Data Article

Dataset of non-timber forest products use and impacts of recent climate change in the Upper Madi Watershed, Nepal

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A B S T R A C T

This dataset presents data collected from household surveys from Upper Madi Watershed of Nepal describing the benefits of non-timber forest products (NTFPs) to people of mountain ecosystems, their perceptions of climate change, and perceived impacts of climate change on NTFPs ecosystem services. The data were collected from 278 households that were randomly selected from the four villages in the watershed during the period September to December 2019. The survey assessed socio-demographic information; collected and utilized NTFPs; perceptions of climate change, and; perceived impacts of climate change on NTFPs ecosystem services. These data are important in understanding the benefits of non-timber forest products in mountain ecosystems and the impacts of climate change as the benefits and impacts are currently not well understood. The data will be helpful in formulation and implementation of adaptation strategies to sustain the supply, protection, and management of NTFPs in mountain ecosystems.

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Specifications Table

| Subject                      | Ecosystem services          |
|------------------------------|-----------------------------|
| Specific subject area        | Non-timber forest products, Climate Change, Ecosystem Services, Mountain Ecosystems |
| Type of data                 | Primary data, Table         |
| How data were acquired       | Data were collected using a structured face to face household survey. The questionnaire is provided as a supplementary file |
| Data format                  | Raw Analysed               |
| Parameters for data collection | The data were collected from the Upper Madi Watershed of Nepal. 278 households were surveyed. |
| Description of data collection | Data were collected from household surveys using structured questionnaires in Upper Madi Watershed of Nepal. Participants were selected using random sampling. |
| Data source location         | Institution: Deakin University |
| Country: Australia           | City/Town/Region: Melbourne |
| Data accessibility           | With the article           |

Value of the Data

- These data are important for understanding the benefits of non-timber forest products to mountain communities and the impacts of recent climate change as the benefits and impacts of climate change are not well understood.
- The data can benefit different stakeholders such as policymakers, practitioners in formulation and implementation of adaptation strategies to sustain supply, protection, and management of NTFPs in mountain ecosystems.
- Researchers in the field of climate change impacts, non-timber forest products and mountain ecosystems can use these data to compare with similar studies in the mountains elsewhere or supporting systematic reviews in the future.

1. Data Description

The dataset provides information on data collected from 278 household surveys on the benefits of non-timber forest products, perceptions of climate change within mountain communities and impacts of climate change on non-timber forest product ecosystem services. The survey data include the following sections: a) socio-demographic information of respondents including age, gender, ethnicity, educational background and occupation b) utilization of non-timber forest products by mountain communities c) perceptions of climate change d) Perceived impacts of climate change on non-timber forest products ecosystem services. The questionnaire is provided as a supplementary file. Social-demographic characteristics are presented in Table 1.

The details of non-timber forest product use in the Upper Madi Watershed of Nepal, number of non-timber forest plant species, purpose of NTFPs collection, respondent perceptions of climate change, perceived impacts of climate change on non-timber forest products ecosystem services are described in Tables 2–8. Data are provided as a supplementary file.

2. Survey Design, Materials and Methods

This research was based on primary data collection through a household survey [1–4] during the period September to December 2019. In our survey the unit of analysis was the household and the household head or his/her representative was the respondent. A complete list of 909
Table 1
Socio-demographic characteristics of respondents (n=278).

| Characteristics                  | Category         | Frequency | Proportion (%) |
|----------------------------------|------------------|-----------|----------------|
| Gender                           | Male             | 174       | 62.6           |
|                                  | Female           | 104       | 37.4           |
| Age (Years)                      | 18–35            | 16        | 5.8            |
|                                  | 36–60            | 122       | 43.9           |
|                                  | >60              | 140       | 50.3           |
| Ethnicity                        | Gurung           | 219       | 78.8           |
|                                  | Dalit            | 54        | 19.4           |
|                                  | Others           | 5         | 1.8            |
| Respondents’ education           | No formal education | 171   | 61.5           |
|                                  | Primary          | 97        | 34.9           |
|                                  | Secondary        | 10        | 3.6            |
|                                  | Tertiary         | 0         | 0.0            |
| Respondents’ occupation          | Farmer           | 271       | 97.5           |
|                                  | Business         | 7         | 2.5            |
| Annual household income (NPR)    | No income        | 1         | 0.3            |
|                                  | <25,000          | 24        | 8.6            |
|                                  | 25,000-50,000    | 75        | 27.0           |
|                                  | 51,000-100,000   | 83        | 29.9           |
|                                  | >100,000         | 95        | 34.2           |

Table 2
Access of respondents to forest (n=278).

| Responses       | Proportion (%) |
|-----------------|----------------|
| Does your family have access to forest? |                |
| Yes             | 100            |
| No              | 0              |

Table 3
Respondents reporting the use of non-timber forest products among the mountain communities.

| Types of NTFPs collection | Frequency | Proportion (%) |
|---------------------------|-----------|----------------|
| Fodder                    | 211       | 76             |
| Fuelwood                  | 278       | 100            |
| Medicinal Plants          | 101       | 36             |
| Bamboo products           | 210       | 75             |
| Nettle products           | 167       | 60             |
| Wild Fruit                | 228       | 82             |
| Wild Vegetable            | 237       | 85             |
| Ornamental Plants         | 206       | 74             |
| Agricultural Tools        | 114       | 41             |
| Ritual Plants             | 32        | 12             |

Households from the four villages (Sikles, Parche, Khilang and Tangting) in the Upper Madi watershed was first collected from the election commission of Nepal. Sample size of 278 households was calculated out of 909 households by using the formula proposed by [5] to provide a statistically significant sample from the target population of the study area [6,7]. Our sample represents approximately 31% of the total households in the study area. The Statistical Package for the Social Sciences (SPSS) was used to randomly select 278 households from the household list. We had contacted 278 householders and all of them had responded, most of the respondents were household heads and some were representatives of the households where the heads were absent. Face to face interviews were conducted with household heads (or their representatives) using a structured questionnaire containing both closed and open-ended questions [1]. To check for clarity and understanding of the survey questions, 10 households were pre-tested.
| Sp. No | Local/Common Name       | English Name                  | Scientific Name                      |
|--------|-------------------------|-------------------------------|--------------------------------------|
| 1      | Badahar                 | Monkey Jack                   | Artocarpus lakoocha                  |
| 2      | Chhomu/Ghude            | Himalayan Small Bamboo        | Thamnocalamus aristatus             |
| 3      | Kalahkulu/Tusaro        | Not available                 | Not available                        |
| 4      | Kamu/Tite               | Himalayan Small Bamboo        | Drepanostachyum falcatum             |
| 5      | Khorasan Chhi           | Not available                 | Not available                        |
| 6      | Malikai/Gophla          | Not available                 | Holboellia latifolia                 |
| 7      | Miphu Chhi/Liso         | Not available                 | Scurria parasitica                   |
| 8      | Ng-ra/ Dudhilo          | Not available                 | Ficus nerifolia                      |
| 9      | Ngisi/Phalat            | Blue Japanese Oak             | Quercus glauca                       |
| 10     | Nishi/Kharus            | Brown Oak of Himalaya         | Quercus semicarpifolia               |
| 11     | Nuri chi                | Not available                 | Not available                        |
| 12     | Odu Chhi/Gogan          | Not available                 | Saurauia napaulensis                 |
| 13     | Pleta Chhi/Chiple       | Not available                 | Pouzolzia sanguinea                  |
| 14     | Plowu/Malinge           | Himalayan Small Bamboo        | Himalayacalamus cupreus              |
| 15     | Prapri/Firfire Ghans    | Not available                 | Hydrangea robusta                    |
| 16     | Pudki/Pachpate          | Not available                 | Sausurea pennata                     |
| 17     | Purichhi/Chuletro       | Not available                 | Brassaiopsis hainla                  |
| 18     | RuRu                    | Not available                 | Not available                        |
| 19     | Tuhuru/Guyeli           | Oleaster                      | Elaeagnus latifolia                  |
| 20     | Tumu/Thotne             | Not available                 | Polygonum molle                      |

**Fodder**

| Sp. No | Local/Common Name       | English Name                  | Scientific Name                      |
|--------|-------------------------|-------------------------------|--------------------------------------|
| 1      | Changi/Loth Salla       | Himalayan Yew                 | Taxus wallichiana                    |
| 2      | Chhodi/Bilaune          | Not available                 | Maesa chisia                         |
| 3      | Chhomu/Ghude            | Himalayan Small Bamboo        | Thamnocalamus aristatus             |
| 4      | Chohsi/Jhyno            | Not available                 | Eurya acuminata                      |
| 5      | Chyarbu/Paiyu           | Himalayan Cherry              | Prunus cerasoides                    |
| 6      | Chyarsi/Angeri          | Lyonia                        | Lyonia ovalifolia                    |
| 7      | Ghiosi/Uttis            | Alder                         | Alnus nepalensis                     |
| 8      | Herah/Malalh            | Not available                 | Viburnum mullula                     |
| 9      | Newa Si/Ashare          | Not available                 | Viburnum nervosum                   |
| 10     | Ngisi/Phalat            | Blue Japanese Oak             | Quercus glauca                       |
| 11     | Palah/Aiselu            | Golden Evergreen Raspberry    | Rubus ellipticus                     |
| 12     | Phusre                  | Not available                 | Hydrangea heteromalla                |
| 13     | Plowu/Malinge           | Himalayan Small Bamboo        | Himalayacalamus cupreus              |
| 14     | Porital/Laligurans      | Rhododendron                  | Rhododendron arboreum                |
| 15     | Rakchan                 | Not available                 | Daphniphyllum himalense              |
| 16     | Syona/Champ             | Magnolia                      | Magnolia champaca                    |
| 17     | Tisya/Bhutro            | Nepal Barberry                | Berberis aristata                   |
| 18     | Tiuru/Bhakimlo          | Chinese Sumac                 | Rhus javanica                        |
| 19     | Tohsi/ Kali Kath        | Not available                 | Myrsine semiserrata                  |
| 20     | Tuhuru/Guyeli           | Oleaster                      | Elaeagnus latifolia                  |

**Fuelwood**

| Sp. No | Local/Common Name       | English Name                  | Scientific Name                      |
|--------|-------------------------|-------------------------------|--------------------------------------|
| 1      | Banmara                 | Crofton Weed                  | Ageratina adenophora                 |
| 2      | Changi/Loth Salla       | Himalayan Yew                 | Taxus wallichiana                    |
| 3      | Cheuri/Titepati         | Mug Hart                      | Artemisia dubia                      |
| 4      | Chhyodomai /Bojho       | Sweet Flag Calamus Root       | Acorus calamus                       |
| 5      | Ghodtapre               | Water Pennywort               | Centella asiatica                   |
| 6      | Ghurbasan/Pakhanbed     | Hairy Bergenia                | Bergenia ciliata                     |
| 7      | Gura                    | Heart-leaved Moonseed         | Tinospora cordifolia                 |
| 8      | Hardjorne               | Orchid                        | Dendrobium amoenum                   |
| 9      | Hey Nhu/ Ban Lasun      | Wild Garlic                   | Allium wallichii                     |
| 10     | Heytanda/Lekbadmali     | Not available                 | Polygonum                            |
| 11     | Kafal                   | Box Myrtle Bayberry           | Myrica esculenta                     |
| 12     | Kudki                   | Not available                 | Neopicrorhiza scrophulariflora       |
| 13     | Kudu/Silitmur           | Pepper                        | Lindera neesiana                     |
| 14     | Megai/Bikh              | Not available                 | Aconitum faxos                       |
| 15     | Nihol Polhu/Allo        | Himalayan Nettle              | Girardinia diversifolia             |
| 16     | Nirmashi                | Not available                 | Aconitum gammiei                     |
| 17     | Okhar                   | Walnut                        | Juglans regia                        |

**Medicinal**

(continued on next page)
| Sp. No | Local/Common Name | English Name         | Scientific Name     |
|--------|-------------------|----------------------|---------------------|
| 18     | Olmi/Halhalu      | Yellow Doek          | Rumex nepalensis    |
| 19     | Palah/Aiselu      | Golden Evergreen Raspberry | Rubus ellipticus |
| 20     | Panch Amle        | Orchid               | Dactylorhiza hatagirea |
| 21     | Pipla             | Wild Pepper          | Piper mullesu       |
| 22     | Poritah/Laligurans| Rhododendron         | Rhododendron arboreum |
| 23     | Pruma/Timur       | Nepal Pepper         | Zanthoxylum armatum  |
| 24     | Pudunchale/Padamchal| Himalayan Rhubarb  | Rheum australe      |
| 25     | Satwa/Satwua      | Not available        | Paris polyphylla    |
| 26     | Teedo/Chiraito    | Chiretta             | Swertia chirayita   |
| 27     | Thakailo          | Not available        | Cirsium veratum     |
| 28     | Tisya/Bhutro      | Nepal Barberry       | Berberis aristata   |
| 29     | Turu/Bhakimlo     | Chinese Sumac        | Rhus javanica       |
| 30     | Yarsya Gumba      | Caterpillar Fungus   | Cordyceps sinensis  |

**Nettle**

| Sp. No | Local/Common Name | English Name         | Scientific Name     |
|--------|-------------------|----------------------|---------------------|
| 1      | L.J. Miller and S. Venn | Himalayan Nettle       | Girardinia diversifolia |

**Bamboo**

| Sp. No | Local/Common Name | English Name         | Scientific Name     |
|--------|-------------------|----------------------|---------------------|
| 1      | Chhomu/Ghude      | Himalayan Small Bamboo | Thamnocalamus aristas |
| 2      | Chigar            | Himalayan Small Bamboo | Borinda chigara     |
| 3      | Kamu/Tite         | Himalayan Small Bamboo | Drepanostachyum falcatum |
| 4      | Misur             | Himalayan Small Bamboo | Not available       |
| 5      | Pirma             | Himalayan Small Bamboo | Not available       |
| 6      | Plowu/Malinge     | Himalayan Small Bamboo | Himalayacalamus cupreus |
| 7      | Syul              | Himalayan Small Bamboo | Not available       |

**Wild fruit**

| Sp. No | Local/Common Name | English Name         | Scientific Name     |
|--------|-------------------|----------------------|---------------------|
| 1      | Chhyaudi          | Not available        | Not available       |
| 2      | Chutro            | Common Barberry      | Berberis asiatica  |
| 3      | Chyarbu/Paiyu     | Himalayan Cherry     | Prunus cerasoides   |
| 4      | Herah/Malah       | Not available        | Viburnum mulava     |
| 5      | Kabu              | Not available        | Not available       |
| 6      | Kafal             | Box Myrtle Bayberry  | Myrica esculenta    |
| 7      | Kasi/Katus        | Nepal Chestnut       | Castanopsis indica  |
| 8      | Makkaji/Gophla    | Not available        | Holboellia latifolia|
| 9      | Meh Palah/Kimbu   | Black Mulberry       | Morus nigra         |
| 10     | Miphu Chhi/Liso   | Not available        | Not available       |
| 11     | Mowa/Khanayo      | Nepal Fodder Fig     | Ficus semicordata   |
| 12     | Naliyo            | Not available        | Not available       |
| 13     | Noulukjuyu/Khiramlo| Not available      | Polygonatum verticillatum |
| 14     | Okhar             | Walnut               | Juglans regia       |
| 15     | Palah/Aiselu      | Golden Evergreen Raspberry | Rubus ellipticus |
| 16     | Puri              | Himalayan Bird Cherry | Prunus napaulensis |
| 17     | Sisi              | Not available        | Not available       |
| 18     | Tehwu             | Not available        | Not available       |
| 19     | Tisya/Bhutro      | Nepal Barberry       | Berberis aristata   |
| 20     | Toju/Golkakri     | Creeping Cucumber    | Solena heterophylla |
| 21     | Tuhuru/Guyeli     | Oleaster             | Elaeagnus latifolia |

**Wild vegetables**

| Sp. No | Local/Common Name | English Name         | Scientific Name     |
|--------|-------------------|----------------------|---------------------|
| 1      | Ban Temi/Ban Tarul| Potato Yam           | Dioscorea bulbifera |
| 2      | Chhomu/Ghude      | Himalayan Small Bamboo | Thamnocalamus aristas |
| 3      | Hey Nhu/ Ban Lasun| Wild Garlic          | Allium wallchii    |
| 4      | Jali Chya         | Mushroom             | Morchella conica   |
| 5      | Jibre Saag        | Adder’s Tongue       | Ophioglossum vulgatum |
| 6      | Kalunge Chya      | Mushroom             | Termitomyces eurhizas |
| 7      | Kanya Chya        | Mushroom             | Pleurotus napaulensis |
| 8      | Laule Tah/Dhaga Saag| Not available | Rheum            |
| 9      | Lotah/Niuro       | Edible Fern Shoot    | Dryopteris coelleta |
| 10     | Maye Tah/Makai Saag| Not available | Not available |
| 11     | Mirge Chya        | Mushroom             | Lentinula edodes |
| 12     | Nagroom Chya      | Mushroom             | Grifola frondosa  |
| 13     | Olmi/Halhalu      | Yellow Doek          | Rumex nepaulensis  |
| 14     | Pahi Tah          | Not available        | Not available      |

(continued on next page)
| Sp. No | Local/Common Name | English Name | Scientific Name |
|--------|-------------------|--------------|----------------|
| 15     | Plema/Chiple Chyau| Mushroom     | Suillus granulatus |
| 16     | Plowu/Malinge     | Himalayan Small Bamboo | Himalayacalamus cupreus |
| 17     | Puchutohru/ Kurilo| Wild Asparagus | Asparagus racemosus |
| 18     | Rato Chayu        | Mushroom      | Laetiporus sulphureus |
| 19     | Thankre Chyau     | Mushroom      | Clavaria cristata |

**Ornamental**

| Sp. No | Local/Common Name | English Name | Scientific Name |
|--------|-------------------|--------------|----------------|
| 1      | Ghurbasan/Pakhanbed| Hairy Bergenia | Bergenia ciliata |
| 2      | Mahu Tah          | Himalayan Primrose | Primula denticulata |
| 3      | Poritah/Laligurans| Rhododendron | Rhododendron arboreum |
| 4      | Sal Tah/Sungava   | Orchid        | Coelogyne cristata |
| 5      | Syona/Champ       | Magnolia      | Magnolia champaca |

**Agricultural tools**

| Sp. No | Local/Common Name | English Name | Scientific Name |
|--------|-------------------|--------------|----------------|
| 1      | Changi/Loth Salla | Himalayan Yew | Taxus wallichiana |
| 2      | Chyarbu/Paiyu     | Himalayan Cherry | Prunus cerasoides |
| 3      | Kyosi/Chilaune    | Needle Wood   | Schima wallichii |
| 4      | Newa Si/Ashare    | Not available | Viburnum nervosum |
| 5      | Ngsi/Phalat       | Blue Japanese Oak | Quercus glauca |
| 6      | Poritah/Laligurans| Rhododendron | Rhododendron arboreum |

**Ritual**

| Sp. No | Local/Common Name | English Name | Scientific Name |
|--------|-------------------|--------------|----------------|
| 1      | Ban Temi/Ban Tarul| Potato Yam   | Dioscorea bulbifera |
| 2      | Cheuri/Titepati  | Mug Watt     | Artemisia dubia |
| 3      | Chhomu/Ghude     | Himalayan Small Bamboo | Thamnocalamus aristatus |
| 4      | Chhyou Mhai/Nagbeli| Clubmoss | Lycopodium clavatum |
| 5      | Chhyu Tah        | Not available | Not available |
| 6      | Chyarbu/Paiyu    | Himalayan Cherry | Prunus cerasoides |
| 7      | Herah/Malah      | Not available | Viburnum nullaha |
| 8      | Kamu/Tite        | Himalayan Small Bamboo | Drepanostachyum falcatum |
| 9      | Khel/Bhojpatra  | Himalayan Silver Birch | Betula utilis |
| 10     | Lerah            | Not available | Not available |
| 11     | Neri/Kukurdaino | Green Briers | Smilax aspera |
| 12     | Ng-ra/ Dudhilo   | Not available | Ficus nerifolia |
| 13     | Plowu/Malinge    | Himalayan Small Bamboo | Himalayacalamus cupreus |
| 14     | Pruma/Timur      | Nepal Pepper  | Zanthoxylum armatum |
| 15     | Puchutohru/ Kurilo| Wild Asparagus | Asparagus racemosus |
| 16     | RuRu             | Not available | Not available |
| 17     | Siuru/Dhupi      | Himalayan Pencil Cedar | Juniperus communis |
| 18     | Thundura Tah/Khaldi| Not available | Bistorta |
| 19     | Tili Tah         | Not available | Not available |
| 20     | Tiuru/Bhakimlo   | Chinese Sumac | Rhus javanica |
| 21     | Tu Nho/Dubo      | Bermuda Grass | Cynodon dactylon |

**Table 5**

Purpose of NTFPs collection (n = 278).

| Responses                   | Proportion (%) |
|-----------------------------|----------------|
| Purpose of NTFPs collection |                |
| Household use only          | 42.1           |
| Both for sale and household use | 57.9         |

**Table 6**

Extent to which respondents agree that climate change is occurring (n = 278).

| Agreement that climate change is occurring | Responses       | Proportion (%) |
|-------------------------------------------|-----------------|----------------|
| Extent of agreement on the statement “Climate change is happening in your area” |                |                |
| Strongly disagree                         | 0               |
| Disagree                                  | 0               |
| Not sure                                  | 13              |
| Agree                                     | 86              |
| Strongly agree                            | 1               |
Table 7
Perception of respondents (n = 278) on various indicators of climate change.

| Perception of change in climate indicators | Significantly Decreased (%) | Decreased (%) | No Change (%) | Increased (%) | Significantly Increased (%) |
|-------------------------------------------|-----------------------------|---------------|---------------|---------------|------------------------------|
| Maximum summer temperature                | 0                           | 0             | 14            | 86            | 0                            |
| Maximum winter temperature                | 0                           | 16            | 33            | 51            | 0                            |
| Minimum summer temperature                | 0                           | 0             | 23            | 77            | 0                            |
| Minimum winter temperature                | 0                           | 35            | 27            | 38            | 0                            |
| Summer rainfall amount                    | 0                           | 7.9           | 24.1          | 67.6          | 0.4                          |
| Winter rainfall amount                    | 0                           | 75.9          | 19.8          | 4.3           | 0                            |
| Summer drought                            | 0                           | 7.2           | 69.1          | 23.7          | 0                            |
| Winter drought                            | 0                           | 3.2           | 22.7          | 74.1          | 0                            |
| Snow fall                                 | 0.3                         | 95            | 4             | 0.7           | 0                            |
| Hailstorms                                | 0                           | 19.8          | 21.6          | 58.3          | 0.3                          |
| Strong wind                               | 0.4                         | 18            | 40.6          | 41            | 0                            |
| Landslides                                | 0                           | 17.6          | 35.6          | 46.5          | 0.3                          |
| Floods                                    | 0                           | 17.3          | 36            | 46.4          | 0.3                          |
| Forest fire                               | 0                           | 21            | 77            | 2             | 0                            |
| Pest and insects                          | 0                           | 0.4           | 2.5           | 96.4          | 0.7                          |
| Invasive plant species                    | 0                           | 0             | 0.4           | 91            | 8.6                          |

Table 8
Perceived impacts of climate change and extreme events on NTFPs.

| Impacts on fodder                          | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
|-------------------------------------------|-----------------------------|---------------|---------------|---------------|------------------------------|
| Forest fire                               | 0                           | 0             | 98            | 2             | 0                            |
| Drought                                   | 0                           | 0             | 93            | 7             | 0                            |
| Change in precipitation                   | 0                           | 0             | 92            | 8             | 0                            |
| Change in temp. pattern                   | 0                           | 0             | 92            | 8             | 0                            |
| Floods                                    | 0                           | 0             | 90            | 10            | 0                            |
| Landslides                                | 0                           | 0             | 81            | 19            | 0                            |
| Wind                                      | 0                           | 0             | 52            | 48            | 0                            |
| Pest and insects                          | 0                           | 0             | 41            | 59            | 0                            |
| Hailstorm                                 | 0                           | 0             | 31            | 69            | 0                            |
| Invasive plant sp.                        | 0                           | 0             | 20            | 78            | 2                            |
| Impacts on fuelwood                       |                            |               |               |               |                              |
| Forest fire                               | 0                           | 0             | 98            | 2             | 0                            |
| Drought                                   | 0                           | 0             | 97            | 3             | 0                            |
| Change in precipitation                   | 0                           | 0             | 95            | 5             | 0                            |
| Change in temp. pattern                   | 0                           | 0             | 94            | 6             | 0                            |
| Floods                                    | 0                           | 0             | 91            | 9             | 0                            |
| Landslides                                | 0                           | 0             | 83            | 17            | 0                            |
| Hailstorm                                 | 0                           | 0             | 61            | 39            | 0                            |
| Wind                                      | 0                           | 0             | 59            | 41            | 0                            |
| Invasive plant sp.                        | 0                           | 0             | 26            | 74            | 0                            |
| Pest and insects                          | 0                           | 0             | 7             | 93            | 0                            |
| Impacts on medicinal plants                |                            |               |               |               |                              |
| Forest fire                               | 0                           | 0             | 100           | 0             | 0                            |
| Landslides                                | 0                           | 0             | 99            | 1             | 0                            |
| Drought                                   | 0                           | 0             | 95            | 5             | 0                            |
| Invasive plant sp.                        | 0                           | 0             | 93            | 7             | 0                            |
| Floods                                    | 0                           | 0             | 91            | 9             | 0                            |
| Change in precipitation                   | 0                           | 0             | 78            | 22            | 0                            |
| Change in temp. pattern                   | 0                           | 0             | 74            | 26            | 0                            |
| Wind                                      | 0                           | 0             | 71            | 29            | 0                            |
| Pest and insects                          | 0                           | 0             | 65            | 35            | 0                            |
| Hailstorm                                 | 0                           | 0             | 49            | 51            | 0                            |

(continued on next page)
Table 8 (continued)

| Impacts on nettle products                     | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
|-----------------------------------------------|-----------------------------|---------------|---------------|---------------|-----------------------------|
| Forest fire                                   | 0                           | 100           | 0             | 0             | 0                           |
| Drought                                       | 0                           | 99            | 1             | 0             | 0                           |
| Floods                                        | 0                           | 87            | 13            | 0             | 0                           |
| Landslides                                    | 0                           | 78            | 22            | 0             | 0                           |
| Change in precipitation                       | 0                           | 77            | 23            | 0             | 0                           |
| Change in temp. pattern                       | 0                           | 76            | 24            | 0             | 0                           |
| Wind                                          | 0                           | 65            | 35            | 0             | 0                           |
| Pest and insects                              | 0                           | 53            | 47            | 0             | 0                           |
| Hailstorm                                     | 0                           | 50            | 50            | 0             | 0                           |
| Invasive plant sp.                            | 0                           | 28            | 72            | 0             | 0                           |

| Impacts on bamboo products                    | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
|-----------------------------------------------|-----------------------------|---------------|---------------|---------------|-----------------------------|
| Forest fire                                   | 0                           | 100           | 0             | 0             | 0                           |
| Floods                                        | 0                           | 99            | 1             | 0             | 0                           |
| Drought                                       | 0                           | 96            | 4             | 0             | 0                           |
| Landslides                                    | 0                           | 94            | 6             | 0             | 0                           |
| Change in precipitation                       | 0                           | 77            | 23            | 0             | 0                           |
| Invasive plant sp.                            | 0                           | 70            | 30            | 0             | 0                           |
| Change in temp. pattern                       | 0                           | 69            | 31            | 0             | 0                           |
| Hailstorm                                     | 0                           | 63            | 37            | 0             | 0                           |
| Wind                                          | 0                           | 57            | 43            | 0             | 0                           |
| Pest and insects                              | 0                           | 41            | 59            | 0             | 0                           |

| Impacts on agricultural tools                 | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
|-----------------------------------------------|-----------------------------|---------------|---------------|---------------|-----------------------------|
| Change in temp. pattern                       | 0                           | 100           | 0             | 0             | 0                           |
| Forest fire                                   | 0                           | 100           | 0             | 0             | 0                           |
| Floods                                        | 0                           | 99            | 1             | 0             | 0                           |
| Drought                                       | 0                           | 98            | 2             | 0             | 0                           |
| Landslides                                    | 0                           | 98            | 2             | 0             | 0                           |
| Change in precipitation                       | 0                           | 96            | 4             | 0             | 0                           |
| Invasive plant sp.                            | 0                           | 86            | 14            | 0             | 0                           |
| Hailstorm                                     | 0                           | 83            | 17            | 0             | 0                           |
| Pest and insects                              | 0                           | 79            | 21            | 0             | 0                           |
| Wind                                          | 0                           | 63            | 37            | 0             | 0                           |

| Impacts on wild fruit                         | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
|-----------------------------------------------|-----------------------------|---------------|---------------|---------------|-----------------------------|
| Forest fire                                   | 0                           | 100           | 0             | 0             | 0                           |
| Floods                                        | 0                           | 99            | 1             | 0             | 0                           |
| Drought                                       | 0                           | 98            | 2             | 0             | 0                           |
| Change in precipitation                       | 0                           | 97            | 3             | 0             | 0                           |
| Landslides                                    | 0                           | 96            | 4             | 0             | 0                           |
| Change in temp. pattern                       | 0                           | 96            | 4             | 0             | 0                           |
| Invasive plant sp.                            | 0                           | 82            | 18            | 0             | 0                           |
| Wind                                          | 0                           | 59            | 41            | 0             | 0                           |
| Pest and insects                              | 0                           | 50            | 50            | 0             | 0                           |
| Hailstorm                                     | 0                           | 42            | 58            | 0             | 0                           |

| Impacts on wild vegetables                    | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
|-----------------------------------------------|-----------------------------|---------------|---------------|---------------|-----------------------------|
| Forest fire                                   | 0                           | 100           | 0             | 0             | 0                           |
| Drought                                       | 0                           | 98            | 2             | 0             | 0                           |
| Change in temp. pattern                       | 0                           | 95            | 5             | 0             | 0                           |
| Change in precipitation                       | 0                           | 95            | 5             | 0             | 0                           |
| Floods                                        | 0                           | 93            | 7             | 0             | 0                           |
| Landslides                                    | 0                           | 86            | 14            | 0             | 0                           |
| Wind                                          | 0                           | 63            | 37            | 0             | 0                           |
| Pest and insects                              | 0                           | 57            | 43            | 0             | 0                           |
| Hailstorm                                     | 0                           | 42            | 58            | 0             | 0                           |
| Invasive plant sp.                            | 0                           | 12            | 88            | 0             | 0                           |

(continued on next page)
prior to survey implementation. 5-point Likert scales [1] were used to quantify the local perceptions of climate change and perceived impacts on NTFP ecosystem services. The quantitative data obtained from household surveys were analyzed using SPSS and Microsoft Excel to obtain descriptive statistics such as frequencies and percentages of responses. The Dictionary of Nepalese Plant Names [9] was used to identify the botanical and common English names of most plant species as local common names collected from household survey were in the Gurung language.

### Ethics Statement

Ethical approval was obtained from the faculty of Science Engineering and Built Environment Human Ethics Advisory Group, Deakin University (reference number STEC-31–2019-GURUNG). Respondents’ participation was completely agreed, voluntary, and anonymous.

### Authors’ contribution

Lila Jung Gurung: Conceptualization, methodology, data collection, and writing of the manuscript.

Kelly Miller, Susanna Venn, and Brett A Bryan: Conceptualization, methodology, review and editing the manuscript.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

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**Table 8 (continued)**

| Impacts on ornamental plants | Responses |
|-----------------------------|-----------|
|                             | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
| Forest fire                 | 0          | 0             | 100           | 0             | 0                          |
| Drought                     | 0          | 0             | 99            | 1             | 0                          |
| Floods                      | 0          | 0             | 99            | 1             | 0                          |
| Change in temp. pattern     | 0          | 0             | 98            | 2             | 0                          |
| Change in precipitation     | 0          | 0             | 97            | 3             | 0                          |
| Landslides                  | 0          | 0             | 97            | 3             | 0                          |
| Invasive plant sp.          | 0          | 0             | 92            | 8             | 0                          |
| Wind                        | 0          | 0             | 59            | 41            | 0                          |
| Pest and insects            | 0          | 0             | 48            | 52            | 0                          |
| Hailstorm                   | 0          | 0             | 44            | 56            | 0                          |

| Impacts on ritual plants    | Responses |
|-----------------------------|-----------|
|                             | Significantly Decreased (%) | Decreased (%) | No change (%) | Increased (%) | Significantly increased (%) |
| Forest fire                 | 0          | 0             | 100           | 0             | 0                          |
| Floods                      | 0          | 0             | 97            | 3             | 0                          |
| Drought                     | 0          | 0             | 97            | 3             | 0                          |
| Landslides                  | 0          | 0             | 94            | 6             | 0                          |
| Change in temp. pattern     | 0          | 0             | 90            | 10            | 0                          |
| Change in precipitation     | 0          | 0             | 90            | 10            | 0                          |
| Pest and insects            | 0          | 0             | 77            | 23            | 0                          |
| Invasive plant sp.          | 0          | 0             | 77            | 23            | 0                          |
| Wind                        | 0          | 0             | 52            | 48            | 0                          |
| Hailstorm                   | 0          | 0             | 42            | 58            | 0                          |
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Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.dib.2020.106404.

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