Households Losses in 2014 Floods and Coping Strategies: A Study of Chiniot, Punjab

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Motivation of Study

Motivation

- Global Warming is likely to intensify the rainfalls, storminess and distort the severity timing and predictability of weather patterns.
- As a result natural disasters, floods in Pakistan and Sri Lanka, severe snow storms in Northern Europe, flooding and land-sliding in Brazil ,and tsunami in Japan have been witnessed over the last year.
- The global distribution of flood disasters of 30 years shows Asia’s extreme vulnerability to flood disasters.
- Pakistan is highly vulnerable to the adverse effects of climate change, particularly those resulting from rising temperatures, increased variability of monsoon, melting of Himalayan glaciers, and an increase in the frequency and intensity of extreme weather events and natural disasters.

Motivation

- Environmental degradation has also given birth to natural calamities which are one of the main reasons for the less development of Pakistan.
- On other hand, Pakistan is also disadvantaged by its heavy dependence on a single river, the Indus, for surface water.
  - Therefore, highly vulnerable to the effects of basin degradation and water pollution.
  - Since its inception; faced 22 major floods, starting from 1950 to 2014.

Motivation

- Report reveals that torrential monsoon in 2010 rains has led to catastrophic flooding throughout parts of Pakistan;
  - killing at least 648 people
  - damaging or destroying 375,000 homes.
  - Economic losses in Punjab Province alone at PKR 200 billion
  - Floods have affected standing paddy crops on 300,000 acres, cotton on 320,000 acres, sugarcane on 70,000 acres, fodders on 30,000 acres, vegetables on 25,000 acres and other crops on 100,000 acres of land.
  - 15,000 cattle-heads have perished and 250 poultry farms have been destroyed.
  - Total damages in monetary terms, are Rs 240 billion

Literature Gap and Significance

- Given this background it is important analyze the coping strategies adopted by the household to mitigate the flood damages/losses.
- Literature suggests that coping strategies vary along with different regions and adoption of these strategies is contingent to socioeconomic factors.
- The literature revolves around these strategies: borrowings, assets disposals, local aids and migration, but there are some missing elements in the literature like government involvement in ameliorating the households' coping abilities, components of borrowings and assets disposals.
- On other side households depend upon borrowings and asset disposals but still the questions are unanswered for the case of Pakistan; what are the borrowing sources of the households and what type of assets are disposed.

Literature Gap and Significance

- The study will focuses on all the aforementioned points. We will also construct flood exposure index, which is not available so far, for this district which can become the basis of this type of index for national level to assess the severity of floods and damages in different areas of the country and government will be able to focus on these areas accordingly. This index will also be helpful tool for the government to design the targeted policy framework for mitigation of floods in these areas.
- The focus of this study is limited to one district “Chiniot” of Punjab, Pakistan.
- Essence of district Chiniot is its high agriculture yield, closeness to the bank of the river Chenab, proneness to floods and facing this issue several times, and severity of floods in this area.

Objectives of the Study

The specific objectives of the study are as follows:

- Construction of flood exposure index to assess the severity of floods
- Examination of losses of households owing to floods.
- Bring to light the coping strategies adopted by households after the floods for the revival and rehabilitation.
- To check out what are the underlying factors that influence the choice of coping strategies.

Review of Literature on Coping Strategies

Literature on Coping Strategies

- Jane Corbett (1988) finds distress migration towards relief camps as last measure of people after the failure of all other available strategies.
- Frankenberger's (1992) summarizes that firstly liquid assets are disposed and then productive assets. Finally, the household or individual is forced to migration.
- Rashid's (2000) findings reveal the coping strategies of urban poor of Bangladesh: social support, inability to pay back loans, and homelessness.
- Ninno et al. (2003) clarifies that households during the floods of 2002 have confronted the shock by reducing expenditures, selling assets and borrowing.
- Hansson et al. (2008) suggests major components for the formation and implementation of ex-post strategies: education, borrowing, insurance.
- Rayhan (2012) highlights that households borrow money and gradually move to assets disposal and savings after the floods.

Literature on Determinants of Coping Strategies

- Jane Corbett (1988) summarizes that income level of households an important determinant for adoption of particular strategy.
- Canon (1994) argues that coping mechanisms of people are dependent upon class, gender, race, age, education and income.
- Morrow (1999) suggests the followings determinants of coping strategies: woman-headed households, concentration of elders and children, poor community, ethnic minorities and households' size.
- Cutter et al. (2003) considers wealth, gender, race, rural or urban, employment loss, property, occupation and family structure as important determinants of coping mechanisms.
- Paul et al. (2009) reports that households' ability to cope varies depending on people's socioeconomic conditions, such as education, income and occupation.

Methodology and Data Construction

Sample Selection

- Primary data is collected by conducting a sample survey and using the questionnaire method.
- Survey is conducted just after the two months of floods, in December, 2014 and questionnaires are filled in response of face-to-face interviews to get highest response rates and to seek appropriate information.
- All the villages are supposed to suffer from floods and are chosen according to the criterion which is their distance from the river Chenab: first three villages (Monian da pump, Shah-dat ka thatha, Kacha) are on the bank of the river, next three (Mingini, Road e ki, Tahli) villages lie between 1-2 km away from the river, succeeding three villages (Ahmed Wala, Bahga, Kalri) are situated 2-3 km ahead and subsequent last three villages (Kunan wali, Purana bagha, Sahaban wali) are distanced more than 3 km's. From each village, twenty households have been selected via simple random sampling, making final sample size of 229 households.

Models for Estimation of Determinants of Coping Strategies

- **Logit Model**
- **Tobit Model**

- **Dependent Variables: Coping Strategies** (borrowing, saving, asset disposal, government cash grants)
- **Independent Variables: Shock Factors** (depth of water in homestead, number of days water stayed at home, number of days spent out of home, agricultural loss) ; **Demographic Factors** (household size, household head age, education of household head, gender of household head, occupation of household head) and **Flood Exposure Index**

Construction of Flood Exposure Index

- Severity of floods in Punjab at local levels is measured by height of flood water and duration of flood.
- This index is based on information of five measures given by households: depth of water in the homestead, depth of water in the home, ground table water rise, number of days water stayed in home and number of days stayed out of home.
- All five variables have been ranged (0-5 or 0-6) and these metrics are summoned to form a combined index ranging from 0-100.
- Based on combined index, we have created a category variable in which households are categorized as: (1) not exposed to floods, (2) moderately exposed to floods, (3) severely exposed to floods, and (4) very severely exposed to floods.

Construction of Flood Exposure Index

	Original Variable		Constructed Category Variable	
Variable	Range	Unit of Measure	Range	Categories
Depth of water in the homestead	0-15	Feet	0-6	0 to 5 : number of feet 6: 6 or above feet
Depth of water in the home	0-10	Feet	0-5	0 to 4 : number of feet 5: 5 or above feet
Ground table water rise	0-25	Feet	0-2	1: 1 to 12 feet 2: 13 to 25 feet
Number of days water stayed in home	0-30	Days	0-6	1: 1 to 5 days 2: 6 to 10 days 3: 11 to 15 days 4: 16 to 20 days 5: 21 to 25 days 6: 26 to 30 days
Number of days stayed out of home	0-60	Days	0-6	0: None 1: > 0 ≤ 1 week 2: > 1 ≤ 2 weeks 3: > 2 weeks ≤ 3 weeks 4: > 3 weeks ≤ 4 weeks 5: > 4 weeks ≤ 5 weeks 6: > 5 weeks 0r above
Index Range			0 to 25 or (0*100)/25 to (25*100)/25 or 0 to 100	
Flood Exposed Categories			0 1 to 34 35 to 67 68 to 100	**Not Exposed** **Moderate** **Severe** **Very Severe**

Villages Exposedness

	Flood Exposure		
Village	Moderate (% of HH's)	Severe (% of HH's)	Very Severe (% of HH's)
Ahmed wala	5	95	___
Bagha	11	89	___
Kacha	10	65	25
Kalri	10	75	15
Kunan wali	15	70	15
Mingini	___	100	___
Monian da pump	___	65	35
Purana bagha	53	47	___
Road-e-ki	10	85	5
Sahaban wali	25	75	___
Shah-hadat ka thatha	___	47	53
Tahli	___	100	___
Grand Total	**12**	**75**	**13**

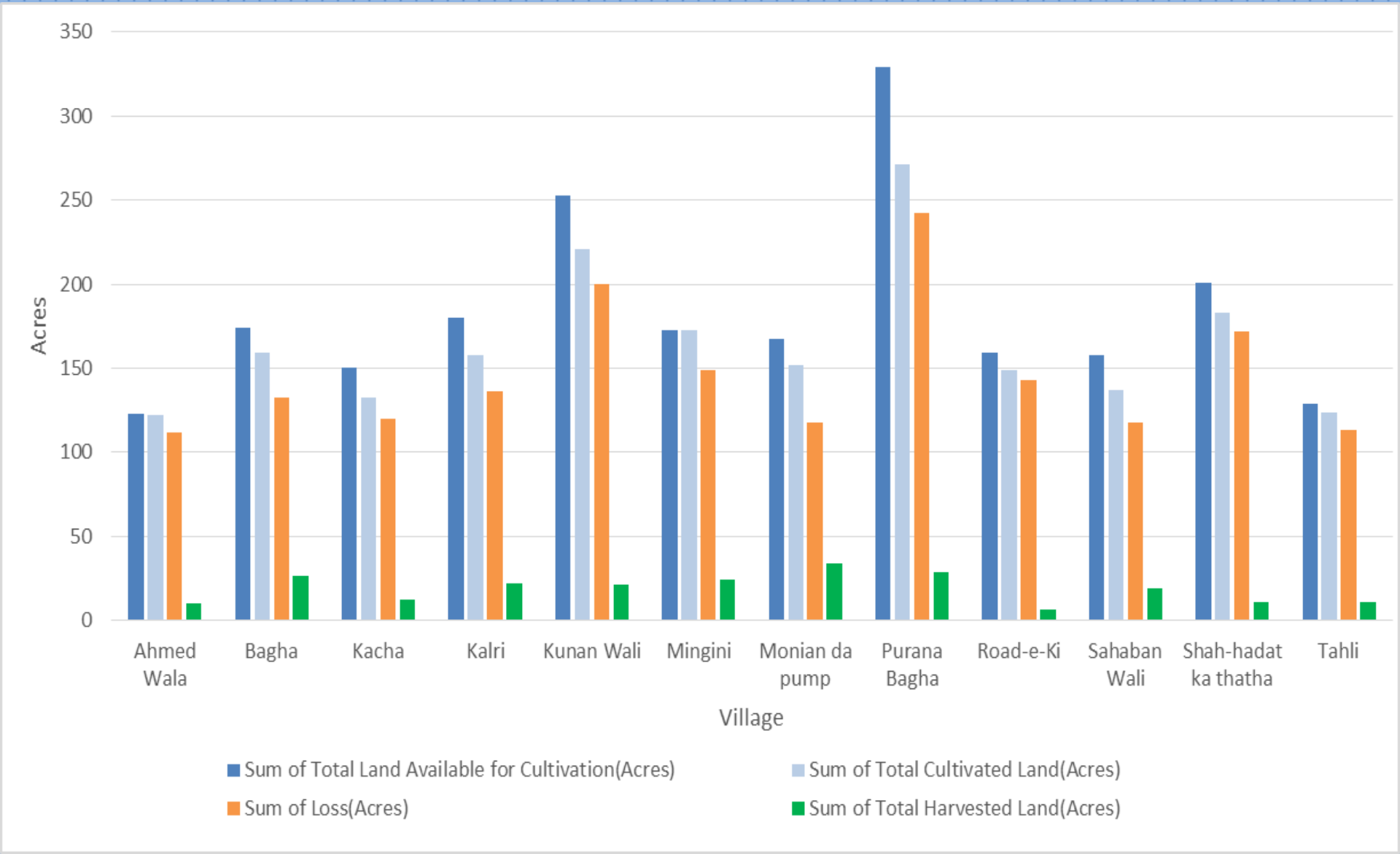
Results:

Aggregate Agricultural Losses

Note: Percentage is given in parenthesis.

Village Name	Flood Exposure	Total Cultivated Land (acres)	Total Harvested Land (acres)	Loss (acres)	Loss in Value (Rs Thousand)
Ahmed Wala		122	10 (8)	112 (92)	4042
	Moderate	25		10 (10)	908
	Severe	97	10 (10)	87 (90)	3134
Bagha		159	26.5 (17)	132.5 (83)	4711
	Moderate	67	12.5 (19)	54.5 (81)	1970
	Severe	92	14 (15)	78 (85)	2741
Kacha		132.2	12 (9)	120.2 (91)	3838
	Moderate	10		10 (100)	230
	Severe	104.2	9 (9)	95.2 (91)	3138
	Very Severe	18	3 (17)	15 (83)	470
Kalri		158	22 (14)	136 (86)	4491
	Moderate	19	3 (16)	16 (84)	627
	Severe	139	19 (14)	120 (86)	3864
Kunan Wali		221	21 (10)	200 (90)	6961
	Moderate	31		31 (100)	904
	Severe	190	21 (11)	169 (89)	6057
Mingini		172.5	24 (14)	148.5 (86)	5139
	Moderate	43.5	7 (16)	36.5 (84)	1371
	Severe	129	17 (13)	112 (87)	3768
Monian da pump		151.5	34 (22)	117.5 (78)	4316
	Severe	88.5	23 (26)	65.5 (74)	2358
	Very Severe	63	11 (17)	52 (83)	1958
Purana Bagha		271	29 (11)	242 (89)	8145
	Moderate	221	26 (12)	195 (88)	6434
	Severe	50	3 (6)	47 (94)	1711
Road-e-Ki		149.2	6.2 (4)	143 (96)	4060
	Moderate	17		17 (100)	476
	Severe	132.2	6.2 (5)	126 (95)	3584
Sahaban Wali		137	19 (14)	118 (86)	3757
	Moderate	94	14 (15)	80 (85)	2576
	Severe	43	5 (12)	38 (88)	1181
Shah-hadat ka thatha		183	11 (6)	172 (94)	6012
	Severe	163	11 (7)	152 (93)	5374
	Very Severe	20		20 (100)	638
Tahli		124	11 (9)	113 (91)	4496
	Severe	124	11 (9)	113 (91)	4496
	Grand Total	**1980.4**	**225.7 (11)**	**1754.7 (89)**	**59968**

Aggregate Agricultural Losses



Crop-wise Losses

	Acres									
Village	Total Land Available for Cultivation	Total Cultivated Land	Sugar cane	Fodder	Rice	Cotton	Other Corps	Total Harvested Crops	Loss	Loss in Value (Rs Thousand)
Ahmed Wala	123	122	10	59	53	__	__	10	112	4042
Bagha	174	159	26.5	43	44	14	32	26.5	133	4711
Kacha	150	132	12	77	36	7	__	12	121	3838
Kalri	180	158	22	82	44	9	1	22	136	4491
Kunan Wali	253	221	21	101	79	7	13	21	200	6961
Mingini	173	173	24	81	51	14	3	24	149	5139
Monian da pump	168	152	34	60	57	2	__	34	118	4316
Purana Bagha	286	279	29	80	64	28	85	22	257	8581
Road-e-Ki	159	149	6	107	30	6	__	6	143	4060
Sahaban Wali	137	133	19	60	36	3	17	19	118	3757
Shah-hadat ka thatha	201	183	11	96	73	3	__	11	172	6012
Tahli	129	124	11	43	59	7	4	11	113	4496
Grand Total	**2121**	**1995**	**226**	**888**	**625**	**99**	**155**	**219**	**1770**	**60404**

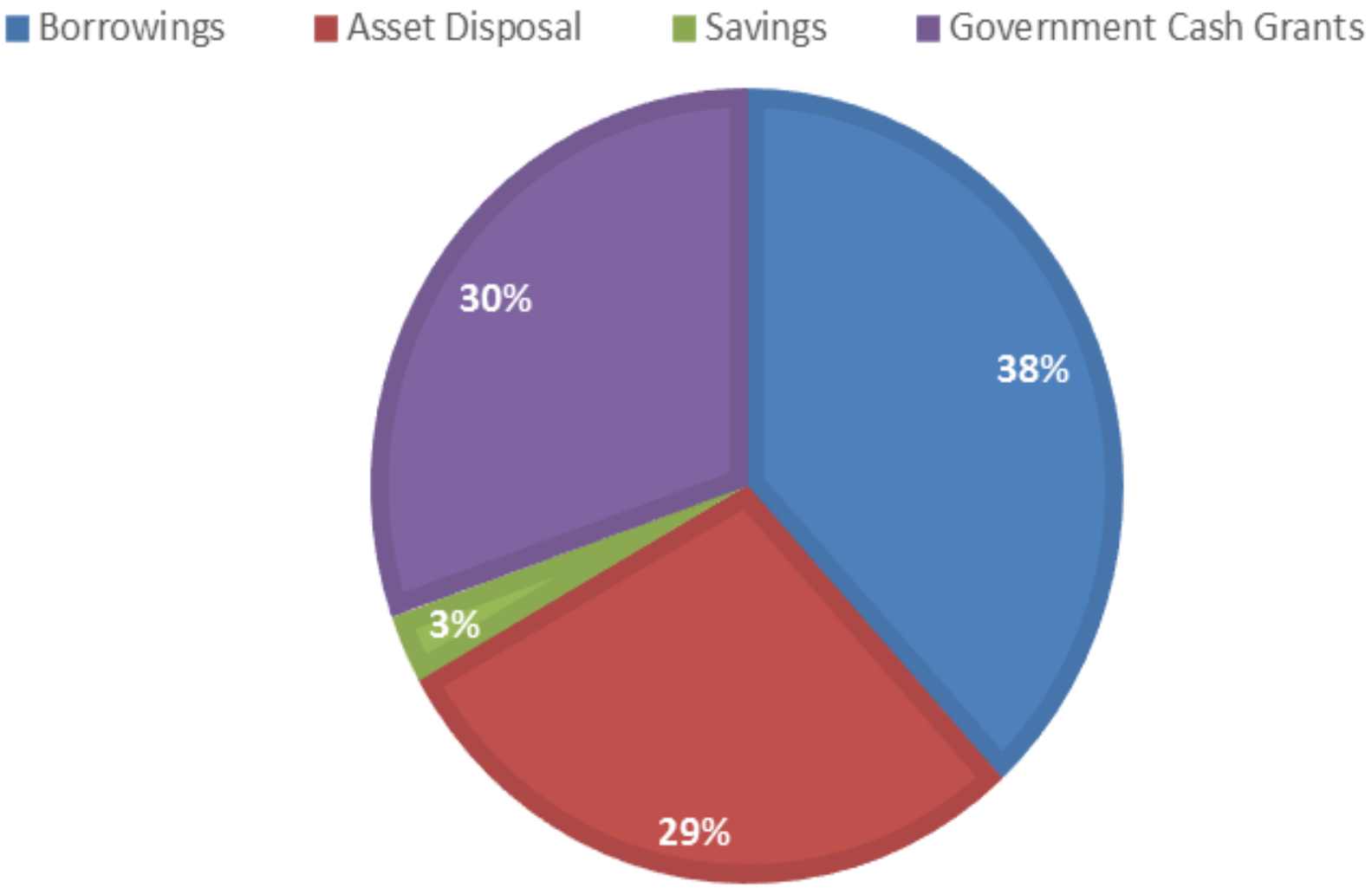
Losses of Dwellings

		Rooms (%)			Loss of Rooms (%)		
Flood Exposure	Villages	Cemented	Raw Bricks	Total Number of Rooms	Cemented	Raw Bricks	Total Affected Number of Rooms
Very Severe		22	78	98	25	75	67
	Kacha	13	88	16	20	80	10
	Kalri	0	100	7	0	100	4
	Kunan Wali	100	0	16	100	0	15
	Monian da pump	0	100	31	0	100	18
	Road-e-Ki	100	0	4	___	___	___
	Shah-hadat ka thatha	0	100	24	0	100	20
Severe		**42**	**58**	**534**	**31**	**69**	**116**
	Ahmed Wala	17	83	59	___	___	___
	Bagha	60	40	43	___	___	___
	Kacha	8	92	38	0	100	21
	Kalri	20	80	46	38	63	24
	Kunan Wali	86	14	43	86	14	22
	Mingini	70	30	67	___	___	___
	Monian da pump	0	100	45	0	100	13
	Purana Bagha	53	47	36	___	___	___
	Road-e-Ki	52	48	56	46	54	13
	Sahaban Wali	85	15	41	___	___	___
	Shah-hadat ka thatha	10	90	29	0	100	17
	Tahli	26	74	31	33	67	6
Moderate		**60**	**40**	**88**	**42**	**58**	**12**
	Ahmed Wala	100	0	4	100	0	2
	Bagha	100	0	12	___	___	___
	Kacha	0	100	7	0	100	2
	Kalri	0	100	11	0	100	4
	Kunan Wali	77	23	13	100	0	3
	Purana Bagha	74	26	23	___	___	___
	Road-e-Ki	0	100	6	0	100	1
	Sahaban Wali	83	17	12	___	___	___
	Grand Total	**42**	**58**	**720**	**30**	**70**	**195**

Coping Strategies Adopted by Households

	Number of Households				
Village	Borrowing	Asset Disposal	Savings	Government Cash Grant	Total Households
Ahmed Wala	15	14	___	8	20
Bagha	8	9	___	11	20
Kacha	17	9	2	13	20
Kalri	14	14	___	11	20
Kunan Wali	14	14	___	10	20
Mingini	19	7	3	14	20
Monian da pump	12	12	2	19	20
Purana Bagha	16	7	___	6	20
Road-e-Ki	14	9	___	10	20
Sahaban Wali	16	11	___	10	20
Shah-hadat ka thatha	15	14	4	13	19
Tahli	6	5	1	7	10
Grand Total	**166**	**125**	**12**	**132**	**229**

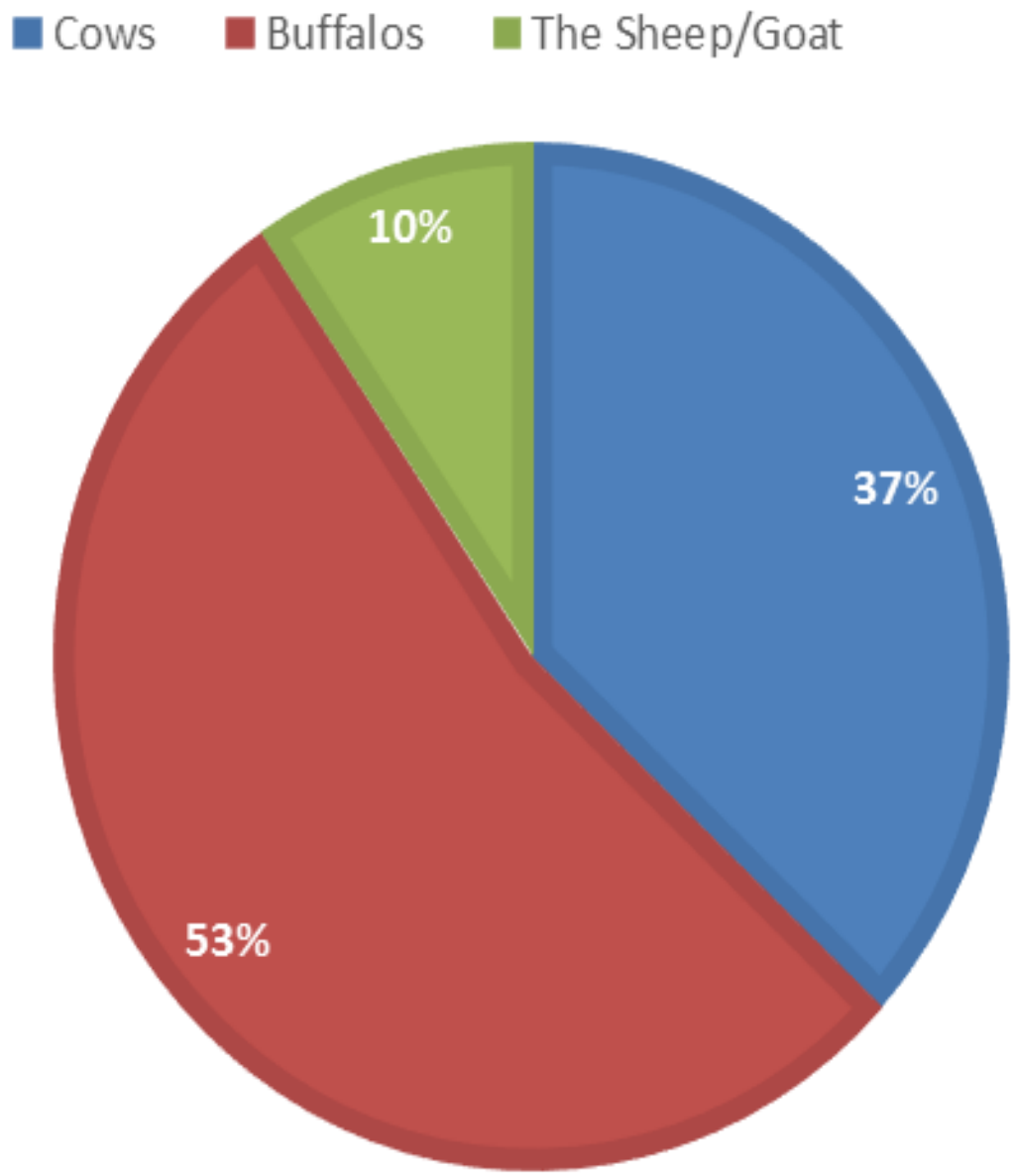
Coping Strategies Adopted by Households



Components of Assets Disposal

		Number of Households		
Village	**Total Number of Households**	**Cows**	**Buffalos**	**Sheep/Goat**
Ahmed Wala	14	3	11	___
Bagha	9	5	6	1
Kacha	9	2	8	1
Kalri	14	6	11	2
Kunan Wali	14	8	8	2
Mingini	7	7	1	___
Monian da pump	12	8	9	2
Purana Bagha	7	2	6	1
Road-e-Ki	9	4	4	2
Sahaban Wali	11	4	8	2
Shah-hadat ka thatha	14	6	9	1
Tahli	5	3	3	1
Grand Total	**125**	**58**	**84**	**15**

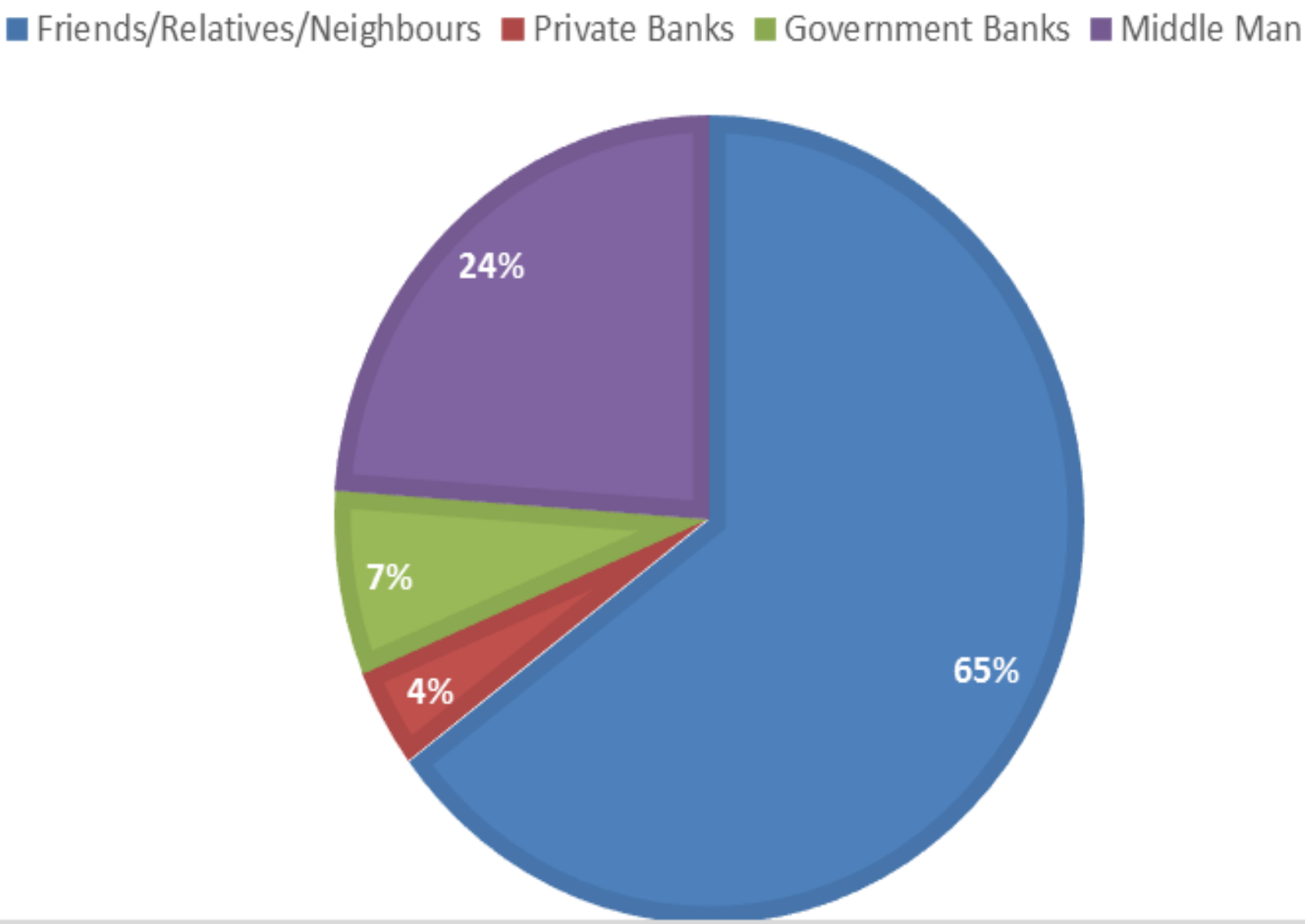
Components of Assets Disposal



Components of Borrowings

		Number of Households			
Village	Total Number of Households	Friends/Relatives/Neighbours	Private Banks	Government Banks	Middle Man
Ahmed Wala	15	12	1	___	2
Bagha	8	8	___	___	1
Kacha	17	13	___	___	5
Kalri	14	6	___	4	5
Kunan Wali	14	6	2	2	6
Mingini	19	15	___	___	4
Monian da pump	12	7	___	4	2
Purana Bagha	16	15	___	___	1
Road-e-Ki	14	12	___	___	2
Sahaban Wali	16	12	3	1	___
Shah-hadat ka thatha	15	5	1	2	11
Tahli	6	3	___	___	3
Grand Total	**166**	**114**	**7**	**13**	**42**

Components of Borrowings



Flood-forecasting Information

	Source of flood-forecasting information	
Village	Government Announcement (%)	News (%)
Ahmed Wala	75	25
Bagha	90	10
Kacha	80	20
Kalri	65	35
Kunan Wali	45	55
Mingini	70	30
Monian da pump	65	35
Purana Bagha	90	10
Road-e-Ki	50	50
Sahaban Wali	80	20
Shah-hadat ka thatha	95	5
Tahli	50	50
Grand Total	**72**	**28**

Government Cash Grants

	Flood Exposure								
	Moderate			Severe			Very Severe		
Village	Total HH's	HH's Received GCG	HH's No GCG	Total HH's	HH's Received GCG	HH's No GCG	Total HH's	HH's Received GCG	HH's No GCG
Ahmed Wala	**1 [316]**	___	**1 [316]**	19 [3726]	8 [1020] (690)	11 [2706]	___	___	___
Bagha	**3 [385]**	**2 [128] (130)**	**1 [257]**	17 [4326]	9 [2384] (180)	8 [1942]	___	___	___
Kacha	**2 [230]**	**1 [60] (20)**	**1 [170]**	13 [2526]	9 [1394] (580)	4 [1132]	5 [1082]	3 [672] (300)	2 [410]
Kalri	2 [492]	1 [210] (25)	1 [282]	15 [3327]	10 [2509] (435)	15 [818]	3 [672]	___	3 [672]
Kunan Wali	3 [923]	1 [338] (20)	2 [585]	14 [4628]	8 [2910] (437)	6 [1718]	3 [1410]	1 [150] (40)	2 [1260]
Mingini	___	___	___	20 [5139]	14 [3653] (651)	6 [1486]	___	___	___
Monian da pump	___	___	___	13 [2102]	12 [1934] (765)	1 [168]	7 [2214]	7 [2214] (515)	___
Purana Bagha	10 [3152]	3 [701] (130)	7 [2451]	10 [4993]	3 [1545] (120)	7 [3448]	___	___	___
Road-e-Ki	2 [476]	___	2 [476]	17 [3524]	10 [2432] (650)	7 [1092]	1 [60]	___	1 [60]
Sahaban Wali	5 [1295]	2 [458] (55)	3 [837]	15 [2462]	8 [1072] (410)	7 [1390]	___	___	___
Shah-hadat ka thatha	___	___	___	9 [3510]	5 [2190] (370)	4 [1320]	10 [2502]	8 [1884] (460)	2 [618]
Tahli	___	___	___	10 [4496]	7 [3686] (555)	3 [810]	___	___	___
Grand Total	**28**	**10**	**18**	**172**	**103**	**69**	**29**	**19**	**10**

HH's=households, RCG= government cash grants, [agricultural loss in rupees thousand], (government cash grants in rupees thousand)

Determinants of Saving and Government Cash Grants, Logit Model

	Saving			Government cash grants		
Variable	MFX	Odds Ratio	z	MFX	Odds Ratio	z
Depth of water in homestead	0.0104	0.8714 (0.1291)	-0.93	0.0327	1.146 (0.1016)*	1.54
Number of days water stayed at home	0.0107	1.1524 (0.0904)**	1.81	0.0041	0.983 (0.0708)	-0.24
Number of days spent out of home	-0.0029	0.9627 (0.0323)	-1.13	0.0107	1.0457 (0.0183)***	2.55
Agricultural loss	-0.0001	0.9984 (0.0024)	-0.65	0.0450	1.0002 (0.0006)**	0.26
Household size	0.0077	1.1073 (0.1505)	0.75	-0.0115	0.9532 (0.0612)	-0.75
Household head age	-0.0008	0.9894 (0.0326)	-0.32	0.0072	1.0303 (0.0119)***	2.6
Education of household head	0.0145	1.2126 (0.1205)**	1.94	0.0183	1.0793 (0.0436)**	1.89
Gender of household head(male =1)	___	___	___	0.5566	24.0616 (26.6228)***	2.87
Occupation of household head(agriculture =1)	___	___	___	___	___	___
Village dummy 1 (Monian da pump = 1)	-0.0422	0.5303 (0.6003)	-0.56	0.2858	4.4872 (6.3707)	1.06
Village dummy 2 (Shah-hadat ka thatha = 1)	0.2214	6.7018 (9.6886)	1.32	-0.0181	0.9278 (0.9869)	-0.07
Village dummy 3 (Kacha = 1)	0.0128	1.1774 (1.3745)	0.14	0.0857	1.4495 (1.5022)	0.36
Village dummy 4 (Kunan Wali = 1)	___	___	___	-0.1118	0.6348 (0.6738)	-0.43
Village dummy 5 (Bagha = 1)	___	___	___	0.0656	1.3245 (1.4313)	0.26
Village dummy 6 (Purana Bagha = 1)	___	___	___	-0.1477	0.5494 (0.6015)	-0.55
Village dummy 7 (Sahaban Wali = 1)	___	___	___	-0.0052	0.9784 (1.086)	-0.02
Village dummy 8 (Road-e-Ki = 1)	___	___	___	-0.1278	0.5953 (0.6493)	-0.48
Village dummy 9 (Kalri = 1)	___	___	___	-0.0618	0.7764 (0.8732)	-0.23
Village dummy 10 (Mingini = 1)	___	___	___	0.1505	1.973 (2.119)	0.63
Village dummy 11 (Ahmed wala = 1)	___	___	___	-0.1305	0.5888 (0.6282)	-0.5
Constant	___	0.2234 (0.5522)	-0.61	___	0.0026 (0.0055)***	-2.82
Log pseudo likelihood		-22.71			-128	
Number of observations		71			224	
Prob > chi2		0.0375			0.0013	
Pseudo R2		0.213			0.1648	

Determinants of Borrowing and Asset Disposal, Logit Model

	Borrowing			Asset Disposal		
Variable	MFX	Odds Ratio	z	MFX	Odds Ratio	z
Depth of water in homestead	0.0037	0.9788 (0.0784)	-0.27	0.0596	1.2735 (0.1009)***	3.05
Number of days water stayed at home	0.0011	0.9934 (0.0536)	-0.12	0.0223	0.9135 (0.0515)*	-1.6
Number of days spent out of home	0.0029	1.0172 (0.0147)	1.18	0.0045	1.0183 (0.0152)	1.22
Agricultural loss	0.0005	1.0027 (0.0012)***	2.23	0.0006	1.0023 (0.0007)***	3.2
Household size	0.0187	1.1147 (0.0719)*	1.68	0.0105	1.0435 (0.0603)	0.74
Household head age	-0.0045	0.9741 (0.0128)***	-2	-0.0038	0.9847 (0.0118)	-1.29
Education of household head	-0.0126	0.9294 (0.0406)*	-1.68	-0.0038	0.9848 (0.04)	-0.38
Gender of household head (male=1)	- 0.0693	0.6682 (0.2002)	-1.35	-0.0699	0.753 (0.2129)	-1
Occupation of household head (agriculture=1)	0.287	3.6654 (11.2832)	0.42	0.1047	1.5228 (2.6884)	0.24
Village dummy 1 (Monian da pump = 1)	-0.1474	0.4775 (0.4561)	-0.77	-0.021	0.9188 (0.9695)	-0.08
Village dummy 2 (Shah-hadat ka thatha = 1)	0.019	1.1189 (1.1402)	0.11	-0.0382	0.8573 (0.9097)	-0.15
Village dummy 3 (Kacha = 1)	0.1056	2.0893 (2.1376)	0.72	-0.1067	0.6514 (0.6317)	-0.44
Village dummy 4 (Kunan Wali = 1)	-0.0458	0.7772 (0.7826)	-0.25	0.1905	2.3102 (2.3506)	0.82
Village dummy 5 (Bagha = 1)	-0.2429	0.3168 (0.3077)	-1.18	0.0760	1.3703 (1.3346)	0.32
Village dummy 6 (Purana Bagha = 1)	0.0934	1.8869 (2.0948)	0.57	-0.0974	0.6762 (0.6762)	-0.39
Village dummy 7 (Sahaban Wali = 1)	0.1149	2.2679 (2.3878)	0.78	0.2135	2.5964 (2.6133)	0.95
Village dummy 8 (Road-e-Ki = 1)	0.0358	1.2455 (1.2295)	0.22	0.0887	1.4466 (1.4482)	0.37
Village dummy 9 (Kalri = 1)	-0.0019	0.9888 (0.9288)	-0.01	0.2417	3.0218 (3.0267)	1.1
Village dummy 10 (Mingini = 1)	0.2317	11.9793 (16.2932)**	1.83	-0.1177	0.6229 (0.6185)	-0.48
Village dummy 11 (Ahmed wala = 1)	0.0589	1.4552 (1.4323)	0.38	0.2674	3.502 (3.4574)	1.27
Constant	___	0.7911 (2.7747)	-0.07	___	0.114 (0.269)	-0.92
Log pseudo likelihood		-113.21			-133.5	
Number of observations		227			227	
Prob > chi2		0.0178			0.0051	
Pseudo R2		0.143			0.1449	

Borrowing, Asset Disposal and Flood Exposure, Logit Model

	Borrowing			Asset Disposal		
Variable	MFX	Odds Ratio	z	MFX	Odds Ratio	z
Flood exposure	0.0270	1.0189 (0.0151)**	1.26	0.0110	1.0457 (0.0143)***	3.27
Constant		0.8727 (0.7916)	-0.15		0.0808 (0.0679)***	-2.99
Log pseudo likelihood		-131.24689			-150.38494	
Number of observations		227			227	
Prob > chi2		0.2067			0.0007	
Pseudo R2		0.0065			0.0371	

(robust standard errors), * significance at 1 %, ** significance at 5 %, * significance at 10 %.**

Saving, Government Cash Grants and Flood Exposure, Logit Model

	Saving			Government cash grants		
Variable	MFX	Odds Ratio	z	MFX	Odds Ratio	z
Flood exposure	0.0003	1.008 (0.0325)	0.25	0.0104	1.0437 (0.0138)***	3.22
Constant		0.0282 (0.057)**	-1.77		0.0999 (0.0806)***	-2.86
Log pseudo likelihood		-40.9651			-149.6697	
Number of observations		227			227	
Prob > chi2		0.8039			0.0013	
Pseudo R2		0.0009			0.034	

(robust standard errors), * significance at 1 %, ** significance at 5 %, * significance at 10 %.**

Determinants of Borrowing, Asset Disposal and Government Cash Grants, Tobit Model

Variable	Coefficient of Asset Disposal	Coefficient of Borrowing	Coefficient of Government Grants
Depth of water in homestead	9508(6342)	3655(3571)	4601(2328)**
Number of days water stayed at home	5232(2722)**	2445(2680)	908(1289)
Number of days spent out of home	1444(871)*	383(559)	795(457)*
Agricultural loss	155(38)***	316(129)***	61(29)***
Household size	-58(3447)	5554(2935)**	-2291(1810)
Household head age	-1333(652)**	-447(474)	708(344)**
Education of household head	-858(2253)	941(1889)	1468(1064)
Gender of household head (male = 1)	-32594(51188)	-22444(13286)*	10816(8249)
Occupation of household head (agriculture = 1)	16677(107835)	79112(120228)	32996(15893)***
Village dummy 1 (Monian da pump = 1)	56221(50387)	-124604(90202)	8500(31271)
Village dummy 2 (Shah-hadat ka thatha = 1)	15403(37864)	-121750(95043)	-24226(30666)
Village dummy 3 (Kacha = 1)	22939(47310)	-79412(78776)	309(30069)
Village dummy 4 (Kunan Wali = 1)	80040(47980)*	-119842(97106)	-30959(30664)
Village dummy 5 (Bagha = 1)	54067(49483)	-148890(91032)*	-21511(28329)
Village dummy 6 (Purana Bagha = 1)	-961(52711)	-126475(101956)	-51482(32599)*
Village dummy 7 (Sahaban Wali = 1)	84952(52526)*	-14664(79874)	-10750(29903)
Village dummy 8 (Road-e-Ki = 1)	60431(54629)	-84831(79977)	-14693(30647)
Village dummy 9 (Kalri = 1)	91452(42442)***	-97716(80930)	-22848(29458)
Village dummy 10 (Mingini = 1)	25951(51203)	-71485(80866)	-5098(28838)
Village dummy 11 (Ahmed wala = 1)	103288(46436)***	-54896(85184)	-8975(32828)
Constant	-49965.24(161518.2)	-83261(144395)	-44863(47103)
Uncensored observation	125	166	130
Log pseudo likelihood	-1694.7259	-2213.6503	-1681.6936
Pseudo R2	0.0132	0.0206	0.0146
Prob > F	0.0005	0.4625	0

Saving, Government Cash Grants and Flood Exposure, Tobit Model

Variable	Coefficient of Asset Disposal	Coefficient of Borrowing	Coefficient of Government Grants
Flood exposure	2767(-820)***	961(634)*	1714(396)***
Constant	-156547(-52958)***	-26083(39113)	-93981(25423)***
Uncensored observation	125	166	130
Log pseudo likelihood	-1711.7843	-2259.695	-1699.6508
Pseudo R2	0.0033	0.0002	0.004
Prob > F	0.0009	0.1317	0

(robust standard errors), * significance at 1 %, ** significance at 5 %, * significance at 10 %.**

Summary and Recommendations

Summary

- The study have manifested that majority of household have been severely exposed to the floods and level of exposure varies among the households even of same villages.
- Households have been unable to save only immoveable possessions, standing crops and rooms. Households' made of raw bricks have suffered more in these losses than cemented houses.
- Households have relied upon major three type of coping strategies after the floods: borrowings, assets disposal and government cash grants.
- All shock factors are significant determinants of households coping strategies while for government cash grants demographic factors have significant role.
- Government cash grants and early flood warnings have played a laudable role in mitigating and coping the aftermaths of floods but the distribution mechanism of these grants reveals role of overwhelming political economy.

Recommendations

- Transparent distribution mechanism and target-based approach will increase the effectiveness of government flood-relief grants.
- Provision of easy loaning by banks and initiatives for the formulation of crop insurance in floods prone areas can also be crucial in mitigating the effects of floods.

THANK YOU!