Invasive species: the threat to smallholder livelihoods

Food security and poverty, especially among smallholder farmers, are two major challenges that have received global attention both in the Millennium Development Goals (MDGs) and the recently adopted Sustainable Development Goals (SDGs). The SDGs aim to achieve improved socio-economic, environmental, health and livelihood status globally by 2030 as stated in the SDG agenda. However, the introduction of Invasive Alien Species (IAS) - which negatively impact humans, animals and plants - may threaten the achievement of the SDGs if not addressed in a timely and holistic manner. Invasive species are plants, animals, insects and microbes that have been introduced to non-native regions; places that have not evolved biological enemies to control them. Invasive species affect food production and the environment by disrupting fresh water systems, taking over land, poisoning animals and threatening biodiversity.

Maasai boy stands in a field of Opuntia stricta, an invasive cactus species, Laikipia, Kenya

Invasive species impact agriculture and the environment, and cause a negative ripple effect on farmer livelihoods. The worst affected are often resource-poor smallholder farmers whose farming systems are less resilient and who rely on the natural ecosystem for their sustenance. For instance, in Myanmar, Thailand and Vietnam the golden apple snail and mimosa (a weed) are invasive species that adversely affect rice production, causing annual losses of about $74.8m. In East Africa, economic losses from major food security crops such as maize and cassava due to several invasive species are estimated at $979m annually with livestock losses above $500m. These losses also extend to the Americas, the Caribbean and Europe, and have negatively impacted food security, nutrition, farmers' incomes and livelihoods in these areas.

Farmer clearing the invasive weed, Parthenium, from his field in the town of Gilgil, Kenya

Farmers around the world have made efforts to address invasive species, but often without much success. Do Pham Ngo, a farmer in Vietnam affected by golden apple snail says: "*The snails have infested the paddy fields and are destroying the rice crop. I have noticed that we are harvesting fewer crops and the pesticides we use to try and control the snails are very expensive and damaging to my health.*" Another farmer in Kenya, Faith Wanyama, affected by the larger grain borer says: "*The pests are destroying both my crops in the field and what I have stored after harvesting. I have not enough to sell and barely enough to take home and feed my family.*"

How can we achieve sustainable development when this problem is estimated to cost the world more than $1.4 trillion (Pimentel et al, 2001)? First, we need to prevent the introduction of invasive species into unaffected regions by setting up robust biosecurity systems at national and regional levels. Second, we can put in place early warning systems for the detection of invasive species. This will facilitate eradication. Third, we must mitigate and control invasive species in areas that have already been affected by using Integrated Pest Management and biological control agents which are host specific and serve as natural enemies of invasive species.

Information is of key importance in preventing, controlling and eradicating invasive species, after all, a problem that is unknown or misunderstood cannot be solved. We need to share information, so that people know how invasive species are transferred across regions, and understand their negative effect on farmers' livelihoods, biodiversity, land and water. More importantly, tackling invasive species requires an interdisciplinary approach that brings together science, research, farmers, policy makers and development agencies. This will bring about a more holistic solution to the problem and promote sustainable development.