



## Research Article

# ASSESSMENT OF MAGNITUDE OF AGRICULTURAL ACCIDENTS IN KANGRA DISTRICT OF HIMACHAL PRADESH

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**Abstract:** Farm mechanization needs energy, suitable tools and implements along with operators for carrying out different agricultural operations. Agricultural workers constitute one of the important sources of farm power in India as well as in Himachal. Accidents are very common in various agricultural operations due to ignorance, lack of training, lack of knowledge about the operation and improper design of tools and implements. So, the present study was carried out to collect the information on agricultural accidents, severity of injuries and causes for accidents.

Data on farm power sources and agricultural machines available in the panchayats revealed that bullock rearing has decreased on account of their high cost of maintenance and limited requirements round the year and tillage is mainly done by power tillers on custom hiring for its convenience and easy portability. Majority of the studied victims (28.97%) were in the age group of more than 60 years followed by 23.87 percentage in age group of 41-50 years. The reported incidents with respect to accidents/injuries from machines total 78 cases out of which 29.49 per cent injuries were from power tiller and 24.30 per cent from sickle/saw/spade and 19.23 per cent from thresher respectively. Rest of the accidents/ injuries were from other sources. Abbreviated Injury Scale (AIS) of accidents highlighted that 42.06 per cent cases were serious but not life threatening, 28.97% were of moderate scale and 15.48% injuries were life threatening with probability of survival. 8.33% cases were critical with survival probability.

**Keywords:** *Agricultural accidents, Injuries, Himachal, Kangra District, Agricultural tools and equipment*

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## Introduction

Himachal Pradesh is a hilly state which provides favourable environment for raising almost all types of agricultural and horticultural crops. Agriculture contributes over 45% to the net state domestic product and is the main source of income and employment in Himachal. Over 93% of the population in Himachal depend directly upon agriculture which provides direct employment to 71% of its people. Agricultural mechanization is becoming popular among the state farmers. Agriculture/horticulture tool/equipment/machinery are being provided to the farmers under various schemes of the State Government.

Agricultural machinery in the country is estimated at about 150 million, which includes about 3 million tractors and other self-propelled equipment. In addition, there are more than 400 million hand tools such as spade, hand hoe, sickle, crowbar, axe etc., that are extensively used by agricultural workers [1]. Farm mechanization along with increased application of other agricultural inputs such as seeds, fertilizers, pesticides, insecticides etc. has enhanced the productivity and production on farms. It also needs energy, suitable tools and implements along with operators for carrying out different agricultural operations.

Human workers are the main forms of energy used in agriculture for various activities besides the use of electric power, mechanical power and other non-conventional energy sources. In India, agricultural workers constitute as one of the important sources of farm power. Besides, they also operate animal drawn equipment, tractors, power tillers, self-propelled and power operated machines [2]. Since the use of human power is extensive in cultivation of crops, the accidents occur due to highest point of various factors viz., strain, fatigue and lack of safety aspects in the traditional equipment, interference of the labourers during the use of long slashing equipment, misuse of equipment, steep slopes and landslides [3].

Use of agricultural tools and implements and other machines is always risky to human safety, if they are not used properly. Accidents are very common in various agricultural operations due to ignorance, lack of training, lack of knowledge about the operation and improper design of tools and implements [4].

Hand equipment like sickle and spade are routinely used on farms in low income countries. Operations like weeding, inter-culture, ridge formation, harvesting and irrigation channel making, are all done manually. Hand tools therefore, contribute to a large number of injuries. Spades and sickles were involved in 46 % of farm injuries in India [5].

Various agricultural related activities cause deaths, amputations and serious injuries every year. Local manufacturers are still in the "cut and weld" level of manufacturing technology. Low or substandard machines continue to be peddled in the market while some machines are not suitable to the farming conditions of the users.

There is a significant role of farm workers in country's agriculture and due attention needs to be given to their safety and occupational health issues so as to have higher productivity, less accidents, and minimum occupational health problems. To have a representative data on agricultural accidents, a survey was conducted in selected villages of four states viz. Madhya Pradesh, Tamil Nadu, Orissa and Punjab on accidents happened during the year 1995-99 [6]. The data collected indicated that the fatalities due to agricultural accidents were 21.2 per 100,000 workers per year. The major source of accidents were farm machines namely tractors, threshers, chaff cutters, cane crushers, sprayers and electric motors, and other sources namely snake bites, drowning in wells/ponds and lightning.

Practically all the accidents- at least their chances and severity can be controlled or minimized by adequate consideration and strategic applications of human factors. As sufficient data on agricultural accidents in Himachal Pradesh is not available, it was essential to collect the information on agricultural accidents, severity of injuries and causes for accidents so that necessary strategy can be developed to minimize the occurrence of such accidents.

# Assessment of Magnitude of Agricultural Accidents in Kangra District of Himachal Pradesh

Table-1 Basic information of selected panchayats

Block	Panchayat	Population	Male	Female	House-holds	Farming families	Major crops	Perennial/ Plantation crops
Kangra	Jamanabad	3740	1924	1816	891	880	vegetables, paddy, wheat,	litchi, mango
	Sadharpur	1849	960	889	433	430	vegetables, wheat, paddy,	litchi, mango
	Total	5589	2884	2705	1324	1310	-	-
Nagrota	Pathiar	2799	1406	1393	721	510	vegetables, paddy, wheat	litchi, mango
	Sunedh	2911	1461	1450	670	650	vegetables, paddy, wheat	litchi, mango
	Total	5710	2867	2843	1391	1160	-	-
Sullah	Bari	2063	1014	1049	560	530	paddy, wheat, maize	litchi, citrus, mango
	Dheera	1281	621	660	226	156	paddy, wheat, maize	litchi, citrus, mango
	Total	3344	1635	1709	786	686	-	-
Panchrukhi	Sagoor	2267	1110	531	531	457	paddy, wheat	litchi, citrus, mango
	Byara	1768	921	835	436	397	paddy, wheat	litchi, citrus, mango
	Total	4035	2031	1366	967	854	-	-
Bhawarna	Pahara	2579	1349	1230	574	402	paddy, wheat	litchi, mango
	Arla	2603	1297	1306	597	502	paddy, wheat, vegetables	litchi, mango
	Total	5182	2646	2536	1171	904	-	-
Bajjnath	Sunpur	500	237	254	75	70	paddy, wheat	litchi, mango
	Majehrna	3176	1562	1614	665	665	paddy, wheat	litchi, mango
	Total	3676	1799	1868	740	735	-	-
Grand Total		27536	13862	13027	6379	5649	-	-

Table-2 Farm power sources and agricultural machines available in the panchayats

Block	Panchayat	Tractor	Power tillers	Diesel engines	Electric motors/pump sets	Bullock pairs
Kangra	Jamanabad	7	20	5	5	400
	Sadharpur	4	8	2	24	2
	Total	11	28	7	29	402
Nagrota	Pathiar	3	7	3	30	15
	Sunedh	4	10	1	7	50
	Total	7	17	4	37	65
Sullah	Bari	4	9	2	84	15
	Dheera	3	11	1	0	4
	Total	7	20	3	84	19
Panchrukhi	Sagoor	3	14	0	150	5
	Byara	2	16	2	150	4
	Total	5	30	2	300	9
Bhawarna	Pahara	1	12	0	8	10
	Arla	5	46	0	25	9
	Total	6	58	0	33	19
Bajjnath	Sunpur	2	3	0	0	10
	Majehrna	8	3	0	2	3
	Total	10	6	0	2	13
Grand Total		46	159	16	485	527

Table-3 Animal/power-operated agriculture machinery

Blocks	Kangra			Nagrota			Sullah			Panchrukhi			Bhawarna			Bajjnath			Grand Total
Panchayat	Jamanabad	Sadharpur	Total	Pathiar	Sunedh	Total	Bari	Dheera	Total	Sagoor	Byara	Total	Pahara	Arla	Total	Sunpur	Majehrna	Total	
Mould board plough	-	-	-	-	2	4	-	4	4	-	2	2	1	5	6	-	6	6	22
Desi plough	400	-	400	3	24	27	5	17	22	-	-	-	70	9	79	-	3	3	531
Disc harrow /Blade harrow	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	3	3	7
Cultivators/Blade hoe	-	-	-	-	-	-	-	-	-	2	-	2	2	5	7	-	8	8	17
Wheat thresher	7	2	9	-	5	5	5	-	5	-	9	9	-	-	-	2	9	11	39
Paddy thresher	-	2	2	3	-	3	2	3	5	1	-	1	4	3	7	2	3	5	23
Winnowers	-	-	-	30	-	30	-	-	-	-	40	40	-	2	2	-	-	-	72
Chaff cutters	-	1	1	-	2	2	3	-	3	6	3	9	-	4	4	5	3	8	27
Sprayers	3	2	5	-	-	-	-	-	-	-	3	3	-	7	7	5	2	7	22

Table-4 Manually-operated tools and equipment

Blocks	Kangra			Nagrota			Sullah			Panchrukhi			Bhawarna			Bajjnath			Grand Total
Panchayat	Jamanabad	Sadharpur	Total	Pathiar	Sunedh	Total	Bari	Dheera	Total	Sagoor	Byara	Total	Pahara	Arla	Total	Sunpur	Majehrna	Total	
Winnowers	-	5	5	-	-	-	-	-	-	-	-	-	-	-	-	5	-	5	10
Chaff cutters	500	5	505	20	60	80	180	10	190	102	72	174	25	3	28	5	3	8	925
Sugarcane crushers	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	2
Sprayers	600	65	665	115	155	270	223	120	343	450	100	550	20	17	7	10	7	17	1852
Rice huller	-	-	-	-	-	-	-	1	1	-	-	-	-	4	4	-	-	-	5
Hand tools for Digging/spade/Kudali)	560	275	835	635	603	0	560	226	786	1500	521	2021	1426	1232	2658	275	1232	1507	
Weeding(Khurpi) Harvesting (Sickle/Scauter)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cutting/Axe/Cutter/Saw)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

## Materials and Methods

Questionnaire based survey method was used for collecting relevant data from the respondents. The proforma of agricultural accidents survey consisted of two parts. Part- I consisted of well structured, simply written set of questions on farm power sources and agricultural machines, tractor/animal-operated agricultural machinery, manually-operated tools and equipment and primary information about the victims in the selected panchayats. Part II consisted of personal detailed information of victims and injury sustained. The proforma was pretested to make it more functional for final study, modified and the information was collected thereafter. The survey was carried out in district Kangra, the largest district in terms of

percentage of residing population in Himachal Pradesh. Six developmental blocks viz. Sullah, Bhawarna, Bajjnath, Kangra, Nagrota and Panchrukhi were selected for conducting the survey. The respective Block Development Office was visited and two panchayats from each block having good number of availabilities of agriculture and horticulture machinery/implements were chosen for conducting the survey and collecting information on agricultural accident data. The selected panchayats were visited and their pradhans, panchayat secretaries and ward panchs were apprised of the study and its objectives. With their help, demographic information of the village was entered in Part-I of the proforma. Individual victims were contacted in person and their details were recorded Part-II [7].

Table-5 Personal information of victims

Blocks	Kangra			Nagrota			Sullah			Panchrukhi			Bhawarna			Bainnath			Grand Total
Panchayat	Jamanabad	Sacharpur	Total	Pathiar	Suneth	Total	Bari	Dheera	Total	Sagoor	Byara	Total	Pahara	Arla	Total	Sunpur	Majehma	Total	
Age																			
≤20	3	1	4(8.33)	2	2	4(8.33)	-	-	-	-	-	-	1	1	2(3.45)	1	-	1(2.86)	11(4.37)
21-30	2	3	5(10.42)	1	3	4(8.33)	-	-	-	3	1	4(8.16)	3	3	6(10.34)	4	-	4(11.43)	23(9.13)
31-40	9	4	13(27.08)	2	6	8(16.67)	2	2	4(28.57)	2	2	4(8.16)	2	6	8(13.79)	2	1	3(8.57)	40(15.87)
41-50	3	5	8(16.67)	8	5	13(27.08)	1	1	2(14.29)	7	8	15(30.61)	8	6	14(24.14)	2	4	6(17.14)	58(23.02)
51-60	5	3	8(16.67)	4	4	8(16.67)	2	1	3(21.43)	4	6	10(20.41)	9	4	13(22.41)	2	3	5(14.29)	47(18.65)
>60	8	2	10(20.83)	5	6	11(22.92)	2	3	5(35.71)	8	8	16(32.65)	9	6	15(25.86)	7	9	16(45.71)	73(28.97)
Gender																			
Male	14	11	25(52.08)	9	15	24(50.00)	4	5	9(64.29)	9	20	29(59.18)	19	18	37(63.79)	10	9	19(54.29)	143(56.75)
Female	16	7	23(47.92)	13	11	24(50.00)	3	2	5(35.71)	15	5	20(40.82)	13	8	21(36.21)	8	8	16(45.71)	109(43.25)
Marital Status																			
Married	20	18	38(79.17)	21	21	42(87.50)	6	7	13(92.86)	21	23	44(89.80)	29	23	52(89.66)	15	17	32(91.43)	221(87.70)
Unmarried	10	0	10(20.83)	1	5	6(12.50)	1	-	1(7.14)	3	2	5(10.20)	3	3	6(10.34)	3	-	3(8.57)	31(12.30)
Education																			
Illiterate	3	3	6(12.50)	5	2	7(14.58)	1	-	1(7.14)	5	5	10(20.41)	1	1	2(3.45)	3	1	4(11.43)	30(11.90)
Primary	6	4	10(20.83)	6	5	11(22.92)	1	1	2(14.29)	3	2	5(10.20)	9	9	18(31.03)	3	7	10(28.57)	56(22.22)
Matric	15	8	23(47.92)	5	10	15(31.25)	4	3	7(50.00)	14	14	28(57.14)	21	10	31(53.45)	9	7	16(45.71)	120(47.62)
Higher secondary	5	3	8(16.67)	6	8	14(29.17)	1	3	4(28.57)	2	3	5(10.20)	1	3	4(6.90)	2	2	4(11.43)	39(15.48)
Graduate	1	-	1(2.08)	-	1	1(2.08)	-	-	-	-	-	-	-	3	3(5.17)	1	-	1(2.86)	6(2.38)
Dependents																			
0	8	3	11(22.92)	10	5	15(31.25)	-	-	-	3	2	5(10.20)	1	6	7(12.07)	5	3	8(22.86)	46(18.25)
1-2	10	0	10(20.83)	6	14	20(41.67)	2	5	7(50.00)	11	4	15(30.61)	17	15	32(55.17)	9	9	18(51.43)	102(40.48)
3-4	9	5	14(29.17)	4	5	9(18.75)	3	1	4(28.57)	10	18	28(57.14)	13	4	17(31.21)	2	4	6(17.14)	78(30.95)
>4	3	10	13(27.08)	2	2	4(8.33)	2	1	3(21.43)	0	1	1(2.04)	1	1	2(3.45)	2	1	3(8.57)	26(10.32)
Work experience																			
<10	6	6	12(25.00)	5	8	13(27.08)	-	-	-	5	2	7(14.29)	4	9	13(22.41)	5	6	11(31.43)	56(22.22)
10-20	14	9	23(47.92)	14	11	25(52.08)	2	2	4(28.57)	9	9	18(36.73)	11	13	24(41.38)	11	7	18(51.43)	112(44.44)
>20	10	3	13(27.08)	3	7	10(20.83)	5	5	10(71.43)	10	14	24(48.98)	17	4	21(36.21)	2	4	6(17.14)	84(33.33)
Occupation																			
Farmer	7	4	11(22.92)	10	5	15(31.25)	7	7	14(100)	6	3	9(18.37)	12	11	23(39.66)	15	9	24(68.57)	96(38.10)
Farmer+side job	19	8	27(56.25)	9	15	24(50.00)	0	0	0	16	19	35(71.43)	17	9	26(44.83)	2	6	8(22.86)	120(47.62)
Labourer	4	6	10(20.83)	3	6	9(18.75)	0	0	0	2	3	5(10.20)	3	6	9(15.52)	1	2	3(8.57)	36(14.29)

Table-6 Information of accident/ injuries from machines operated by victims

Blocks	Kangra			Nagrota			Sullah			Panchrukhi			Bhawarna			Bainnath			Grand Total
Panchayat	Jamanabad	Sacharpur	Total	Pathiar	Suneth	Total	Bari	Dheera	Total	Sagoor	Byara	Total	Pahara	Arla	Total	Sunpur	Majehma	Total	
Thresher wheat	-	-	-	3	2	5(25.00)	-	-	-	-	1	1(8.33)	2	5	7(35.00)	2	-	2(15.38)	15(19.23)
Power Tiller	3	-	3(30.00)	-	5	5(25.00)	-	-	-	1	4	5(41.67)	6	-	6(30.00)	2	2	4(30.77)	23(29.49)
Tractor	-	-	-	1	1	1(5.00)	-	-	-	2	-	2(16.67)	-	1	1(5.00)	1	-	1(7.69)	5(6.41)
Plough	3	-	3(30.00)	1	2	3(15.00)	-	1	1(7.12)	-	1	1(8.33)	-	-	-	-	-	-	8(10.26)
Chaff cutter	3	-	3(30.00)	-	1	1(5.00)	1	1	2(14.29)	-	1	1(8.33)	1	-	1(5.00)	-	-	-	8(10.26)
Drat/Sickle/Saw/Spade	1	-	1(10.00)	3	2	5(25.00)	-	-	-	1	1	2(16.67)	3	2	5(25.00)	5	1	6(46.15)	19(24.36)

Table-7 Information of accident/ injury from other sources

Blocks	Kangra			Nagrota			Sullah			Panchrukhi			Bhawarna			Bainnath			Grand Total
Panchayat	Jamanabad	Sacharpur	Total	Pathiar	Suneth	Total	Bari	Dheera	Total	Sagoor	Byara	Total	Pahara	Arla	Total	Sunpur	Majehma	Total	
Snake bite	5	4	9(23.68)	5	6	11(39.29)	1	3	4(36.36)	4	4	8(21.62)	2	5	7(18.92)	2	2	4(19.05)	43(25.00)
Monkey bite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3(14.29)	3(1.74)
Bear attack	3	-	3(7.89)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3(1.74)
Beewasp attack	2	1	3(7.89)	-	-	-	-	-	-	3	1	4(10.81)	-	-	-	-	-	-	7(4.07)
Irrigation/bunds	1	2	3(7.89)	2	-	2(7.14)	-	-	-	-	-	-	1	2	3(8.11)	-	1	1(4.76)	9(5.23)
Fall from tree-pruning/harvesting/fodder	5	6	11(28.95)	3	3	6(21.43)	3	1	4(36.36)	1	5	6(16.22)	2	3	5(13.51)	5	2	7(33.33)	39(22.67)
Loading/unloading	1	-	1(2.63)	-	1	1(3.57)	-	-	-	1	2	3(8.11)	2	1	3(8.11)	-	-	-	8(4.65)
Cattle/stray animal hitting	2	2	4(10.53)	4	1	5(17.86)	-	1	1(9.09)	3	1	4(10.81)	2	-	2(5.41)	1	4	5(23.81)	21(12.21)
Thunderstorm/lightening	-	-	-	-	-	-	-	-	-	1	-	1(2.70)	2	-	2(5.41)	-	-	-	3(1.74)
Fall from field terrace/other farm source	2	2	4(10.53)	1	2	3(10.71)	2	-	2(18.18)	7	3	10(27.03)	7	5	12(32.43)	-	1	1(4.76)	32(18.60)

Table-8 Time of accident/ injury

Blocks	Kangra			Nagrota			Sullah			Panchrukhi			Bhawarna			Bainnath			Grand Total
Panchayat	Jamanabad	Sacharpur	Total	Pathiar	Suneth	Total	Bari	Dheera	Total	Sagoor	Byara	Total	Pahara	Arla	Total	Sunpur	Majehma	Total	
Early morning	7	3	10(20.83)	8	4	12(25.00)	2	3	5(35.71)	2	1	3(6.12)	10	7	17(29.31)	4	3	7(20.00)	54(21.43)
Morning	9	5	14(29.17)	5	8	13(27.08)	3	2	5(35.71)	4	5	9(18.37)	6	4	10(17.24)	9	7	16(45.71)	70(27.78)
Afternoon	6	4	10(20.83)	7	6	13(27.08)	1	-	1(7.14)	7	7	14(28.57)	8	7	15(25.86)	3	2	5(14.29)	60(23.81)
Evening	6	3	9(18.75)	2	7	9(18.75)	1	2	3(21.43)	10	9	19(38.78)	5	6	11(18.97)	2	4	6(17.14)	58(23.02)
Night	2	3	5(10.42)	-	1	1(2.08)	-	-	-	1	3	4(8.16)	3	2	5(8.62)	-	1	1(2.86)	10(3.97)

Table-9 Nature and magnitude of injuries sustained by victims

Blocks	Kangra			Nagrota			Sullah			Panchrukhi			Bhawarna			Bajnath			Grand Total	
Panchayat	Jamanabad	Sadharpur	Total	Pathiar	Suneth	Total	Bari	Dheera	Total	Sagoor	Byara	Total	Pahara	Arla	Total	Sunpur	Majehma	Total		
Major cut on skin	7	-	7(11.67)	3	6	9(16.98)	2	4	6(19.35)	4	6	10(21.28)	6	3	9(12.33)	4	5	9(20.93)	50(16.29)	
Minor cut on skin	2	-	2(3.33)	2	1	3(5.66)	1	2	3(9.68)	2	1	3(6.38)	1	3	4(5.48)	2	2	4(9.30)	19(6.19)	
Fracture	6	5	11(18.33)	3	8	11(20.75)	3	6	9(29.03)	7	10	17(36.17)	10	8	18(24.66)	6	6	12(27.91)	78(25.41)	
Death	3	2	5(8.33)	-	1	1(1.89)	2	-	2(6.45)	0	1	1(2.13)	3	3	6(8.22)	1	-	1(2.33)	16(5.21)	
Multiple injury	-	1	1(1.67)	1	-	1(1.89)	2	1	3(9.68)	2	0	2(4.26)	2	-	2(2.74)	2	1	3(8.57)	12(3.91)	
Electric shock	-	-	-	-	-	-	-	-	-	1	1	2(4.26)	2	2	4(5.48)	-	-	-	6(1.95)	
Arm/leg damage	2	5	7(11.67)	5	3	8(15.09)	1	2	3(9.68)	2	1	3(6.38)	3	5	8(10.96)	3	4	7(6.98)	36(11.73)	
Head injury	2	-	2(3.33)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2(0.65)	
Skin disease	1	-	1(1.67)	-	-	-	-	-	-	-	-	-	1	-	1(1.37)	-	-	-	2(0.65)	
Internal injury	2	6	8(13.33)	7	2	9(16.98)	3	1	4(12.90)	4	1	5(10.64)	-	-	-	2	2	4(9.30)	30(9.77)	
Eye injury/damage	-	-	-	1	-	1(1.89)	-	-	-	-	-	-	-	-	-	-	-	-	1(0.33)	
Spine/disc injury	1	-	1(1.67)	-	1	1(1.89)	1	-	1(3.23)	-	-	-	-	1	3	4(5.48)	2	1	3(6.98)	10(3.26)
Crushing of hand/finger	2	-	2(3.33)	2	3	5(9.43)	1	1	2(6.45)	2	2	4(8.51)	5	1	6(8.22)	1	-	1(2.33)	20(6.51)	
Poisoning	9	7	16(26.67)	4	5	9(16.98)	1	3	4(12.90)	5	4	9(19.15)	2	5	7(9.59)	-	5	5(11.63)	50(16.29)	
Burn injury	-	-	-	1	-	1(1.89)	-	-	-	-	-	-	2	2	3(4.11)	-	-	-	4(1.59)	
Hand	-	-	-	-	1	1(1.89)	-	-	-	-	-	-	-	-	-	-	-	-	1(0.33)	
Fingers	-	-	4(6.67)	-	1	1(1.89)	-	-	-	-	1	1(2.13)	6	1	7(9.59)	1	-	1(2.33)	14(4.56)	
Arm	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3(4.11)	-	-	-	3(0.98)	
Leg	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1(2.33)	2(0.65)	
Foot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Knee	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

# Assessment of Magnitude of Agricultural Accidents in Kangra District of Himachal Pradesh

Table-10 Abbreviated Injury Scale (AIS) of accidents

Blocks	Kangra			Nagrota			Sulah			Panchruhi			Bhawarna			Bainath			Grand Total
Panchayat	Jamanabad	Sadharpur	Total	Pathar	Sunehi	Total	Barf	Dheera	Total	Sagor	Byara	Total	Pahara	Alia	Total	Sunpur	Majhwa	Total	
Minor	1	-	1(2.08)	-	2	2(4.17)	-	-	-	3	5	8(16.33)	1	-	1(1.72)	1	2	3(8.57)	15(5.95)
Moderate	1	4	5(10.42)	6	8	14(29.17)	-	3	3(21.43)	12	7	19(38.78)	13	7	20(34.48)	2	10	12(28.97)	73(28.97)
Serious but not life threatening	13	5	18(37.50)	9	9	18(37.50)	3	3	6(42.86)	5	11	16(32.65)	16	16	32(55.17)	12	4	16(45.71)	106(42.06)
Life threatening, survival probable	13	6	19(39.58)	5	4	9(18.75)	1	1	2(14.29)	3	1	4(8.16)	1	3	4(6.90)	-	1	1(2.86)	39(15.48)
Critical, survival probable	2	3	5(10.42)	2	3	5(10.42)	2	-	2(14.29)	5	1	6(12.24)	1	-	1(1.72)	2	-	2(5.71)	21(8.33)
Currently Untreatable	-	-	-	-	-	-	1	-	1(7.14)	-	-	-	-	-	-	1	-	1(2.86)	2(0.79)

Table-11 Possible causes of accidents/injury

Blocks	Kangra			Nagrota			Sulah			Panchruhi			Bhawarna			Bainath			Grand Total
Panchayat	Jamanebad	Sadharpur	Total	Pathar	Suneh	Total	Bani	Dheera	Total	Sagor	Byara	Total	Pahara	Alia	Total	Sunpur	Moehma	Total	
Carelessness	8	12	20(20.41)	13	12	25(26.60)	6	5	11(13.58)	7	12	19(15.97)	25	25	51(29.82)	11	12	23(23.87)	149(23.28)
Lake of safety devices	16	2	18(18.37)	8	10	18(18.15)	5	6	11(13.58)	8	7	15(12.61)	12	13	25(14.62)	4	4	8(10.39)	95(14.84)
Tiredness/restlessness	2	-	2(2.04)	-	2	2(2.13)	-	-	-	-	3	3(2.52)	2	3	5(2.92)	-	1	1(1.13)	13(2.03)
Ignorance	23	8	31(31.63)	10	9	19(20.21)	7	7	14(17.28)	14	9	23(19.33)	10	15	25(14.62)	7	8	15(19.48)	127(19.84)
Lack of protective covers	11	-	11(11.22)	4	5	9(9.57)	1	-	1(1.23)	4	4	8(6.72)	5	7	12(7.02)	1	4	5(6.49)	46(7.19)
Over speed	1	-	1(1.02)	-	-	-	1	3	4(4.94)	-	2	2(1.68)	2	4	6(3.51)	2	-	2(2.60)	15(2.34)
Slippery ground	-	2	2(2.04)	5	1	6(6.38)	1	2	3(3.70)	6	5	11(9.24)	6	1	7(4.09)	1	-	1(1.13)	30(4.69)
Poor light	-	3	3(3.06)	5	-	5(5.32)	4	6	10(12.35)	1	2	3(2.52)	3	3	6(3.51)	6	1	7(9.09)	34(5.31)
Illness	-	-	-	-	-	-	-	-	-	-	2	2(1.68)	3	-	3(1.75)	-	-	-	5(0.78)
Sloppy terrace	-	2	2(2.04)	-	-	-	-	-	-	3	3	6(5.04)	3	4	7(4.09)	-	-	-	15(2.34)
Adjustment	1	1	2(2.04)	1	3	4(4.26)	-	1	1(1.23)	-	4	4(3.36)	2	2	4(2.34)	2	4	6(7.79)	21(3.28)
Drugs/liquor	-	-	-	-	-	-	-	-	-	-	2	2(1.68)	1	-	1(0.58)	-	-	-	3(0.47)
Overloading	-	-	-	-	-	-	-	-	-	-	3	3(2.52)	1	1	2(1.17)	-	-	-	5(0.78)
Loose garments/hair	1	-	1(1.02)	-	-	-	3	5	8(9.88)	-	2	2(1.68)	1	-	1(0.58)	-	-	-	11(1.30)
Lacks of Knowledge/experience	3	-	3(3.06)	1	2	3(3.19)	3	4	7(8.64)	-	3	3(2.52)	4	3	7(4.09)	3	1	4(5.19)	27(4.22)
High rainfall	-	-	-	-	-	-	-	1	1(1.23)	1	2	3(2.52)	1	-	1(0.58)	1	-	1(1.13)	6(0.94)
Machine defect	-	-	-	1	1	2(2.13)	1	3	4(4.94)	-	4	4(3.36)	2	1	3(1.75)	2	-	2(2.60)	15(2.34)
Fall from tree	-	2	2(2.04)	-	1	1(1.06)	4	2	6(7.41)	-	4	4(3.36)	3	-	3(1.75)	1	-	1(1.13)	17(2.66)
High wind velocity	-	-	-	-	-	-	-	-	-	-	2	2(1.68)	2	-	2(1.17)	-	-	-	4(0.63)

Table-12 Period of recovery and compensation received by victims

Blocks	Kangra			Nagrota			Sulah			Panchruhi			Bhawarna			Bainath			Grand Total
Panchayat	Jamanebad	Sadharpur	Total	Pathar	Suneh	Total	Bani	Dheera	Total	Sagor	Byara	Total	Pahara	Alia	Total	Sunpur	Moehma	Total	
Period of hospitalization																			
<1 week	21	9	30(62.50)	14	16	30(62.50)	6	7	13(92.86)	20	20	40(81.63)	23	18	41(70.69)	11	11	22(27.86)	21(69.84)
1-2week	1	5	6(12.50)	4	2	6(12.50)	-	-	-	2	1	3(6.12)	4	6	10(17.24)	1	4	5(6.25)	1(11.90)
>2week	8	4	12(25.00)	4	8	12(25.00)	1	0	1(7.14)	2	4	6(12.24)	5	2	7(12.07)	6	2	8(10.26)	8(18.25)
Absence of work																			
<15 days	5	4	9(18.75)	7	3	10(20.83)	1	2	3(21.43)	6	7	13(14.29)	7	3	10(17.24)	4	3	7(20.00)	46(8.25)
15-30 days	6	2	8(16.67)	5	5	10(20.83)	1	3	4(28.57)	6	2	8(16.33)	6	4	10(17.24)	2	2	4(11.43)	44(17.46)
31-60 days	4	3	7(14.58)	4	2	6(12.50)	1	1	2(14.29)	2	5	7(14.29)	1	7	8(13.79)	2	3	5(13.89)	35(13.89)
61-90 days	3	1	4(8.33)	2	1	3(6.25)	-	1	1(7.14)	1	1	2(4.08)	5	5	10(17.24)	-	4	4(11.43)	24(9.52)
91-120 days	2	2	4(8.33)	1	7	8(16.67)	-	-	-	3	4	7(14.29)	5	2	7(12.07)	-	-	-	26(10.32)
>120 days	10	6	16(33.33)	3	8	11(22.92)	4	-	4(28.57)	11	7	18(36.73)	8	5	13(22.41)	10	5	15(42.86)	77(30.56)
Expenditure																			
<10000	11	5	16(33.33)	5	10	15(31.25)	3	6	9(64.29)	18	19	37(75.51)	18	11	29(50.00)	10	8	18(51.43)	124(49.21)
10000-20000	9	4	13(27.08)	6	5	11(22.92)	2	-	2(14.29)	2	2	4(8.16)	6	5	11(18.97)	2	3	5(14.29)	46(18.25)
20000-30000	8	6	14(29.17)	5	7	12(25.00)	1	-	1(7.14)	-	-	-	3	3	6(10.34)	1	2	3(8.57)	36(14.29)
30000-40000	2	1	3(6.25)	8	1	9(18.75)	-	-	-	1	1	2(4.08)	2	2	4(6.90)	-	4	4(11.43)	22(8.73)
>40000	0	2	2(4.17)	2	3	5(10.42)	1	1	2(14.29)	1	3	4(8.16)	3	5	8(13.79)	4	-	4(11.43)	25(9.92)
Compensation																			
Nil	30	18	48(100)	22	26	48(100)	5	7	12(85.71)	24	25	49(100)	31	26	57(98.28)	18	17	35(100.00)	249(98.81)
10000-20000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
>20000	-	-	-	-	-	-	2	-	2(14.29)	-	-	-	1	-	1(1.72)	-	-	-	3(1.19)

Because of small and fragmented land holdings and undulating topography, power tiller was reported as best option by the respondents for its convenience and easy portability. Thus, the majority of respondents were using power tiller for the field preparation and sowing operations but rest of the farming operations were being done by the traditional tools and implements.

[Table-3] presents the data on power-operated agricultural machinery available in the selected panchayats of district Kangra. The farmers were having a total of 22 mould board plough, 39 wheat threshers, 23 paddy threshers, 27 chaff cutters, 22 sprayers and 72 winnowers that were power operated. For animal operated machinery, only desi plough was bullock driven and a total of 531 desi ploughs were available with the farmers but many were abandoned due to mechanized ploughing being done by power tiller.

Few numbers of farmers possessed power operated accessories like disc harrow (7), cultivators (17) and mould board plough (22). The level of possession of power operated farm machinery and equipment to perform the major farm operations in the studied panchayats was quite low. For manually-operated tools and equipment, 10 winnowers, 925 chaff cutters, 1852 sprayers, 5 rice huller were possessed by a substantial proportion of farmers. All households had availability of hand tools as non-farming families had small agriculture area/ kitchen garden.

Mechanisation of various farm operations is a crucial factor in the successful implementation of an intensive and diversified farming system based on intensive use of production and yield increasing technology and multiple cropping. Due to seasonal nature of agricultural operations, the farmers face difficulty in their timely and successful completion, especially during the peak labour-load periods, at the time of transplanting /sowing, picking /harvesting of the crop produce. To mitigate the problem of labour availability, some devices have also been introduced through state schemes for different agricultural operations. This would make it possible to introduce diversified and multiple cropping on farmers' farms. This switching over to mechanical power will not only help to perform the various farm operations in time but will also help the farmers to adopt more profitable crop rotations.

The data compiled for part-II of the questionnaire was related to information of victims of accidents and injuries associated with agricultural operations. Personal information of the victims studied in the three selected blocks of Kangra District have been compiled in [Table-5]. Majority of the victims (28.97%) were in the age

group of more than 60 years followed by 23.87 percentage in age group of 41-50 years. 56.75 per cent victims were male and 43.25 per cent were female. As far as education was concerned, 47.62 per cent of them studied upto matric level, 22.22 per cent had primary education, 11.90 per cent were illiterate, 15.48% studied upto higher secondary level and only 2.38 per cent were graduates. Regarding their experience in farming, 44.44 per cent had 10 to 20 years of experience and 33.33 and 22.22 per cent had more than 20 and less than 10 years of skill and know-how of agriculture farming respectively. 47.62 percentage of the victims were farm workers having side job along with farming while 38.01 per cent were farmers having agriculture as sole source of income for them and rest were work as labourer.

Injuries in farming range from cuts and scrapes to total disabilities and fatalities. The reported incidents with respect to accidents/injuries from machines total 78 cases out of which 29.49 per cent injuries were from power tiller and 24.30 per cent from drat/sickle/saw/spade and 19.23 per cent from wheat thresher respectively. Many farmers have either purchased the power tiller themselves or on subsidized rates from the agriculture department of the state. When asked, none have received the training for its safe operation and therefore had no technical knowledge regarding its working and maintenance. Moreover, when further enquired, some hired them for ploughing purposes. Rest of the accidents/injuries were from other sources. 25.00 per cent snake bite incidences were reported when doing agriculture and animal's work. 22.67 per cent cases were due to fall from trees while doing activities of pruning, harvesting or thinning fodder. 18.60% happenings were as a result of fall from field terrace/other farm source. Rest of them were reported cases of cattle/stray animal hitting, irrigations/bunds fall, loading/unloading of produce or manure, thunderstorm/lightening, animals bite such as bears and monkeys as well as from bee and wasp attack. There was no reported incidence as a result of heat stroke and crop drying.

[Table-8] reports the information regarding time of accident/ injury. Most of the accidents were in the morning i.e., 27.78 per cent and afternoon (23.81%) and evening time (23.02%) followed by early morning time (21.43%). Regarding the nature and magnitude of injuries sustained by victims, 30.95 % had fracture of body parts, 19.84 per cent had poisoning from snake bite and pesticides as well as had major cuts on their skin. 14.29 per cent had arm/ leg damage.

As majority of the cases were due to fall from tree and from field terraces so were the reported levels of magnitude. 9.77 % of the victims' population had internal injuries and 16.29% had major cuts on their skin and 5.21 per cent died on the spot while doing agricultural activities. The victims had sprayed the chemicals without any safety measures leading to skin and other problems. The farmers in the area are still not very aware of the adverse health effects of spraying insecticides/pesticides without any protective measures. The table also report the data regarding amputation of body parts. Compared to other parts, 14 cases (4.56%) had finger amputation which was mainly due to chaff cutter. 3 and 2 cases had arm and leg amputation due to falling from tree while cutting fodder. All the chaff cutters were of local make and some were too old and rusted as they were installed outside the animal shed/home.

Abbreviated Injury Scale (AIS) of accidents as figured in [Table-10] revealed that 42.06 per cent cases were serious but not life threatening, 28.97% were of moderate scale and 15.48% injuries were life threatening with probability of survival. 8.33% cases were critical with survival probability.

Possible cause of accidents/injury were because of carelessness (23.28%), ignorance (19.84%), lack of safety devices (14.84%) and lack of protective covers (7.19%). Rest of the respondents had injuries due to tiredness/restlessness, fall from sloppy terrace, slippery, adjustment of body while doing that job etc.

Regarding serious injuries, the victims were hospitalised for less than one week period (69.84%) followed by 11.90% for 1-2 weeks period while 18.25% cases of high magnitude injury has to stay for more than two weeks period. Due to the reported accidents and injuries, 18.25% victims could not do the farming for 2 weeks while 17.46 per cent also could not pursue field work up to one month and 30.56 per cent victims had more than 120 days of period of absence from work. Only 3 victims received compensation form SDM that too due to death of their kin.

### Conclusion

Much of the farm work in the state is done by hand tools like spades, sickles, hand hoes and others. However, to achieve the much-needed precision in farm operations to obtain optimum yields, and to save time and costly labour, greater mechanisation of agricultural chores is imperative. Under various schemes of the State Government agriculture/horticulture tool/equipment/machinery are being provided to the farmers. Many farmers are also buying small scale machinery like power tiller and power weeder on their own on group basis. The risk of getting injured is far greater if the equipment is badly designed or lacks appropriate safety features, which is mostly the case with local made farm machines and equipment. Due attention needs to be paid to the capabilities and limitations of agricultural equipment while designing and operating them to achieve higher productivity and enhanced safety and comfort of workers.

**Application of research:** Agricultural accidents are increasing day by day with increase of mechanization in agriculture and due to handling of machines by untrained personnel. Study of magnitude and type of agricultural accidents are essential to spell out the man machine variables involved in agricultural accidents and to suggest possible measures for accident minimization. The data base on accidents would help in having a clear picture of the situation and decide the priorities and the work plan for preventing/minimizing these accidents.

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