Cultivating resilience: Lessons from the

Coastal communities are particularly vulnerable to climate change. They are affected by changes in sea-level and wave height, as well as changes in weather patterns. Some families with home gardens were better able to recover from the tsunami in Sri Lanka than others. Such resilience often depended on how well the home gardens were protected by trees. However, strong community networks and related support, was also found to be very important for families recovering from this disaster.

Melissa Harvey and Sathis Wijewardane

The 2004 Indian Ocean tsunami severely impacted the coastal zones of Sri Lanka, causing considerable erosion, damage to infrastructure and salinisation of soil and water sources. It affected about 28 000 coastal home gardens. Gardens were flooded with salt water, and crops, trees, infrastructure and equipment were lost. In May 2005, discussions and visits to around 30 growers in Matara, Hambantota and Ampara districts, southern Sri Lanka, found some clear features of cultivation and income systems that affected resistance to the impact of the tsunami and their ability to recover (resilience). Most of the growers visited had gardens of half a hectare or less, which were within walking distance of their home. The gardens provided a significant source of food and/or income for the household, and the cultivated land had been affected by the tsunami. As well as features that affected the physical resilience of plots, economic, livelihood and social factors also had significant influence on home garden households' resilience.

Photo: Melissa Harvey

Production restarted soon after the tsunami in gardens like this one that had living fences.

Protection from trees

Before the tsunami hit, there was little evidence that the communities knew that trees would protect them. After the disaster, they clearly appreciated the positive effect of having trees there. Many households mentioned the protection provided by living fences as a mitigating factor to the tsunami's impact. Indeed, trees proved vital for resilience in home gardens affected by the tsunami. This can be highlighted by the difference in impact on two neighbouring plots. One was protected by a living fence, with tree and shrub crops growing in the garden. The neighbouring household, which was growing only a large crop of pumpkins and had little surrounding tree cover, was severely damaged, with all infrastructure and crops lost.

Trees grown as part of a home garden system not only offer protection, but are also a significant source of income. Coconut palms (*Cocos nucifera*) were one of the few crops to widely survive the tsunami impact. Coconut palms grow abundantly along the coast and are a key feature in many home plots. They are superbly adapted to coastal conditions, being salt and drought tolerant and with flexible trunks, which absorb the energy of wind and waves. Households that had lost other crops were still able to gain an income from coconuts.

During the discussions in 2005, there was mixed local knowledge about agro-ecological home gardens. Some people had misconceptions about approaches. For example, some people thought that having too many trees would compete with vegetable crops, whilst other groups had a good understanding of the benefits of ecological approaches. However, even some who did understand the benefits of such approaches didn't always use them, citing labour or financial reasons.

While it appeared that none of the growers had used resilience as a conscious factor when planning their gardens, those gardens where local knowledge and cultivation practices were used proved to have better resilience. Although traditional approaches such as crop combinations are still useful, there is definitely scope for introducing new practices that could improve the systems. For example, few growers practiced composting, or had a lot of knowledge about pest and disease control methods.

Livelihood diversification

Diversification of income generating activities and off-farm employment is widely recognised as an integral part of rural livelihoods. Indeed, it was found to be a very important feature in the growers' ability to recover after the tsunami. Many growers had off-farm employment as well as their home garden, such as office work or contracted farm labour. Others were engaged in non-land based agricultural activities, such as coir processing (coconut fibre), mushroom cultivation or seedling production. Householders with diversified sources of income continued to gain some earnings following the tsunami. Many jobs, such as office work, had not been severely affected. Non-land based, and non-seasonal agricultural activities, such as mushroom and seedling cultivation could be re-established quite easily, and were not so dependent on the season or land quality.

Community support is vital

The role of community groups and networks was crucial to a household's capacity to re-organise their activities following the tsunami. Many community groups had formed strong networks for support, joint activities and accessing resources, which helped them to resume cultivation even without external aid. After the tsunami, many communities worked together in formal and informal groups to make land rehabilitation and cultivation possible, for instance, clearing land, accessing inputs and applying for assistance. Of the communities visited that had re-formed their community-based organisations following the tsunami, they had all re-started, or had put considerable effort and motivation into re-starting cultivation and working out the challenges for themselves. This included applying for assistance as a group, replanting shared gardens, and having soil tests done collectively to find out if the land was ready for cultivation. They were aware that they had a greater capacity and better chance of being responded to as a group than as individuals. This emphasises the value of supporting communities and networks in development and rehabilitation, and the implementation of interventions that do not undermine the capacity and strength of community groups, institutions and networks.

Family and friendship networks also played a vital role in the rehabilitation of livelihoods for many households. Some growers replanted their crops on the strength of loans from family or friends and without any NGO or government aid towards rebuilding agriculture. Further, many households demonstrated remarkable personal motivation and innovation to resume cultivation without any external aid, for example planting trial plots to test for soil and crop suitability.

Psychosocial issues

Psychosocial issues can have a significant impact on households' resilience in relation to any livelihood, including agriculture. Such issues, including lack of motivation and depression, were a considerable constraint to some households' capacity to resume their livelihoods after the tsunami. Many people had lost family members and were in mourning. Many were also living in temporary accommodation and in a situation of great uncertainty. This posed practical constraints to starting cultivation again, such as lack of land, as well as psychological issues. Agricultural and other livelihood activities have a strong potential role in the improvement of psychosocial wellbeing, as well as income. Several examples were found where support and training for home gardens and coir processing was introduced with the primary aim of providing activities and community-building to lift people's spirits, with the improvement of livelihood options being only a secondary outcome. Longer term studies following the tsunami found that time was also a crucial factor in people's resilience, with many households reaching a stage that they could begin to rebuild their livelihoods a year or more after the impact.

The impact of development on resilience

The economic effects of long term development efforts had a considerable impact on the resilience of growers. Before the 1970s, agrochemicals were not widely used. Most growers produced their own seed for crops. Green Revolution approaches, including chemical pesticides and fertilizers and new crop varieties, were introduced in the 1970s, and have in many cases resulted in higher yields. However, several of the growers in Sri Lanka found that the profit is similar in both systems – the higher yield from using fertilizers and new varieties is offset by greater spending on inputs. In the lower income districts of Hambantota and Ampara, high spending on inputs caused considerable debt problems. Several households that had borrowed money to buy inputs at the start of the season, lost not only all their crops, but also the investment in inputs.

In the wealthier Matara district, the cost of labour, which had been pushed up by wages offered by the local garment industry, was identified as a major constraint to agricultural production. It was also a reason for using less labour intensive approaches (such as using fertilizer and pesticides) instead of more labour intensive approaches. This clearly highlights the complexity of agronomic systems and the links between resilience and the influence of different resources and markets.

Sharing insights

The results of the insights gathered have been disseminated to the University of Ruhuna, to NGOs working in Sri Lanka and to other groups working on disasters and resilience. It is hoped that the findings will contribute to an information booklet on gardening for resilience to climate change as part of Garden Organic's series of free booklets on organic agriculture in the tropics. (Garden Organic is the U.K.'s leading organic growing charity.)

In terms of what we can learn from this analysis about how to promote home gardens that are resilient to the impacts of climate change, five key points can be drawn:

- The impact of having trees along with other crops improves resilience by acting as a physical barrier to high speed waves or wind, but are also a more resilient crop in themselves, providing a reliable source of food and income.
- Diverse livelihood options can contribute to the resilience of home growers, by providing alternative income if crops fail. Opportunities could be enhanced through training.
- Strong cohesive communities are resilient in themselves, even in the absence of external aid. In order to build resilience, development and rehabilitation interventions should build on existing local institutions such as community groups, or local businesses.
- There is a limit to people's capacities to adapt and recover, which can be based on the level of psychological or material impact they have experienced during a disaster. It is thus crucial that adaptation or rehabilitation approaches can identify the level of capacity and provide appropriate support for basic needs, as well as longer term livelihood support.
- The impacts of development found in this study demonstrate the importance of considering the specific economic and social context when looking at resilience and adaptation to climate change.

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