

## Supplemental material for

“Climate Vulnerability Assessment of Farming Systems in Himachal Pradesh, Indian Himalayas”, by Ranbir Singh Rana, Vaibhav Kalia, Sharda Singh, S. S. Randhawa, Ramesh Chauhan, Anup Katoch, Anupama Sandal, Rajesh Kumar Thakur, and S. K. Upadhyay, published in *Mountain Research and Development* 41(4), 2021. (See <https://bioone.org/toc/mred/41/4>)

**TABLE S1** Distribution of land cover classes for Kullu district.

<b>Class</b>	<b>Area (Sq. Km)</b>	<b>Percent</b>
Forest	2234.05	41
Agriculture	409.67	7
Grass/Shrub	1454.28	27
Rocks/Non-vegetation	850.85	15
Snow/Clouds	468.34	9
Glaciers	79.17	1
Water body	6.64	0.1
Total	5503.00	100

**TABLE S2** Climatic trends in Kullu district, Himachal Pradesh.

<b>Weather Parameters</b>	<b>Mean Sen's slope</b>	<b>p-value</b>	<b>Sen's slope</b>	<b>p-value</b>
<b>Kharif</b>				
<b>(June–September crop season)</b>				
Max. T	30.70	0.01	0.25	
Min. T	16.10	0.02	0.00	
Diurnal T	14.70	-0.02	0.04	
Rainfall	475.00	1.24	0.45	
Rainy days	10.59	0.03	0.13	
<b>Rabi</b>				
<b>(October–May crop season)</b>				
Max. T	20.00	0.02	1.11	
Min. T	4.70	0.02	0.00	
Diurnal T	15.90	0.005	0.68	
Rainfall	475.10	-1.00	0.51	
Rainy days	6.86	-0.07	0.01	

**TABLE S3** Farmers' perceptions of climate change in different blocks of Kullu district, Himachal Pradesh.

<b>(Percent response of farmers surveyed)</b>					
<b>Particulars</b>	<b>Kullu</b>	<b>Naggar</b>	<b>Banjar</b>	<b>Anni</b>	<b>Nirmand</b>
Increasing temp. during summer	93.9	86.2	91.3	94.7	90.9
Prolonged summer season	95.9	89.7	100.0	92.1	84.8
Short summer season	4.1	10.3	0.0	7.9	15.2
Delayed in the onset of rainy season	85.7	82.8	91.3	86.8	93.9
Uneven distribution of rainfall	87.8	86.2	87.0	89.5	93.9
Insufficient rainfall during rainy season	93.9	82.8	95.7	92.1	97.0
Delay in the outset of winter season	85.7	72.4	82.6	84.2	81.8
Very low temp. in winter season	87.8	75.9	78.3	84.2	75.8
Short winter period	95.9	82.8	95.7	94.7	93.9
Temp. above normal during winter	79.6	65.5	73.9	78.9	81.8
Reducing snowfall in winter	100.0	82.8	100.0	100.0	100.0
High humid weather	71.4	69.0	69.6	63.2	63.6
Increasing foggy days in winter	40.8	41.4	43.5	36.8	42.4
Increasing cloudy days in winter	40.8	41.4	43.5	36.8	42.4
Unpredictable rainfall	77.6	72.4	65.2	73.7	63.6
Threat of floods	79.6	69.0	47.8	52.6	57.6
High velocity winds	95.9	75.9	82.6	89.5	72.7
Mudslides	55.1	48.3	47.8	52.6	54.5
High intensity of rainfall	89.8	69.0	78.3	65.8	66.7

**TABLE S4** Farmers' perceptions of crop phenology in relation to climate change. (percentage of farmers agreeing).

<b>Sr. no</b>	<b>Particulars of change</b>	<b>Kullu</b>	<b>Nagggar</b>	<b>Banjar</b>	<b>Anni</b>	<b>Nirmand</b>
1	Experienced or realized change in climate and crop phenology	100.0	100.0	100.0	100.0	100.0
2	Advancement in natural flowering of fruits and crop flowering by 7–10 days time	95.9	62.1	87.0	73.7	69.7
3	Delay in natural flowering of fruits and crop flowering by 7–10 days time	18.4	31.0	17.4	26.3	33.3
4	Advancement in fruit setting by 7–10 days time	81.6	69.0	82.6	73.7	66.7
5	Delay in fruit setting period by 7–10 days time	18.4	31.0	17.4	26.3	33.3
6	Shifting to vegetable crops due to warming in climate	91.8	58.6	73.9	47.4	48.5
7	Increase in dry spell (6 to 8 month)	91.8	72.4	91.3	81.6	87.9
8	Decrease in dry spell	8.2	27.6	8.7	18.4	12.1