

Extrapolation Domain Analysis – A method to estimate potential global impacts of research projects

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The Quesungual Slash & Mulch System: Today Honduras; Tomorrow the World!

The Quesungual Slash and Mulch Agroforestry System (QSMAS) is a smallholder production system which uses a basket of technologies to manage water, soil and nutrients in drought-prone hillsides in the subhumid tropics. The system now works well for roughly 7000 farmers in Honduras. Researchers need to know who else could benefit.

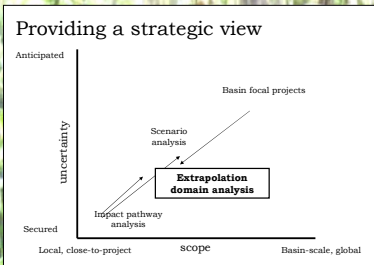
Adoption is a slow process. We wanted to accelerate adoption by finding other places in the world that appear suitable for Quesungual. To do this we used Extrapolation Domain Analysis (EDA)



Quesungual plot in preparation, Lempira - Honduras. (Photo PNIS Team)



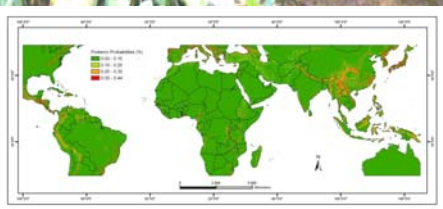
Quesungual plots in Lempira, Honduras. (photo PNIS Team)



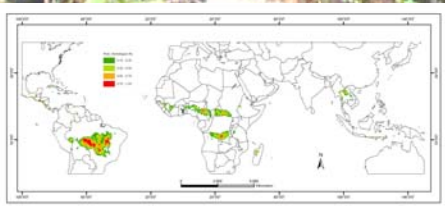
As figure above shows, EDA is part of a broader impact process: EDA fills the gap between analysis of supply and demand for research. Impact pathways define how research projects supply research solutions, and provide concrete links but over a localized domain. Analysis at basin and global scale from Basin Focal projects show the demand for change, but are very uncertain about what changes can occur. EDA helps bridge the gap by showing how specific projects could spread globally. Also, it can show where they cannot.



Factors considered important for the project success are mapped globally and used in combination with climate similarity areas.



Probabilities of finding similar sites to the Quesungual pilot sites given the factors above.



Homologue areas of Quesungual pilot sites in Lempira - Honduras.

How to search globally for suitable areas

>EDA combines climate matching with site favorability analysis to find areas that are more or less suitable for Quesungual.

>Climate matching uses Homologue, developed here in CIAT to search for sites that have climates similar to source areas.

>Site favorability analysis uses Bayesian Weights of Evidence modeling to estimate the probability that a site has factors deemed by project participants to be favorable or unfavorable for Quesungual.

>EDA estimates the combined probability of suitability for each pixel of about 5 km², anywhere in the tropics. This is cross-referenced with maps of population to estimate how many people stand to gain from adoption, should it prove successful.

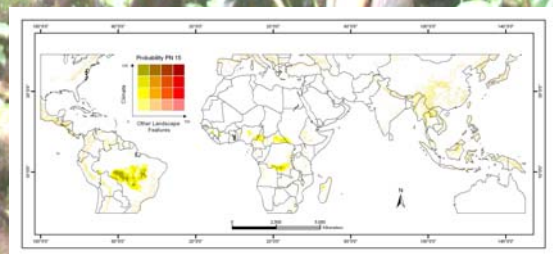
Results

As figures below show, the Quesungual looks promising in parts of Brasil, across Central America, S.E. Asia and Africa.

Areas that appear suitable are worth looking at in more detail to learn and work out what is needed to encourage adoption. Areas that appear unsuitable can be eliminated.

Discussion

The results allow us to extend insight over the whole of the tropics and subtropics far beyond the original project sites. The results express, in map form, where project specialists believe success is likely and, conversely, where it is not. This is done in a transparent way, so that the domain results can be reviewed and revised, if required. At the very least this is a valuable process to help understand the full potential of change deriving from research and the factors that are likely to promote or obstruct adoption. Spatial analysis is part of a process of looking for potential winners.



Extrapolation Domain areas of Quesungual.



References.

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