

CAN AQUACULTURE PREVENT DEFORESTATION IN THE PERUVIAN AMAZON

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Abstract:

This study examines whether aquaculture has the potential to reduce deforestation in the Peruvian Amazon. The natural resources of the Peruvian Amazon are subject to extreme pressures due to increases in subsistence farming, cattle ranching, and logging in the region. The resulting loss of biodiversity has affected the delicate soil balance that is characteristic of the Amazon, and has contributed to water pollution as well as erosion (Guerra et al. 2001). One of the highest rates of deforestation in the Amazon basin can be found at the foothills of the eastern Andes (Lepers et al. 2005), which includes the area in this study, located in the Condorcanqui region of the state Amazonas. In this part of the Amazon, deforestation is mainly caused by small-scale subsistence agriculture (Achard et al. 1998) such as that found in the communities in the study.

Fishing is an essential part of the socio-economic system that functions in the Peruvian Amazon. Fish meat is the most important source of animal protein in the Amazon, and the main generator of cash for indigenous people (McDaniel, 1997). However, freshwater Amazonian fisheries have been subject to extreme overexploitation in the past few decades (Rainforest Conservation Fund, 1999). Boats with technological equipment and large-scale capacities have threatened stocks in local rivers and oxbow lakes, which has affected the ability of small-scale, native fisherman to support themselves (Rainforest Conservation Fund, 1999).

The Research Institute of the Peruvian Amazon (IIAP) has assisted the development of fish farming in the Condorcanqui region as a way to augment diets and decrease the ecological impact of subsistence farming. Fish farming can also be seen as a way to substitute for the loss of traditional river fishing. IIAP has become the leading governmental organization in fisheries research and aquaculture in the Peruvian Amazon, and works to provide native-species fingerlings, and educational courses to native aquaculturists.

This study surveys the subsistence villages along road and river communities to determine the impact of fish farming on deforestation in the Condorcanqui region. This region is populated by small communities of indigenous Awajún and Wampí tribesmen, who practice subsistence agriculture. Data was collected from a sample of 184 families in ten different communities. Five of the villages were situated along the banks of the Nieva or Santiago river systems, while the other five were accessible by road, travelling southwest from the town of Santa Maria de Nieva. Data was collected with the assistance of IIAP, which provided a guide who had relations with all of the communities. All of the families in the sample practice subsistence agriculture, while 104 of the respondents supplement their agricultural crops with fish from aquaculture ponds integrated into their farmland. The participants answered a range of questions about the size of their farms, and the productivity of their land.

We use a variety of regression-based approaches to determine how incorporating aquaculture into subsistence farmlands affects deforestation after controlling for socioeconomic and farm characteristics. Our study suggests that an extra square meter of aquaculture reduces the area deforested for crops on approximately a one for one

basis. However, aquaculture should maintain its productivity for much longer than cropping, as it does not depend on soils whose fertility can be exhausted in a few years. Our simulations, based on our survey results, indicate that over time aquaculture should reduce deforestation significantly, especially in areas where poor soils provide only a few years of subsistence crops.

These should be regarded as interesting but preliminary results. Because we used a convenience-based sampling approach, our results could be affected by selection bias. In addition, we do not have enough information to test whether selection bias in the implementation of fish farming affect our results. Therefore, these results suggest that aquaculture could be useful in limiting deforestation, but additional work should use experimental methods or more in-depth surveys to measure the effect of aquaculture on deforestation.