



Reducing the Dangers of Using Hybrid Rice in Slope Agriculture

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ABSTRACT

The Yunnan Province Honghe Hani Rice Terraces, a UNESCO World Heritage Site and a national symbol of China, are in danger of collapsing in some places. This study makes an effort to explore the reasons why this is occurring and what may be done to stop it. The potential drawbacks of recently introduced seed and water management technologies, as well as their specific impact on rice terraces and the people who depend on them, have not been thoroughly addressed in prior research. Field observations were triangulated with in-depth interviews with locals and a review of the scientific literature in order to gain a deeper understanding of the problem. To accomplish this, I spent time in China working with a translator in a crucial village that is regarded as the first in the region to successfully carve rice terraces and implement the necessary irrigation system on a steep slope. The findings suggest that while migration and the new seed and technologies do conserve water and enhance lives, they may also be endangering the region's ability to sustain rice terracing in the long run. The authors came to the conclusion that a comprehensive strategy was required and proposed a tactical plan to support ecological, social, and economic longevity. Further investigation into the viability of these resilience-building strategies in other hybrid rice-terracing locations, such as the Philippines and Vietnam, was also demanded.

Keywords: Agroecology, Agroforestry, Slope agriculture, Landslides, Hybrid rice, Rice terraces

INTRODUCTION

Numerous aspects of this extraordinary eco system's dynamics have been described in various works of literature; nonetheless, the narrative is typically given from the perspective that it continues to exist in perfect equilibrium. My interest in what was initially an anthropological field study of Hani traditional rural water management was sparked by this. I learned that the system had undergone very recent alterations that seemed to be endangering it from this perspective. There was a need for an interdisciplinary investigation to comprehend the dynamics at work

MATERIALS AND METHODS

People

Hani is an oral language that varies greatly from mountain to mountain and cannot be written. Their history is mostly passed down through patrilineal genealogy, song, dance, and needlework. The material that has already been written about the Hani people and the origins of rice terraces is fragmented and does not adequately address the technical issues required to understand the ecological, hydrological, or agronomic elements at play.

Method

The in-depth discussions with village elders focused on the origins of the rice terraces and the history of the villagers. The next step was to undertake a field research with the help of local knowledge holders in order to determine why and how the system operated. Before proposing a solution, triangulation with scientific literature was utilized to investigate, confirm, or clarify the key issues made in the empirical data using figures, as is typical in development work where there is a lack of data. This was crucial for the interdisciplinary nature of the work, which employed data from the human sciences to identify a problem in the life sciences and multidisciplinary life sciences analysis to suggest a management solution.

Research Framework

These techniques led to the hypothesis that the new irrigation and rice technology may be to blame for the recent observed decline in spring productivity and paddock collapse among elderly. A direct functional comparison of the key aspects of rice farming for the old and new types was carried out after the life-science data gathered from the interviews and field study were

triangulated with the literature. Using the data points for the two types, a multi-dimensional comparative impact map was subsequently constructed. Then, a direct comparison of observable percolation rates between old and contemporary irrigation technologies was conducted. The ethnological survey was used to create a thorough before-and-after model of the hydro-ecological system. These provided a picture of the present and past cycles of mountain aquifer recharging. After that, each field's leading authorities verified the findings.

RESULTS

According to the findings, there is a direct link between new rice technology and a large rise in both life expectancy and quality of life. This was not unexpected. The rice had a number of negative environmental effects. Due to its hybrid status, it needs expensive insecticides that inbreeds do not. Insect resistance increases with time, and the plant needs more input to live. Most crucially, because it uses 50% less water, it's possible that not enough water is seeping back into the ground to keep some terraces from collapsing in combination with new water-saving technology. However, more investigation would be required to determine whether these same events take place in other terracing areas, such as the Philippines or Vietnam, where hybrid rice is also grown.

DISCUSSION

Effects on regional natural and human systems

The under layers of the paddy soil may not get wet enough, deeply enough to prevent crumbling into a paddy below if there is noticeably less water available on the surface. When a paddy collapses, it frequently affects the sources of subsistence for multiple families. Additionally, the local mountain aquifer's capacity to refill source springs is impacted by this decrease in surface water availability. Without the source springs, the community's water supply for drinking and domestic use disintegrates along with the complete natural irrigation system. In actuality, the renewal of this cycle is currently essential to both natural and human systems.

The way forward

Although it may not be possible to alter rainfall patterns or the present outward migration, we may increase environmental resilience by strengthening the soil. The villagers said their main concern for now was figuring out what causes the disease and pest catastrophes on the hybrid rice and how to prevent them in follow-up meetings with leaders in November 2019. We believe that all three problems can be resolved at once. Resilience can be rebuilt into the terraces on several fronts at once by expanding local agroforestry and intercropping ancient and new rice breeds together at key sites concurrently. Crumbling might be less common, and the increase in biodiversity density might help lessen the load of pests and diseases, which would lessen the need for chemicals and the pressure they put on the ecosystem. Together, these factors might increase the region's long-term viability of both rice terracing and subsistence farming.

Agroforestry expansion in key places

Increasing agroforestry could also aid in soil stabilization. In the flatlands, trees interspersed with ground crops have long been used to improve soil structure and moisture retention, while slope agriculture has received less attention. This may be for obvious reasons; yet conventional tree management can and does succeed in this. When the trees become too large, they can be chopped down for firewood or coppiced to replenish the materials needed to manufacture baskets, stools, and other high-value, alternate incomes. By serving as a retainer, their roots could also aid in preventing unneeded soil erosion if placed in appropriate locations like crucial points along key lines.

Affirming the resource status of local traditional ecological knowledge

Hani people are aware of how and where to divert side streams of water for percolation over steep hills in order to save the earth from collapsing. Additionally, they are aware of the importance of keeping a field wet to prevent it from collapsing, have the right tree species on hand, and are generally conscious of the benefits of biodiversity for increased ecological stability. Locals already plough liberation weed back into the ground for better soil structure and increase fertility using buffalo manure. Additionally, they are aware of when and how to control the water level in their antiquated irrigation system that is gravity fed. It seems that some locals have lost faith in their own understanding of regional ecological systems as a result of the introduction of so much change.

CONCLUSION

Using the information from the survey, the dangers of using hybrid rice in the area of the Honghe Hani Rice Terraces were examined in this research. In order to find out how the Hani people arrived at the mountain, how they initially carved the terraces, and how they constructed a self-sustaining irrigation system, village leaders were questioned as part of the field study. These statistics, when combined with the literature, demonstrate that the Hani people's quality of life and life expectancy were both greatly increased by the new hybrid rice. However, it also seemed to pose a major threat to the regional environment's normal hydrological cycle. To determine whether these concerns exist in other rice-terracing regions, including the Philippines or Vietnam, where hybrid rice is also grown, more research is required.

At key sites, we have suggested a number of cutting-edge agricultural management techniques that could support rice terracing in the area. The long-term viability of both hybrid rice terracing and slope agriculture for substance mountain farming could be enhanced by increasing biodiversity, agroforestry intensity, intercropping of various rice breeds, alternative cropping, and affirming local ecological knowledge as a resource. It was also announced that more effort was needed to track the effectiveness of these measures.