

Identifying priority knowledge needs for implementing nature-based solutions: results from Malta and other Mediterranean Islands

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The Mediterranean islands face significant environmental challenges

- high population density and tourism
- reliance on imports
- water scarcity
- increasing risks from climate change

 **Nature-based solutions?**

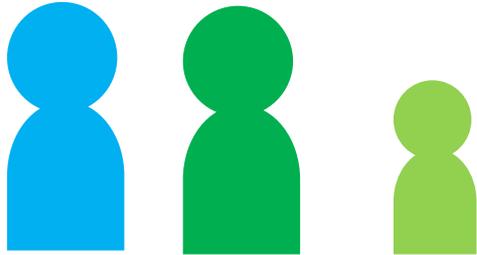
Nature-based solutions

- ... addressing societal challenges
- ... benefitting the environment?
- ... actions inspired by nature?

- Key EU environmental policy priority
- **Limited policy and management uptake**

Greater use of NBS in the Mediterranean islands depends on meeting key knowledge gaps limiting implementation

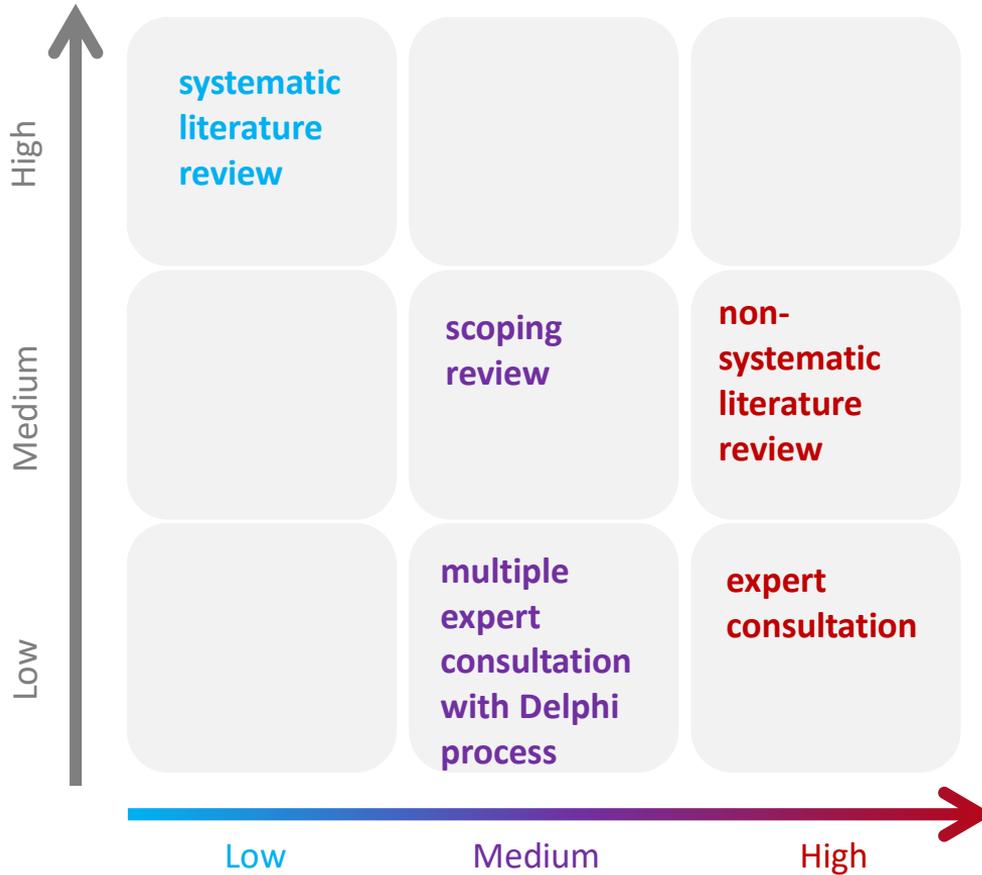
How can these be identified inclusively: fair representation of all stakeholders?



**Participatory processes
synthesising stakeholder
knowledge**

Knowledge synthesis is a systematic process to identify, collate and prioritize available evidence about a given issue.

**Time and resources
required**



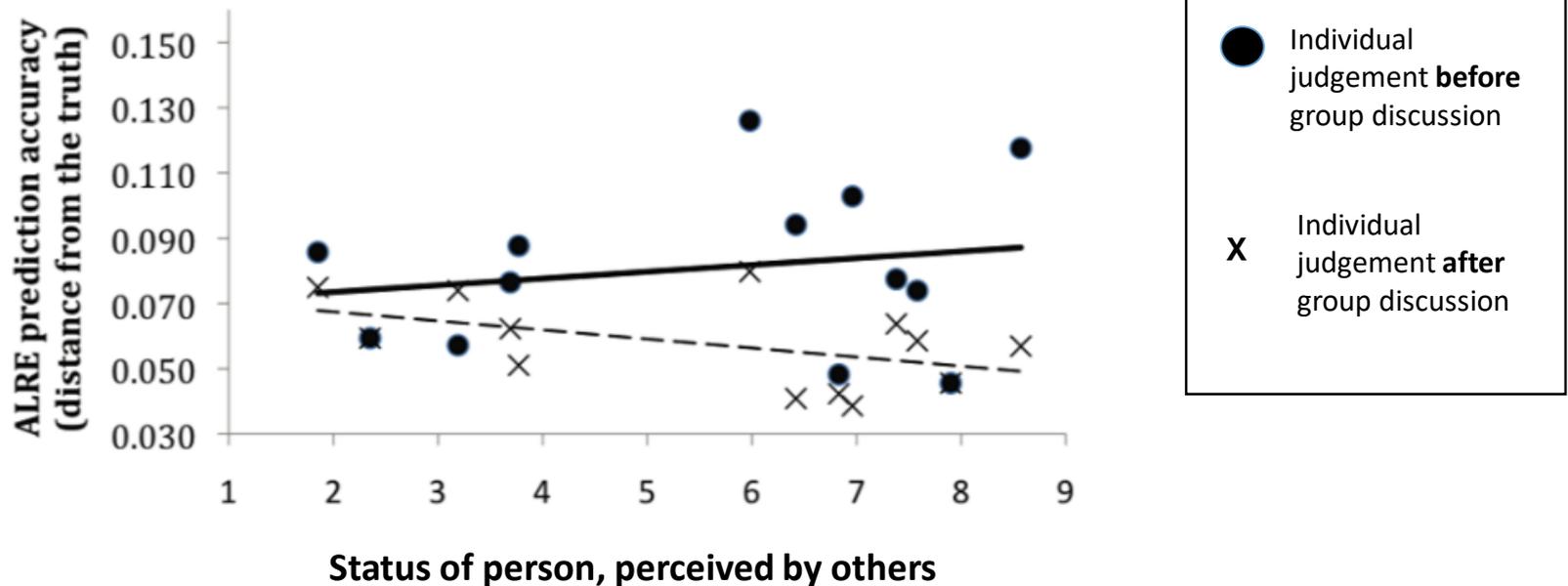
What normally happens:

- Non-systematic literature review
- Vote-counting
- Expert consultation

Risk of bias

Diverse expert groups using formal consensus methods are less likely to be biased

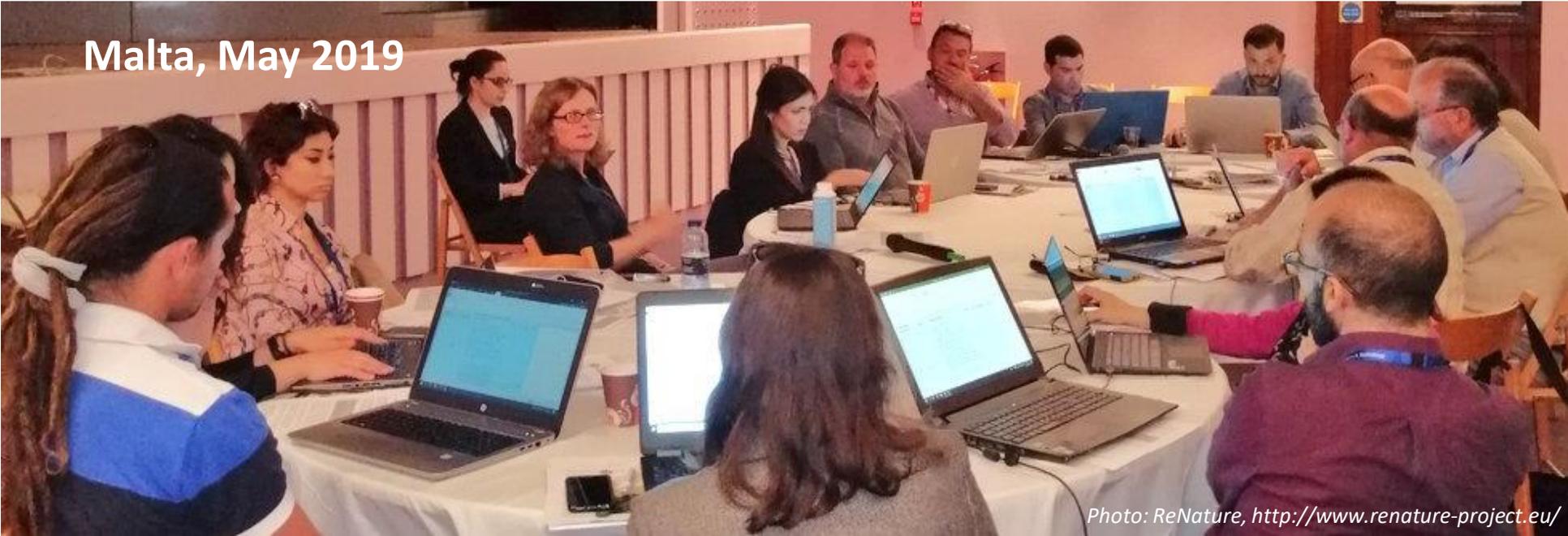
Qualifications, track records and experience are **poor guides to performance** of scientific experts.



Greater use of NBS in the Mediterranean islands depends on meeting key knowledge gaps limiting implementation

Workshop to develop a collaborative, stakeholder-led set of priority knowledge needs

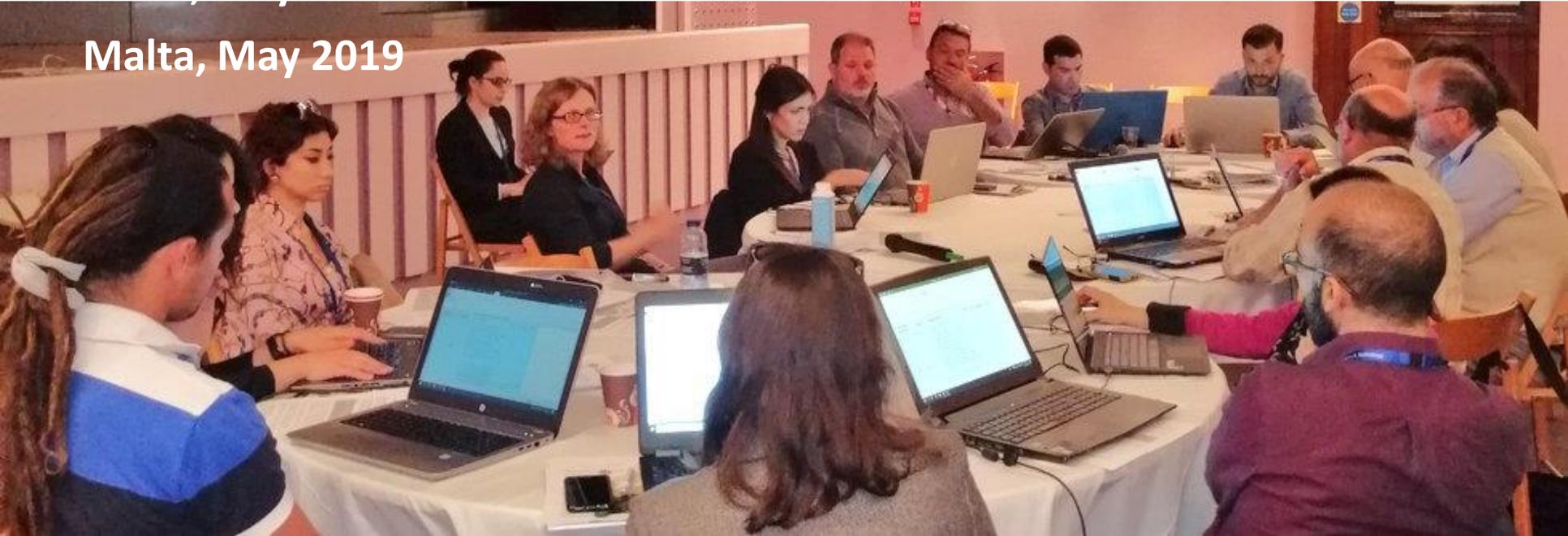
Malta, May 2019



18 environmental stakeholders – local and national government, NGOs, business and research

Malta, Cyprus and Sardinia

Malta, May 2019



Priority needs identified via a modified Delphi process

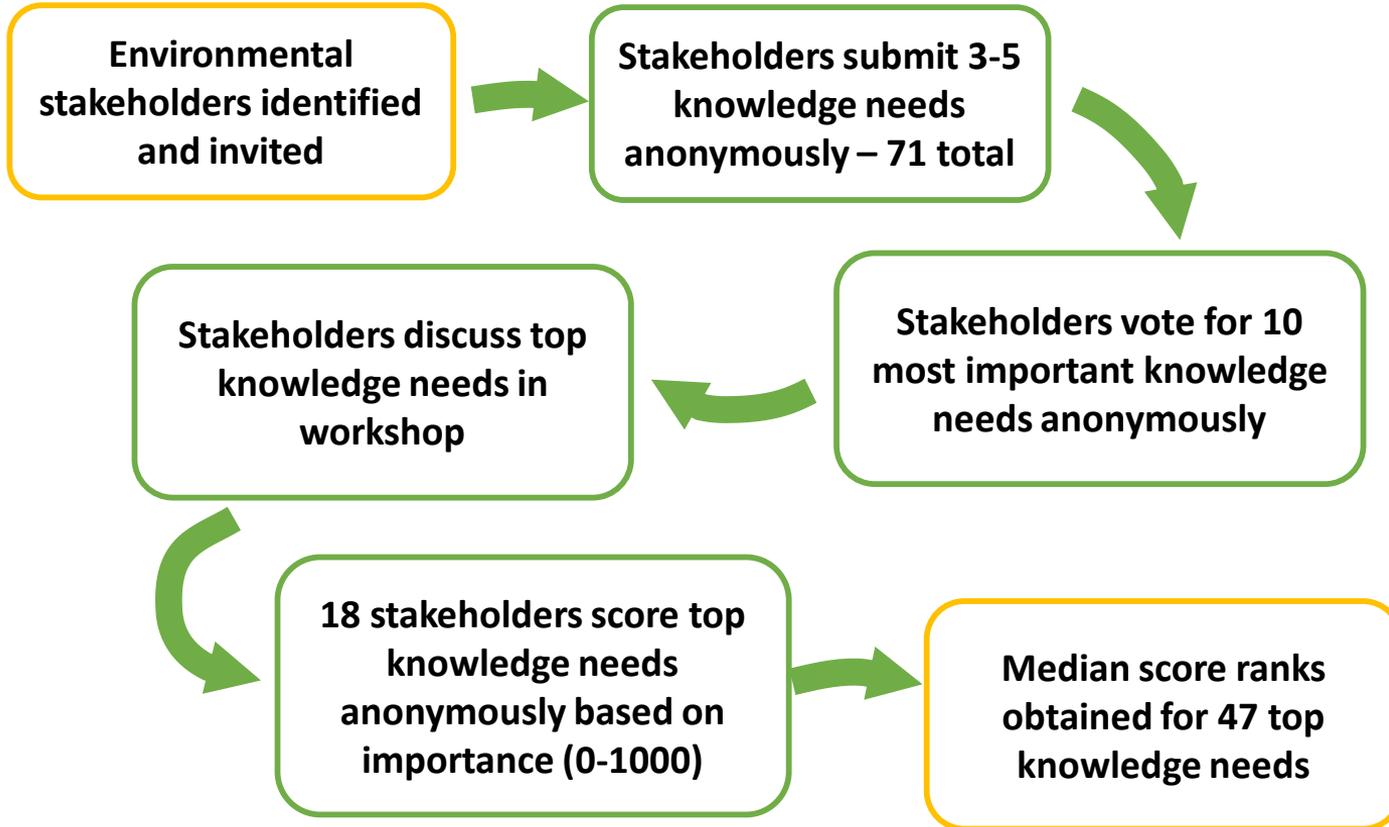
- **Method of knowledge synthesis**
 - **Participants provide information anonymously**
 - **Discussion to exchange information**
 - **Participants can update information anonymously**

Prioritisation method used by Sutherland et al. (2018) for horizon scanning; pollinators; environmental management, etc...

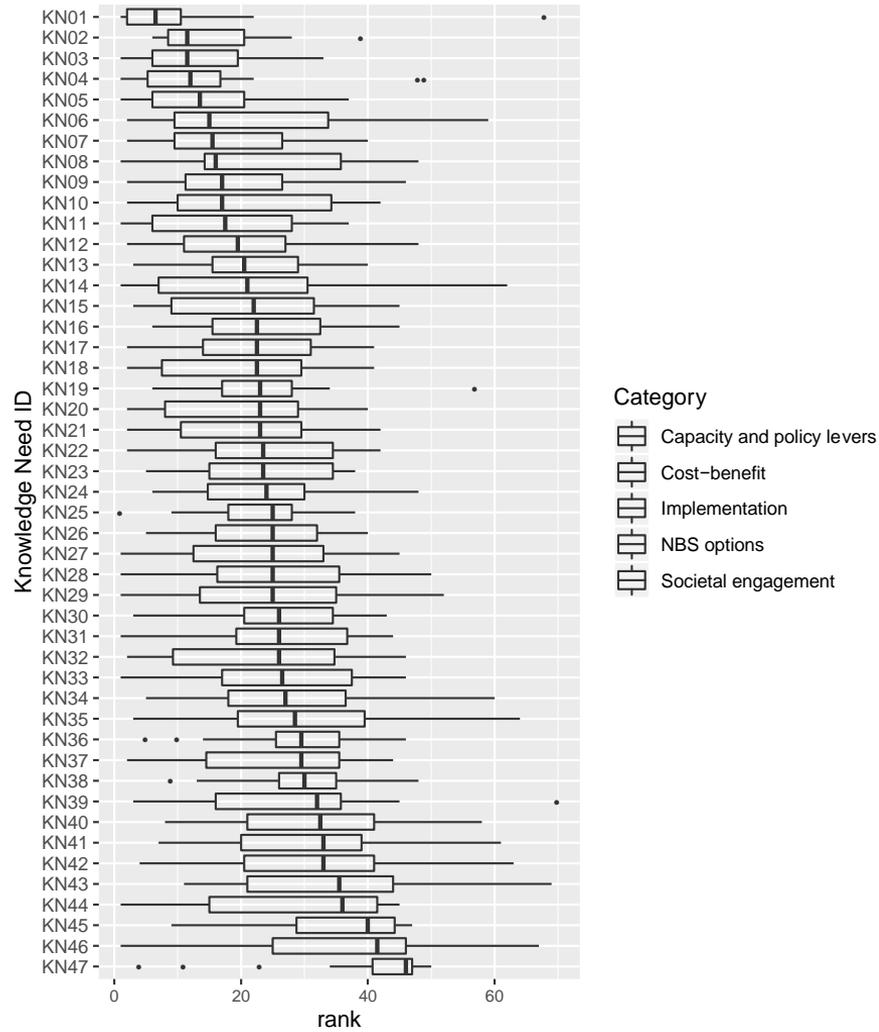
Sutherland, W.J., et al. 2018. A 2018 horizon scan of emerging issues for global conservation and biological diversity. Trends in ecology & evolution, 33(1), pp.47-58. DOI: <https://doi.org/10.1016/j.tree.2017.11.006>

Image source: Valebullo on Pixabay <https://pixabay.com/photos/prickly-pear-fruit-cactus-2415809/>

Priority needs identified via a modified Delphi process



Knowledge Need (KN)	Category	Median rank	Inter-quartile range	Next steps to address KN	
				Knowledge synthesis and research	Policy and business action
Need for a more precise definition: what exactly are NBS?	NBS options	6.5	2.00-10.75	✓	✗
Which NBS are adapted to dry Mediterranean conditions to minimise irrigation needs?	Implementation	11.5	8.00-19.00	✓	✗
How to increase the adoption and actual use of NBS in urban plans?	Capacity and policy levers	11.5	5.00-18.00	✓	✓
How can new or existing buildings and built-up areas be modified to accommodate green infrastructure?	NBS options	12	5.00-16.25	✓	✓
Cost-benefit analysis of urban green spaces - long term benefits to human health vs the opportunity cost of not building on land	Cost-benefit	13.5	6.00-19.00	✓	✗



- **Little group agreement on priority knowledge needs (Friedman and Wilcoxon Signed Rank tests) – varied perspectives**
- **Most needs require next steps of either knowledge synthesis or further primary research**
- **Need for evidence of effectiveness, such as CBA, and NBS for local context**



Friedman test

used to compare group means where the participants are the same but receive different treatments, and the dependent variables are ordinal. **One group** that is measured on **three or more different occasions**.

Non-parametric version of one-way ANOVA with repeated measurements. Does not say which groups are different, only that one is.

Wilcoxon signed-rank test

Compares two sets of scores that come from the same participants. Bonferroni correction for repeated measures. Nonparametric equivalent of the dependent/paired-sample t-test



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All stakeholder participants are co-authors.

Priority knowledge needs for implementing nature-based solutions in the Mediterranean islands

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Next steps will include:

- **Selected, collaborative in-depth knowledge synthesis, or primary research, depending on stakeholder consultation**
- **Pilot research projects with industry partners to allow monitoring of benefits, and increase public awareness, including focus group studies**
- **Collating examples of best practice through the Mediterranean**



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Which PKN would you prefer?

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Thanks for listening!