation to the climate emergency, through a commitment to transform local agri-food systems to ensure access to sufficient, sustainable, healthy and nutritious diets for all, therefore preventing food vulnerability and enhancing food justice.

- CHALLENGE 1, MITIGATION: Reduce the GHG emissions of agri-food systems to limit global warming.[2]
- CHALLENGE 2, ADAPTATION: Adapt local agri-food systems to enable them to be more resilient during extreme climate events.

2. What is The Barcelona Challenge's Toolkit?

The Barcelona Challenge for Good Food and Climate aims to overcome these challenges by inspiring and supporting specific action under the six action categories of the *Milan Urban Food Policy Pact*. These actions also echo and reinforce the commitments adopted by signatory cities of C40's *Good Food Cities Declaration*.
To join *The Barcelona Challenge*, committed cities must record, via a dedicated website[3], the actions they are already implementing or are planning to implement by 2030. The website will allow cities to estimate, record, visualise and disseminate the potential impacts of achieving the actions they are committing to (via *The Barcelona Challenge for Good Food and Climate Toolkit*[4]). These refer not only to GHG emissions reduction, but also to other social, ecological or economic impacts (e.g., lives saved, jobs generated, saved water, etc).

3. How does The Barcelona Challenge's Toolkit estimate the potential impacts of the actions committed to by participant cities?

With the present document we are describing the methodology applied to estimate the projected impact of the commitments adopted by cities within the framework of The Barcelona Challenge's Toolkit. Such a methodology is based on scientific publications of major topicality and robustness. Based on available data, we have made quantitative approximations to highlight the order of magnitude of the projected impacts of such actions.
Due to the high complexity of the interdependencies between the environment and public policies, and to the scarcity and reliability of quantitative data, it is impossible to offer exact calculations of the impacts on climate and society. Therefore, the expected annual projected benefits produced by *The Barcelona*

1 https://barcelona-milanpact2021.com/

2 Cities will be able to commit to a specific reduction in their agri-food systems' GHG emissions. The toolkit can be used to estimate the projected magnitude of this reduction based on the proposals established in international scientific research. The toolkit also enables the user to estimate other multi-dimensional benefits (socio-ecological benefits and economic returns) of adopting healthy and sustainable diets for all. Cities are encouraged to commit beyond the Nationally Determined Contributions (NDC) which were at the heart of the Paris Agreement.

3 www.thebcnchallenge.org

4 https://toolkit.thebcnchallenge.org/

Challenge's Toolkit must be understood as a means to give an idea of the order of magnitude of the overall projected impacts of the actions committed by a city.
Global and generalisable data can only be obtained from the meta-analysis and integrated analysis of very complex processes. The number of such studies is limited in scientific literature, and they tend to analyse a limited range of variables related to the aims of *The Barcelona Challenge*. Therefore, *The Barcelona Challenge's Toolkit* does not offer estimates for all the projected impacts of each single committed action, but for a limited number of parameters related to such projected benefits. Such metrics are thus to be understood as "proxies" for a wider range of projected positive impacts. We can expect the real impacts to be much more diverse and complex and to vary according to each territorial context.
The expected benefits considered here often overlap between the different actions. Therefore, it has been considered more relevant to estimate the global impacts of all actions committed by each city, avoiding such possible overlapping. For this same reason the data required to be used in *The Barcelona Challenge's Toolkit* is related to the overall target ambition of all committed actions from a single city, and not to each single committed action.
Note that the projected benefits will be distributed along different territorial and administrative levels, also beyond the city boundaries.

4. How and with which data have the projected impacts of the committed actions been estimated?

In the following pages we offer an explanation of the steps taken to illustrate the order of magnitude of the impact of the committed actions. The references used are organised according to the data required from participant cities (targeted inputs), in order to facilitate the understanding of the overall results (expected annual projected benefits). As previously stated, the outputs show an estimation of the projected impacts of all commitments made by each participant city within *The Barcelona Challenge*.

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Targeted input #1: number of residents assuming the "Planetary Health Diet".

The metrics regarding the reduction in GHG emissions (tCO_2eq) have been obtained from Ivanova *et al.* (2020). The publication establishes that *"Nutrition guidelines diets* optimized with regards to health guidelines (generally including a reduction in the red meat intake and increase in plant-based foods) are associated with more moderate potential reductions between 1.3 and 0.01 tCO_2eq/cap (mean of 0.3 tCO_2eq/cap)". This proposal is based in a meta-analysis that takes into consideration different nutrition guidelines in diverse geographical contexts: e.g. 2000 calorie dietary guideline (higher consumption of fruits and veggies, seafood and dairy, and lower consumption of meats, eggs, nuts, seeds, oils, solid fats and added sugar); WHO guidelines (reduction in meat and dairy products); UK dietary recommendation (60% reduction in meat, no apparent change in dairy); healthy diet according to Dutch Dietary Guidelines, DACH recommendations[5].

IPES-Food (2017) presented that "Twelve percent of global expenditure on healthcare ($673 billion annually) is spent on diabetes (P. Zhang *et al.*, 2010)[6]". This expenditure is especially linked to type 2 diabetes, as more than 95% of people with diabetes have this type (WHO, 2022)[7]. Considering that the world population in 2010 was about 6,9 billion, the per capita expenditure on healthcare at the global level proposed is 97.54 US$/cap.

Willett, W. *et al.* (2019) have assessed that "Dietary changes from current diets to healthy diets are likely to substantially benefit human health, averting about 10.8–11.6 million deaths per year, a reduction of 19.0–23.6%". This analysis of potential effects of dietary change on diet related to disease mortality has used three different approaches: 1) Comparative Risk Model: The risk factors included high consumption of red meat (including beef, lamb, and pork), low consumption of fruits, vegetables, legumes, nuts, and fish, and being underweight, overweight, or obese. The disease endpoints included coronary heart disease, stroke, type-2 diabetes, site-specific cancers, and an aggregate of other diseases; 2) Global Burden of Disease Model: Reduced intakes of sodium and increased intakes of whole grains, nuts, vegetables, and fruits, and low sodium intake contributed most to reduced mortality; and 3) Alternative Healthy Eating Index 2010: Low scores are given for high consumption of trans fat and sugar-sweetened beverages and high scores for high consumption of polyunsaturated fat in addition to variables included in the other analyses.
Considering the global population in 2019 of about 7,770 million inhabitants, approximately 11 million prevented death globally means 0,001415 prevented deaths/cap.

O'Hara, J. K. (2011) cites Conner *et al.* (2008)[8] assessments that "estimated the economic impacts of Michigan residents consuming fruits and vegetables according to USDA guidelines[9], and whether the increase in the supply of fruits and vegetables would occur from Michigan producers when seasonally available. Assuming that the increase in production would occur on existing commodity crop acreage, the authors determined a net increase of 1,780 jobs within the state".
Conner´s *et al.* publication shows that the increase of locally sourced, seasonal fruits and vegetables consumption generates new jobs related to agricultural activities productive related labour. Their estimations have been pondered regarding State's population, proposing as a global metric 0,000178 new jobs/cap, (1,780 jobs/9,99 million inhabitants in the State of Michigan). Available, integrated data

5 See more information in the publication supplementary data: https://cfn-live-content-bucket-iop-org.s3.amazonaws.com/journals/1748-9326/15/9/093001/2/ERL_15_9_093001_suppdata.xlsx?AWSAccessKeyId=AKIAYDKQL6LTV7YY2HIK&Expires=1643109373&Signature=d%2FM33hCY8NGE1w7zDCts0nZjg2c%3D

6 Zhang, P., Zhang, X., Brown, J., Vistisen, D., Sicree, R., Shaw, J., Nichols, G., 2010. Global healthcare expenditure on diabetes for 2010 and 2030. Diabetes Res. Clin. Pract. 87, 293–301. doi:10.1016/j.diabres.2010.01.026

7 https://www.who.int/news-room/fact-sheets/detail/diabetes

8 Conner, D.S., W.A. Knudson, M.W. Hamm, and H.C. Peterson. 2008. The food system as an economic driver: Strategies and applications for Michigan. Journal of Hunger & Environmental Nutrition 3(4):371–383.

9 An adult consuming 2,000 calories per day should be eating 2.5 cups of vegetables and two cups of fruit per day. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 – 2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at https://health.gov/our-work/food-nutrition/previous-dietary-guidelines/2015.

from the Michigan food system is unique, and thus it has been estimated as a representative context.

MUFPP Action Framework	Challenge	Expected annual projected benefits	Scientific references	Proposed metrics
2, 3, 4, 5	1	Reduction in GHG emissions (tCO_2eq)	Ivanova, D., Barrett, J., Wiedenhofer, D., Macura, B., Callaghan, M., & Creutzig, F. (2020). Quantifying the potential for climate change mitigation of consumption options. *Environmental Research Letters*, 15(9), 093001. https://doi.org/10.1088/1748-9326/ab8589	0.3 tCO_2eq/cap
	2	Healthcare expenditures saved related to diabetes (US$)	IPES-Food (2017). Unravelling the Food–Health Nexus: Addressing practices, political economy, and power relations to build healthier food systems. The *Global Alliance for the Future of Food* and IPES-Food.	97.54 US$/cap
	2	Prevented deaths (nº)	Willett, W., Rockström, J., Loken, B. *et al.* (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet Commissions* 393 (10170), 447-492. https://doi.org/10.1016/S0140-6736(18)31788-4	0.001415 prevented deaths/cap
	2	New jobs generated (nº)	O'Hara, J. K. (2011). Market Forces: Creating Jobs through Public Investment in Local and Regional Food Systems (Union of Concerned Scientists). https://www.ucsusa.org/sites/default/files/2019-09/market-forces-report.pdf	0.000178 new jobs/cap

Table 1: Challenges, expected annual projected benefits, scientific references and metrics related to targeted input #1.

Targeted input #2: Number of residents shifting to an organic diet.

Ivanova *et al.* (2020) proposal is also used to estimate the expected annual reduction in GHG emissions related to shifts to an organic diet. The publication presents that "Organic food has lower emissions compared to conventionally produced food, with an average annual mitigation potential of 0.5 tCO_2eq/cap and a median of 0.4 tCO_2eq/cap". The meta-analysis takes into consideration publications addressing organic food consumption options impact in diverse geographical contexts: e.g. buy at least 30% or 60% more organic food products, 100% shift to organic crops and livestock production[10].

According to Bommelaer O. & Devaux J. (2011) additional costs and financial losses evaluated and attributed to diffuse agricultural pollution (nitrates and pesticides) in France are estimated between 1,105 and 1,675 M€/year. The assessment considers additional costs of water and sanitation services affecting the water bill, additional expenses of households located in communities affected by this pollution and the impacts due to eutrophication. It has been estimated that overall additional expenditure is related to conventional farming practices of fertilisation, as organic farming regulations limit the amount of nitrogenous fertilisers per hectare that can be used, and ban the use of soluble nitrogen fertilisers, responsible for water sources pollution (see, for example, Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products). This data has been used, as available aggregated data, to estimate the cost saving per capita at the global level, using the minimum calculated by Bommelaer O. & Devaux J. (2011) (1,105 M€, that is 1,642.03 US$) and considering 65.34 M inhabitants in France in 2011.

It is widely publicised that a number of pesticides and inputs used in conventional agriculture and food are suspected or proved to act as endocrine disruptor compounds. Abovementioned IPES-Food (2017) report also presents that "It has been estimated that total population exposure to Endocrine Disrupting Chemicals causes an annual health cost of $217 billion in the EU (equivalent to 1.28% of EU Gross Domestic Product) (Trasande *et al.*,2016)[11]". Considering the UE population in 2016 (510.1 million), it has been established 425.40 US$/cap as a metric to assess the economic savings on health costs related to endocrine disruptors exposure resulting from the resident´s shift to an organic diet.

MUFPP Action Framework	Challenge	Expected annual projected benefits	Scientific references	Proposed metrics
2, 3, 4, 5	1	Reduction in GHG emissions (tCO_2eq)	Ivanova, D., Barrett, J., Wiedenhofer, D., Macura, B., Callaghan, M., & Creutzig, F. (2020). Quantifying the potential for climate change mitigation of consumption options. *Environmental Research Letters*, 15(9), 093001. https://doi.org/10.1088/1748-9326/ab8589	0.5 tCO_2eq/cap
	2	Expenditure saved by totally reducing pesticides and nitrogen fertilizers pollution in water courses from conventional agriculture (US$)	Bommelaer O. & Devaux J. (2011). Coûts des principales pollutions agricoles de l'eau". Collection «Études et documents» du Service de l'Économie, de l'Évaluation et de l'Intégration du Développement Durable (SEEIDD) du Commissariat Général au Développement Durable. Available online at: http://temis.documentation.developpement-durable.gouv.fr/docs/Temis/0070/Temis-0070550/19342_ENG.pdf	25.13 US$/cap
	2	Health costs	IPES-Food (2017). Unravelling the Food–Health Nexus:	425.40

10 See more information in the publication supplementary data: https://cfn-live-content-bucket-iop-org.s3.amazonaws.com/journals/1748-9326/15/9/093001/2/ERL_15_9_093001_suppdata.xlsx?AWSAccessKeyId=AKIAYDKQL6LTV7YY2HIK&Expires=1643109373&Signature=d%2FM33hCY8NGE1w7zDCts0nZjg2c%3D

11 Trasande, L., Zoeller, R.T., Hass, U., Kortenkamp, A., Grandjean, P., Myers, J.P., DiGangi, J., Hunt, P.M., Rudel, R., Sathyanarayana, S., Bellanger, M., Hauser, R., Legler, J., Skakkebaek, N.E., Heindel, J.J., 2016. Burden of disease and costs of exposure to endocrine disrupting chemicals in the European Union: An updated analysis. Andrology. 4, 565–572. doi:10.1111/andr.12178

		savings related to exposition to endocrine disruptors (US$)	Addressing practices, political economy, and power relations to build healthier food systems. The *Global Alliance for the Future of Food* and IPES-Food.	US$/cap

Table 2: Challenges, expected annual projected benefits, scientific references and metrics related to targeted input #2.

Targeted input #3: Number of residents consuming food regionally and locally produced.

Ivanova *et al.* (2020) estimates that "Regional and local food and Seasonal and fresh food involves average reductions of 0.4 and 0.2 tCO_2eq/cap". The meta-analysis has taken into consideration publications addressing consumption options related to the local or regional origin of the production: e.g., consumption of regional food, shift from food transported by air or produced in a heated greenhouse to average food, buy at least 30% or 60% more locally produced food[12].

MUFFP Action Framework	Challenge	Expected annual projected benefits	Scientific references	Proposed metrics
2, 3, 4, 5	1	Reduction in GHG emissions (tCO_2eq)	Ivanova, D., Barrett, J., Wiedenhofer, D., Macura, B., Callaghan, M., & Creutzig, F. (2020). Quantifying the potential for climate change mitigation of consumption options. *Environmental Research Letters*, 15(9), 093001. https://doi.org/10.1088/1748-9326/ab8589	0.4 tCO_2eq/cap

Table 3: Challenges, expected annual projected benefits, scientific references and metrics related to targeted input #3.

12 See more information in the publication supplementary data: https://cfn-live-content-bucket-iop-org.s3.amazonaws.com/journals/1748-9326/15/9/093001/2/ERL_15_9_093001_suppdata.xlsx?AWSAccessKeyId=AKIAYDKQL6LTV7YY2HIK&Expires=1643109373&Signature=d%2FM33hCY8NGE1w7zDCts0nZjg2c%3D

Targeted input #4: Number of residents shifting to an organic and regionally/locally produced diet.

In the report *Pollinators: importance for nature and human well-being, drivers of decline and the need for monitoring*, the Directorate General for Environment of the European Commission presented that "In a comprehensive global assessment, Lautenbach *et al.* (2012)[13] estimated the economic benefits of global pollination services at c.€190 billion to €467 billion in 2009, based upon the market price of crop production that can be directly attributed to animal-mediated pollination". It is considered that organic farming schemes create the optimal conditions for enabling the ecosystems services of pollinators in crop production through agroecological farming practices, by adding complexity to agricultural landscapes that generates diversified agricultural productions to supply local markets.
Taking the minimum economic benefit of global pollination services, €190 billion (US$ 266), and considering world population in 2009 (6.84 billion), it has been obtained 27.78 US$/cap as a global metric to assess the economic benefits of pollinations as a result of the residents´ shift to an organic and regionally/locally produced diet.

MUFPP Action Framework	Challenge	Expected annual projected benefits	Scientific references	Proposed metrics
2, 3, 4, 5	2	Economic benefits of pollination services (US$)	European Commission, Directorate-General for Environment, *Pollinators: importance for nature and human well-being, drivers of decline and the need for monitoring*, Publications Office, 2020, https://data.europa.eu/doi/10.2779/699559	27.78 US$/cap

Table 4: Challenges, expected annual projected benefits, scientific references and metrics related to targeted input #4.

Targeted input #5: Number of agricultural hectares converted to organic farming schemes in the City-Region.

Organic farming schemes are recognized as the main alternative for sustainable farming, and the formal reference for agroecological farming practices worldwide. It occupies more than 1% of global agricultural land[14], and more than 8% in territories such as the European Union[15]. Its certification standards are currently well established and formalized globally, through public certification schemes and international agreements, and thus it has been taken as available data to reference sustainable farming practices, including non-certified agroecology-based agriculture.
Organic farming schemes provides a number of benefits for the Planetary Health, such as protecting pollination natural ecosystem services (see projected benefits linked to targeted input # 4) and decreases in GHG emissions, in water pollution, or in sanitary costs related to endocrine disrupting agents (see projected benefits linked to targeted input # 2). As cities' food provision connects urban food systems with distant territories, re-localization of food provision may also imply additional benefits by reducing transport economic costs and related GHG emissions. Based on all those positive impacts, the European Union has set a target of 25% of its total agricultural land under organic farming by 2030 within its Farm to Fork Strategy (2020), Such a target has been considered as a reference in other territories.
The present targeted input focuses on economic benefits directly related to an increase of organic agricultural land, without agricultural land use increases, regarding the higher financial performance of organic farming compared to conventional farming crops and systems. As most cities import many of

13 Lautenbach, S., Seppelt, R., Liebscher, J. and Dormann, C.F. (2012) Spatial and Temporal Trends of Global Pollination Benefit. PLOS One [online]. 7(4): e35954.

14 Crowder & Reganold, 2015.

15 European Commission 2021. Organic Farming Statistics 2019. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic_farming_statistics>

their food from outside the city-boundaries, following the theoretical approach of City-Region Food Systems (Blay-Palmer *et al.*, 2018)[16], conversion of agricultural land to organic farming schemes could include surrounding territories.
The proposed metrics are based on (1) assessments of comparative financial performance done for 55 different crops in 14 countries and five continents that estimate organic agriculture is significantly more profitable (22-35% higher net present values) than conventional farming when organic premium prices are applied (Crowder and Reganold, 2015), and (2) on FAOSTAT data regarding the 2015 world crops gross production value (US$ 2,377 billion) and area harvested (1,387 million ha). Following this information, and taking the lowest estimation of benefits increase (22%), it is obtained an estimation of about 376.99 US$/ha as benefits increase regarding agricultural land converted to organic farming schemes in the City-Region territory.

MUFPP Action Framework	Challenge	Expected annual projected benefits	Scientific references	Proposed metrics
2, 3, 4, 5	2	Benefits increase through the conversion of agricultural land to organic farming schemes in the City-Region (US$)	Crowder, D. W., & Reganold, J. P. (2015). Financial competitiveness of organic agriculture on a global scale. *Proceedings of the National Academy of Sciences*, 112(24), 7611-7616. https://doi.org/10.1073/pnas.1423674112 FAOSTAT 2015. Available at: https://www.fao.org/faostat	376.99 US$/ha

Table 5: Challenges, expected annual projected benefits, scientific references and metrics related to targeted input #5.

16 Blay-Palmer, Alison, Guido Santini, Marielle Dubbeling, Henk Renting, Makiko Taguchi, and Thierry Giordano. 2018. "Validating the City Region Food System Approach: Enacting Inclusive, Transformational City Region Food Systems" Sustainability 10, no. 5: 1680. https://doi.org/10.3390/su10051680

Targeted input #6: Number of municipal, non-sedentary and farmers markets promoted by the local authority.

O'Hara, J. K. (2011) presented data obtained from different research projects in several States of the US, that modest public funding for otherwise-unsuccessful farmers markets could create jobs over a five-year period. The estimations propose a job growth between 5.4 jobs/year[17] (500 farmers markets, 13,500 total jobs created in 5 years) and 2.4[18] (100 farmers markets, 1,200 total jobs created in 5 years). These additional jobs are estimated from a shift from long, wholesale channels to direct, local marketing channels.

MUFPP Action Framework	Challenge	Expected annual projected benefits	Scientific references	Proposed metrics
5	2	Number of new jobs generated	O'Hara, J. K. (2011). Market Forces: Creating Jobs through Public Investment in Local and Regional Food Systems (Union of Concerned Scientists). https://www.ucsusa.org/sites/default/files/2019-09/market-forces-report.pdf	2.4 new jobs generated/ farmer market and year

Table 6: Challenges, expected annual projected benefits, scientific references and metrics related to targeted input #6.

Targeted input #7: Number of residents adjusting food intake and assuming food waste reduction options.

Ivanova *et al.* (2020) states that "Food sufficiency—implying a reduction in the overall food intake—and Food waste reduction options mitigate an average of 0.3 tCO_2eq/cap and a median of 0.1 tCO_2eq/cap". The meta-analysis takes into consideration publications addressing different food waste reduction options: e.g. a total reduction of avoidable waste, reduce avoidable consumer-level food losses-sum of all products, halving avoidable and possibly avoidable consumer food waste, remove avoidable and possibly avoidable waste, waste minimization-waste rate of 2.4-3.9%, people share leftover/ food surplus via online food communities or give it to charity, reducing food waste in retail and household) ; and food sufficiency (e.g. eat no more than needed to maintain a healthy body, balanced energy intake, balancing energy intake and expenditure, assuming low or moderate physical activity, foundation diet-recommended dietary pattern that meets the minimum nutrient and energy needs requirements for the population)[19].

Stenmarck, *et al.* (2016) present that "The costs associated with food waste for EU-28 in 2012 are estimated at around 143 billion euros". This includes costs associated with food waste from households (around 98 billion euros) and along the supply chain (e.g., processing, packaging, retailing costs). Considering the EU-28 population in 2012 (504.05 million), we propose US$ 343.95 saved/cap (283.68 € saved/cap) as a metric to assess the order of magnitude of the economic resources saved when residents adjust food intake and assume food waste reduction options.

Scialabba (2013) has estimated globally "The average blue water footprint of food wastage, when considering food crops only and not taking animal products into account, is about 30 m^3 per capita and

17 Henneberry, S.R., B. Whitacre, and H.N. Agustini. 2009. An evaluation of the economic impacts of Oklahoma farmers markets. Journal of Food Distribution Research 40(3):64–78.

18 Hughes, D.W., C. Brown, S. Miller, and T. McConnell. 2008. Evaluating the economic impact of farmers markets using an opportunity cost framework. Journal of Agricultural and Applied Economics 40(1):253–265.

19 See more information in the publication supplementary data: https://cfn-live-content-bucket-iop-org.s3.amazonaws.com/journals/1748-9326/15/9/093001/2/ERL_15_9_093001_suppdata.xlsx?AWSAccessKeyId=AKIAYDKQL6LTV7YY2HIK&Expires=1643109373&Signature=d%2FM33hCY8NGE1w7zDCts0nZjg2c%3D

per year". This number has been taken as a metric to assess the volume of saved water related to food intake adjustments and food waste reduction options of the population.

MUFPP Action Framework	Challenge	Expected annual projected benefits	Scientific references	Proposed metrics
6	1	Reduction in GHG emissions (tCO_2eq)	Ivanova, D., Barrett, J., Wiedenhofer, D., Macura, B., Callaghan, M., & Creutzig, F. (2020). Quantifying the potential for climate change mitigation of consumption options. *Environmental Research Letters*, 15(9), 093001. https://doi.org/10.1088/1748-9326/ab8589	0.3 tCO_2eq/cap
6	2	Costs associated with food waste saved (US$)	Stenmarck, Å.; Magnus Jensen, C.; Quested, T.; Moates, G. Estimates of European Food Waste Levels; EU FUSIONS: Stockholm, Sweden, 2016; ISBN 978-91-88319-01-2. https://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf	343.95 US$ saved/cap
6	2	Saved water (m^3)	Scialabba, N. Food Wastage Footprint: Impacts on Natural Resources-Summary Report; FAO, Food and Agricultural Organization of the United Nations: Rome, Italy, 2013. http://www.fao.org/3/i3347e/i3347e.pdf	30 m^3/cap

Table 7: Challenges, expected annual projected benefits, scientific references and metrics related to targeted input #7.

5. Who is promoting *The Barcelona Challenge for Good Food and Climate*?

The Barcelona Challenge is an initiative led by the Barcelona City Council, Red de Municipios por la Agroecología (Municipalities for Agroecology Spanish Network) (Spain), the Milan Urban Food Policy Pact, C40, Terres en villes (France) and Sustainable Food Places (UK). The technical support for the development of *The Barcelona Challenge* has been run by Red de Municipios por la Agroecología (María Carrascosa García and Daniel López García), and co-financed by Daniel and Nina Carasso Foundation. A growing number of global networks and organizations are joining the Steering Committee of The Barcelona Challenge, such as RUAF, IPES-Food, Glasgow Food and Climate Declaration, EAT and Rikolto.