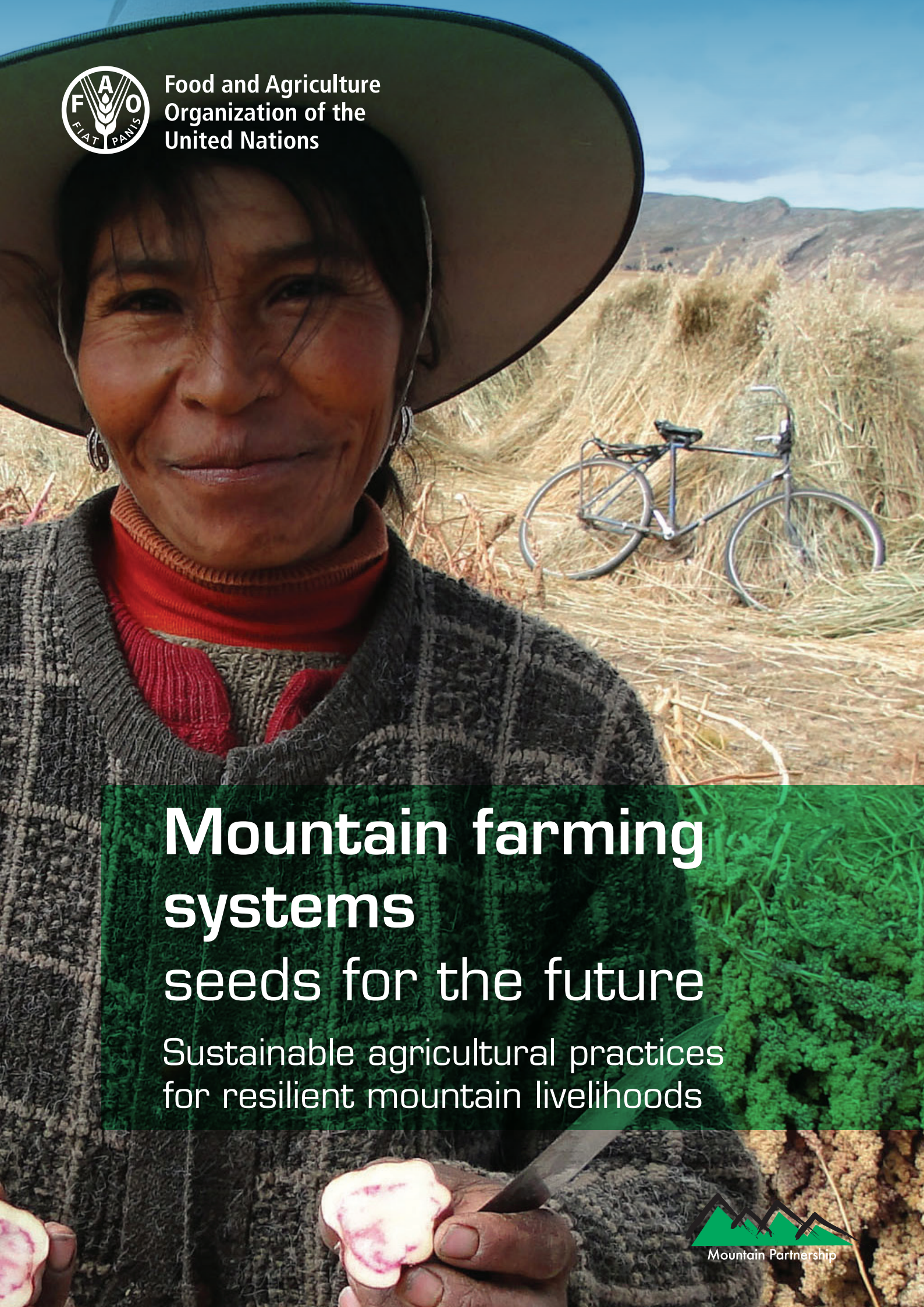

Food and Agriculture Organization of the United Nations

Mountain farming systems

seeds for the future

Sustainable agricultural practices for resilient mountain livelihoods

Mountain Partnership

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Resilient practices for large cardamom agroecology in Nepal

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Large black cardamom is an important cash crop for marginal farmers in the Eastern Himalayas. It is ecologically native, involves little workload and is not dependent on high external inputs. However, climate change and lack of product profiling have increased risks for farmers. This intervention focused on developing a package of practices (POP) to reduce risks and build resilience.

Large black cardamom (*Amomum subulatum Roxb.*), native to the Eastern Himalayas, is widely grown as a cash crop in Bhutan, Nepal, and the northeastern states of the Indian Himalayas. It is a high-value, low-volume crop that grows well on marginal lands and favours agroforestry systems suited to mountain environments. The product is a boon for farmers and a primary export commodity in the region, with national and local governments prioritizing its production and promotion. In recent years, the area under large cardamom has increased exponentially due to high returns and increased market demand. However, substantial fluctuations in both yields and market prices have led farmers to explore more sustainable modes of production and trade. These swings are due to two broad challenges:

- **Climate change**: Extreme climate events, erratic rainfall, increasing pests and disease, hailstorms and snowfall have impacted traditional management practices and the crop cycle. For example, flowering and harvesting times have changed due to rising temperatures and a decline in pollinators, resulting in reduced fruit setting.

Water storage for irrigation of large cardamom crop during dry season
©Nakul Chettri

Improved dryer for improving quality of pods and reducing use of fuelwood
©Nakul Chettri)

- **International competition and volatile market:** Several plants in the genera *Amomum*, *Elettaria* and *Aframomum*, all belonging to the Zingiberaceae family, are referred to as cardamom, though they have different local names and their taste, aroma and chemical compounds vary greatly. Cardamom is often described as green, white, black or red based on the appearance of the dried fruit, and indexed to fruit size/form such as small, large and round. The green or small cardamom (*Elettaria cardamomum*) is cultivated in Guatemala, India, Sri Lanka and other tropical countries; large black cardamom (*Amomum subulatum Roxb*.) is a particular species of cardamom grown only in Bhutan, India and Nepal. Though overall demand for cardamom has increased over the years, the expansion of cardamom plantation area in other countries has led to increased competition and a drop in international market prices. Large black cardamom from the Eastern Himalayas has to compete in price with green, white and large cardamom, as it is not differently positioned in the international market. However, most data on international trade in cardamom, market actors and use are generic. At the same time, the increased dependency on large cardamom poses higher risks to farmers due to production fluctuation and volatile markets. For example, in 2014, large cardamom capsules in Nepal fetched USD 28 per kg, and dropped to USD 10 per kg in 2017.

To address these challenges and improve the livelihoods of communities involved in large cardamom agroforestry, the International Centre for Integrated Mountain Development (ICIMOD), together with partners, co-developed a package of practices and demonstrated it in Taplejung district, Nepal. The POP is based on series of field studies, observations, interactions and literature review, and integrates climate-smart practices and innovations developed in different pockets of the Kangchenjunga landscape. It focuses on (i) diversification of income sources by integrating honeybees, legumes and fruit trees on large cardamom farms; (ii) understanding ecosystem services and ecosystem management, with community-led microplans and collective actions; (iii) strengthening market

linkages and enterprise development; and (iv) demonstrating climate-resilient farming practices, such as effective and efficient use of water, renewable energy, crop management as per weather forecasts and climate services, green manures, vermicompost, replacement of old shade trees, and access to services and information on market prices and crop advisories.

Strong emphasis is placed on strengthening institutional linkages, community mobilization and capacity-building to ensure sustainability. In partnership with social enterprises, community members are being trained to make value-added products from cardamom pods, such as cardamom powder, cardamom biryani masala, and cardamom tea mix. Traditionally, the cardamom stems are discarded, but following training a number of entrepreneurs have begun using cardamom fibre to weave products such as tablemats. In addition, an SMS-based information service now connects farmers to market prices, weather forecasts and crop advisories.

Comparison of large cardamom production (kg)			
Categories	**Baseline 2015**	**End line 2018**	**Difference (Significant at 1%)**
Beneficiary households (n136)	100.57	153.64	53.06***
Non-beneficiary households (n115)	107.38	106.83	-0.54
Difference	-6,81	46.81**	DiD=53.60***

Figure 6: Comparison of large black cardamom production.[4] The production for non-beneficiary households remained stagnant between baseline and end line; however, production increased by 53 kg among beneficiary households and this increment is statistically significant at 1%.

Source: Case study authors' own elaboration, 2020.

The baseline and end line surveys, conducted in late 2015 and early 2018 respectively, showed high uptake of the POP by target communities, and a significant reduction in loss among target households compared with the non-target ones. There are opportunities for transboundary collaboration to promote large cardamom as a regional product through coordinated research, technology exchange for improved yields, building organized markets and infrastructure, and developing compatible regional policies. The next step will be to position large cardamom as a niche product with coherent regional standards, by informing market actors about its unique attributes. Bhutan, India and Nepal have prioritized large black cardamom as a valuable foreign exchange-earning export commodity. Nepal has listed it in its National Trade Integration Strategy (2010–2015 and 2016–2020). Bhutan has included large cardamom as an important product under its "One Gewog One Product" policy, and the Government of Sikkim has placed great emphasis on promoting this crop to support rural livelihoods. Regional stakeholders are now planning to position large cardamom as a product with unique attributes through collective action and a common marketing approach, backing this up with a Geographical Indication certificate.

One way to respond to climate change is more income for large cardamom farmers so they have more options; this farm is a fantastic example of that.

David Molden
former Director General of ICIMOD

[4] DiD stands for Difference in differences, which is calculated using the formula: (C-D)-(A-B); where C is end line figure of beneficiary households, D is end line figure of non-beneficiary households; A is baseline figure of beneficiary households and B is baseline figure of non-beneficiary households. The asterisks denote significance level, set before data collection: *** Significant at 1% and ** 5%. The significance level is the probability of rejecting the null hypothesis when it is true. For example, a significance level with *** indicates a 1% risk of concluding that a difference exists when there is no actual difference.