# Sierra Leone: Fighting fires with rice paddies

Farmers in Sierra Leone shifted from slash-and-burn cultivation to rice cultivation in inland swamps. That is reducing the number of forest fires, a GIS study has shown.

Farmers in Sierra Leone normally clear a patch of land in the forest, often using fire, so they can grow rice and other crops. They cultivate the land for several years until the soil fertility declines, then move to another area, which produces low yields and harms the environment. The IFAD-supported Smallholder Commercialization Programme helped farmer groups develop swamps in the valleys so they can grow irrigated rice, which produces higher yields. It also means they no longer have to set fires to grow enough food to feed their families.

The Smallholder Commercialization Programme geo-referenced the locations of the rice paddies. Merging these GIS data with another dataset from NASA's Fire Information for Resource Management System (FIRMS) shows that developing the rice paddies indeed reduced the number of fires.
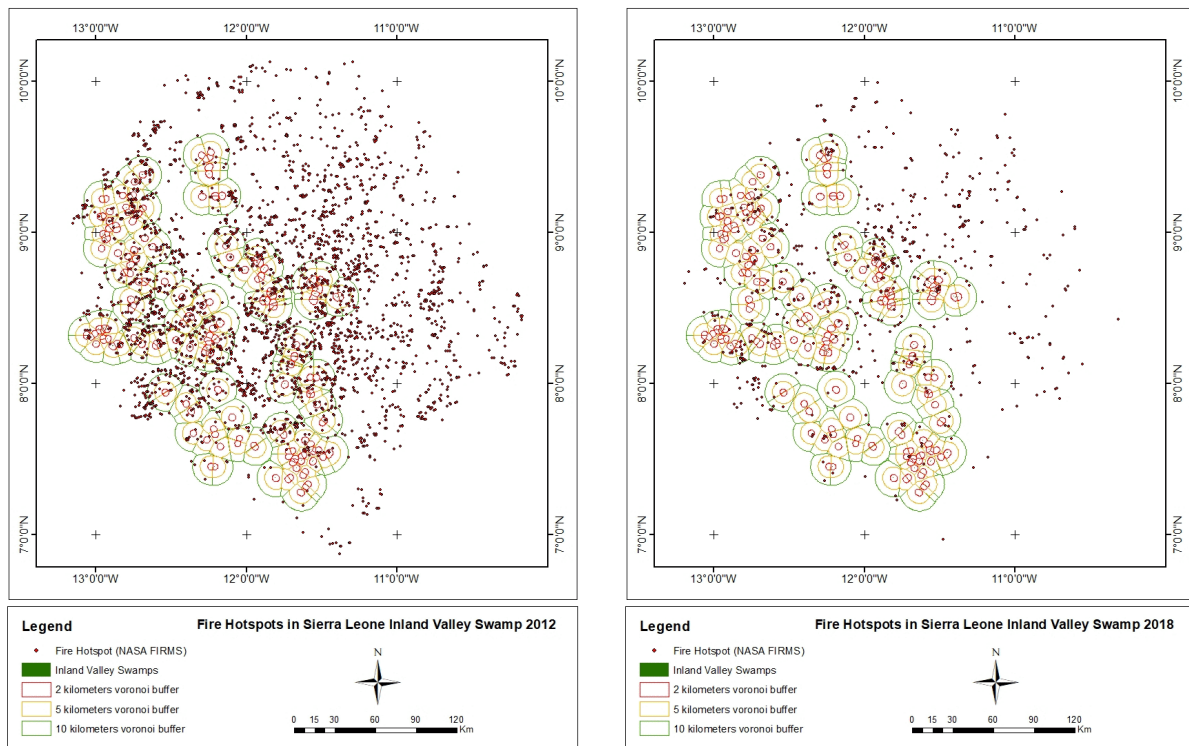

Images showing the decrease in annual fires around project areas between 2012 (left) and 2018 (right)

There were on average 2.8 fewer fires a year within 10 km of the rice paddies developed by the programme, equal to a reduction of over 60% during the duration of the project.

The NASA data recorded over 14,600 fire events between 2012 and 2018 in Sierra Leone, or an average of 2,086 fires a year.

Merging the datasets was possible because the Smallholder Commercialization Programme rigorously collected GPS coordinates on the swamp areas to plan, track and accurately report on field activities.

The programme mapped over 3,281 ha of swamps, of which 1,411 ha were developed. The IFAD GeoM&E team then compared those swamps developed by the project with the other swamps that remained undeveloped.
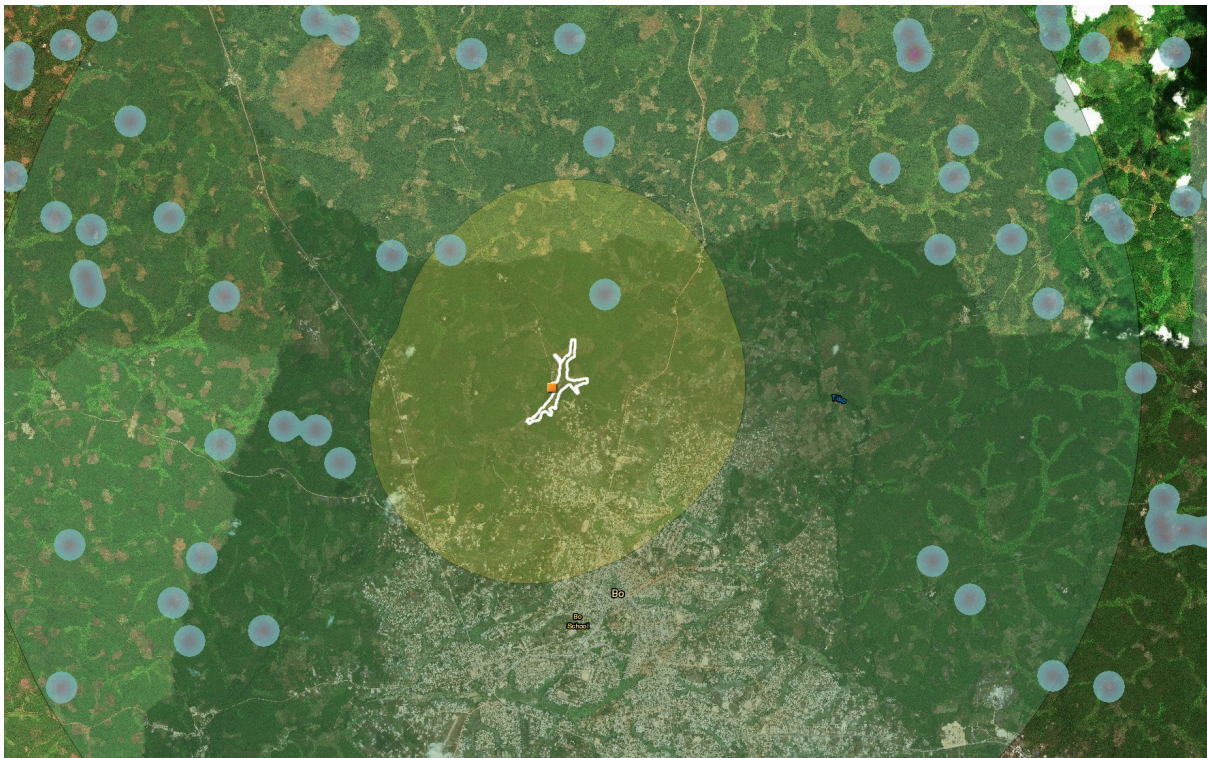
Location of fires (purple and blue dots) and a swamp developed by the Programme (white). There were only two fires within 10 kilometres of the swamp. Polygons © SCP, fires © NASA dataset, base map © contributors, HERE

GIS and econometric analysis showed that there were 2.8 fewer forest fires each year within 10 kilometers of the new paddies. There were 1.0 fewer fires within a 5 kilometre radius, 0.3 fewer within 2 kilometres (all at 0.001 statistical significance level). The robustness of results could be confirmed after controlling for confounding factors, including precipitation, temperature, slope and road infrastructure.

Farmers switched practices because they could harvest higher yields and earn more income from wetland rice cultivation. The programme supported 149 farmer groups to introduce simple but effective irrigation systems in the swamps. This allowed the groups to cultivate crops three times per year as opposed to just once.

The programme also promoted the cultivation of New Rice for Africa (NERICA) varieties that mature in three instead of eight months.

The programme did not anticipate that developing the swamps would lead to fewer fires. This is an unintended positive side-effect for the environment. These positive results for both farmers and the environment suggest the inland valley development

Rice paddy fields developed by the Smallholder Commercialization Programme, Sierra Leone. © IFAD / Oliver Mundy

model could be replicated elsewhere in Sierra Leone. Mapping the locations of interventions is a useful management tool for such projects - and allows new insights to be gained by comparing locations with external datasets.

Acknowledgements

Front page photo: staff collecting GPS coordinates of an IVS developed by the project. © Smallholder Commercialization Programme / Lucy Coker

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