

Organic rapeseed –mustard cultivation towards attending localized self-reliance in edible oil production for the Lepchas at Dzongu, North Sikkim

Sikkim, the Himalayan state of north east India is yet to attain self-sufficiency in organic oilseed production that necessitates the localized growing needs for increasing domestic oilseed output, in order to achieve organic edible oil security. Rapeseed and mustard occupy the largest share of rabi oilseed production in the Sikkim Himalaya region. Besides, an increased incidence of soil-borne pests, likely red ants and white grubs, became the major problem for continuous organic cultivation of cruciferous vegetables (cabbage, cauliflower, broccoli etc.) and potatoes during the non-rainy winter months in Sikkim. Crop rotation with alternative cultivation of rapeseed –mustard often reduced the extent of crop damage from soil born insects significantly in the previously infected farmers' fields.

Since 2023, ICAR NEH Sikkim Center conducted frontline demonstrations on rapeseed – mustard cultivation viz. NRCHB 101 (late sown Indian mustard; 105-110 days) and NRCYS-05-02 (high oil containing Yellow Sarson; 110-115 days) variety in pilot mode with the line Departments, as an alternative crop option to replace the popular pattern of subsistent cruciferous winter vegetable cultivation under TSP. Earlier, subsistent vegetable mustard (local) cultivation was popular with limited water availability for the tribal Lepcha households of Dzongu. A gravity-based irrigation system was established through HDPE pipe lining to ensure water availability for each tribal household. Total 15 tribal Lepcha villages of Dzongu, North Sikkim was adapted viz. Lingdong, Barfok, Hee Gyathang, Bringbong, Noom, Panam, Lingthem, Gor, Taryong, Gnon, Sangdong, Shagyong, Sangtok, Lingdem, Ruklu-kayem, and Laven, benefiting 234 households. The organic seed yield of rapeseed –mustard varieties ranged between 1.03- 1.71 t ha⁻¹ and 1.01- 1.52 t ha⁻¹ for NRCHB 101 and NRCYS-05-02, respectively. The overall high profitability was ensured for the adapted tribal farmers, as the benefit-cost ratio was reported between 1.79 to 2.37 (Table 1).

Prior to TSP programme implementation, sparse cultivation of local mustard (toria) by the Lepcha farmers of Dzongu often encountered momentous hardship to avail suitable oil extraction facility in their nearby settlements on regular basis. They use to travel Singtam (~ 50 km away) to extract the mustard oil from their limited organic oilseed produce (mostly, rapeseed mustard). On this backdrop, six oil expeller machines were installed for community basis usage at Kussong, Lingthem, Lingdem, Lingdong, Gor, Shagyong and Sangtok, in order to facilitate community adaptation of post-harvest processing of rapeseed-mustard (oil extraction) by the tribal dwellers on custom hiring basis under TSP programme. The present initiative not only boosted localized crop productivity of rapeseed –mustard; but also enabled the Lepcha farmers to attend localized self-sufficiency domestic mustard oil usage and reduced the dependency of external supply of mustard oil. Moreover, excess seasonal produce from cluster cultivation was packed after vacuum filtration (at Lingdong village, lower Dzongu) and marketed with local branding to the nearby Mangan Market. The residual mustard oilcake was used by the farmers as alternative livestock feed. Thus, organic mustard cultivation became an alternative crop rotation option for existing market supply of subsistent organic cruciferous winter vegetables, which were often severely damaged by the soil born pests viz. white grub, red ant etc.; thus becoming the voice of localized self-reliance of Lepchas in the TSP-adapted villages of Dzongu. Our targeted interventions also facilitated area expansion as a cash crop and also secured the household usage of organic rapeseed mustard oil by other farming communities in the nearby villages of Mangan District towards attaining their better livelihood from subsistent hill agriculture.







Table 1: Farmer specific production economics of mustard cultivation at Dzongu, North Sikkim

Sl. no.	Farmer name	Village	Grain yield (t ha ⁻¹)	Cost of cultivation (₹ ha ⁻¹)	Net return (₹ ha ⁻¹)	Benefit Cost Ratio
1.	Mr. Chopel Lepcha	Panam	1.58	19200	45580	2.37
2.	Mr. Sonam Targen Lepcha	Sangtok	1.23	18100	32330	1.79
3.	Mr. Rinku Lepcha	Bringbong	1.71	19800	50310	2.54
4.	Mrs. Nimthit Lepcha	Shagyong	1.53	20350	42380	2.08
5.	Mrs. Sezey Lepcha	Gor	1.40	19650	37750	1.92
6.	Mrs. Lhakit Lepcha	Lingthem	1.03	14500	27730	1.91

(Source: ICAR Research Complex for NEH Sikkim center - Tadong, Department of Agriculture/ Horticulture, Govt. of Sikkim)