PRO-POOR GROWTH ACROSS DIFFERENT AGRO-CLIMATIC ZONES OF RURAL PAKISTAN

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Prevalence of high rural poverty with spatial distribution necessitates tracking of growth distribution dynamics across different cropping zones to work out precisely the accrual of growth benefits across different regions and segments of population to frame specific policies for sustained growth and effective poverty reduction in Pakistan. This paper for the first time disaggregates Poverty Equivalent Growth Index (PEGR) at the most disaggregated level of different agro-climatic zones of Pakistan to measure growth pro-poorness in both relative and absolute terms. Results summarize variant growth pattern, relatively high poverty concentration among non-farming rural households despite relatively larger net real growth, more reduction in poverty among farming households and largest contribution to overall rural poverty by major cropping zones. PEGR analysis for overall studied period shows pro-poorness of growth in relative terms for the majority of agro-climatic zones due to reinforcing effect of declining relative inequality to positive growth effect, except for Mixed (II) and Rain-fed Punjab (V) zones. Contrarily, anti-pro poor pattern of growth is observed for majority of the zones in absolute terms with the exception of Rice/Other Sind (VII) and Baluchistan (IX). However, considerable volatility in the quality of growth has emerged during different sub-periods over the time. High (low) growth periods are largely found to be anti-poor (pro-poor) while negative growth turned to be poverty reducing pro-poor in certain cases. The findings explicitly identify the negative role of resource inequalities on poverty reduction in areas of major cropping zones during high growth scenarios due to highly skewed regional distribution of irrigated land.

Keywords: Growth distribution pattern, regional variations, poverty equivalent growth rate, rural Pakistan

INTRODUCTION

Pakistan's poverty analysis has largely been focused on quantitative aspects by comparing poverty estimates over time and place which could hardly establish trends and general inferences; like inconsistent relationship between national income and poverty trends, strapping nexus of poverty and growth performance of agriculture sector and poverty as predominantly rural phenomenon with spatial distribution. Moreover, coverage of these studies has largely been at highly aggregate levels i.e. national or sub-national levels of different provinces individually. Malik (1992), Qureshi and Arif (1999), Arif and Munir (2001) and Malik (2005) attempted poverty estimations at more disaggregated levels of nine different agro-climatic zones of country (Appendix I) classified by Pickney (1989). These studies identified high extent of rural poverty with regional variations attributed by diversity in climatic factors, availability of irrigation water, regional farm resources distribution, farming system and cropping pattern, ratio of on-farm-and-off-farm income to total income, net value addition to the farm produce, agricultural pricing policy, integration with affluent urban areas, off-farm employment opportunities, etc. However, they also ignored the important

aspects of distributional quality of growth to draw an appropriate poverty reducing policy lessons.

In this perspective, very few studies, including Saboor and Hussain (2005), Omer and Jafri (2008), Anwar (2010) and Cheema, and Sial (2012) addressed the distributional aspects of growth but confined the scope either to a specific sector or at highly aggregated levels of entire rural area of the country or different provinces without segregating rural population engaged in various on-farm and off-farm employment activities at most disaggregated level of different agro-climatic zones. Further, these studies relied only on single perspective (relative or absolute) of pro-poorness for limited range of poverty measures. On the other hand, Jamal (2014) estimated growth pro-poorness in both relative and absolute perspectives but at national level only.

The agrarian economy of Pakistan consists of over 60 percent of rural population and absorbs 44 percent of country's labor force in productive employment (GoP, 2013-14). The existing high extent and variability of rural poverty suggest mapping of both quantity and distributional quality of growth at most disaggregated level of different agro-climatic zones of Pakistan to work out precisely the extent and contribution of poverty by each zone and sharing of growth benefits among different farming systems and segments (farming and non-farming) of rural population to

Appendix I. Distribution of districts covered under different agro-climatic zones (Pickney,1989).

Zone	Agro-Climatic Zones	Districts
I.	Rice/Wheat Punjab	Sialkot, Gujrat, Gujranwala, Sheikhupura, Lahore and Kasur
II.	Mixed Punjab	Sargodha, Khushab, Jhang, Faisalabad, Okara and Toba Tek Singh
III.	Cotton/Wheat Punjab	Sahiwal, Bahawalpur, Bahawalnagar, Rahim Yar Khan, Multan and Vehari and Khanewal
IV.	Low intensity Punjab	Dera Ghazi Khan, Rajanpur, Muzaffargarh, Leiah, Mianwali, Bhakkar and Dera Ismail Khan
V.	Rainfed Punjab	Attock, Jhelum, Chakwal, Rawalpindi and Islamabad
VI.	Cotton/Wheat Sind	Sukkur, Khairpur, Nawabshah, Hyderabad, Tharparkar and Sanghar
VII.	Rice/ Other Sind	Jacobabad, Larkana, Dadu, Thatta, Badin, Shikarpur, Nasirabad and Karachi
VIII.	Other KPK (Except D.I. Khan)	Swat, Dir, Peshawar, Kohat, Karak, Mansehra, Abbottabad, Kohistan, Mardan and Bannu
XI.	(Baluchistan (Except Nasirabad)	Quetta, Sibi, Kalat and Mekran

frame region specific policies for sustained growth and effective poverty reduction.

This paper will, to our knowledge for the first time, disaggregate Poverty Equivalent Growth Index (PEGR) by different agro-climatic zones of Pakistan during 1998-2011 to identify both absolute and relative trends in distribution of growth benefits for head count ratio, poverty gap and poverty gap squared. The results would help to identify the trends and proportionate contribution of each zone to overall rural poverty, and intra-and-inter zonal accrual of absolute and relative growth benefits amongst different segments of rural community to frame zonal specific policy matrix for development of Pakistan. The paper is organized into six sections. Section 2 provides a brief discussion on pro-poor growth measure employed in paper - Poverty Equivalent Growth Rate (PEGR). Section 3 provides details on data and poverty lines. Section 4 presents the dynamics of various poverty measures. Sections 5 present and discuss the main findings. The final section concludes the study.

METHODOLOGY

Review of various pro-poor growth indices [McCulloch and Baulch (2000); Kakwani and Pernia (2000); and Ravallion and Chen (2003)] explains triangular nexus of growth, poverty and inequality but does not satisfy standard poverty axiom of monotonicity. Thus there was need to develop that measure of pro-poor growth which could ensure poverty reduction as monotonic function of increased growth.

Kakwani and Son (2008) addressed the issue and developed new index (modifying Pro-poor Growth Index (PPGI) of Kakwani and Pernia, 2000) satisfying standard poverty axiom of monotonicity - the Poverty Equivalent Growth Rate (PEGR). This index can be written as

$$PEGR = \gamma^* = \left(\frac{\delta}{\eta}\right)\gamma = \varphi\gamma$$

$\varphi = (\delta/\eta)$ (Ratio of the poverty elasticity of growth to the poverty elasticity of growth computed with inequality unchanged – relative pro-poor growth (Kakwani and Pernia, 2000)

γ = Observed growth rate in societal income

It is then possible to distinguish pro-poor growth (absolute and relative) using Pro-poor Growth Index (PPGI) of Kakwani and Pernia (2000).

The absolute PEGR can be written as $* = (\delta/\eta^*)$, where

$$\eta = \frac{1}{\theta}\int_0^H \frac{\partial P}{\partial x} x(p)\, dp$$

Where p is percentile, and

$$\eta^* = \frac{\mu}{\theta}\int_0^H \frac{\partial P}{\partial x}\, dp$$

The relative and absolute measures of the PEGR can be written respectively as:

Relative measure of PEGR = $\gamma^* = \gamma + (\varphi-1)\gamma$

and Absolute measure of PEGR =

$$\gamma^* = \gamma[1+(\varphi-\varphi^*)]+(\varphi^*-1)\gamma$$

The PEGR measure satisfies the basic monotonicity condition such that the reduction (increase) in poverty is a monotonically increasing (decreasing) function of the PEGR. It also takes account of the level of growth. Growth will be pro-poor in a relative sense if $\gamma^*>\gamma$, which is satisfied if $\gamma>0$ and >1. Growth will be pro-poor in an absolute sense when $\gamma>0$ and *>1 or when $\gamma<0$ and *<1. Pro-poor growth in the absolute sense entails relative pro-poor growth, but not the other way around.

Data and poverty lines: This study encompasses the 1998 to 2011 decade. The working dataset has been constructed from the several waves of the Household Integrated Economic Survey (HIES) made available by the Government of Pakistan. Aggregate household expenditure is used as the main welfare indicator. The main justification for using household aggregate consumption expenditure as a welfare proxy is that the income component responses in the survey

are considered less reliable than expenditure items, due to the temptation of tax avoidance, the more volatile nature of rural income, the imperfection of agricultural markets and the incidence of large non-monetized rural transactions. Consumption expenditure on non-durable goods is considered in the literature as a more reliable proxy for welfare (Bergen, 1967; Mahmood, 1984; Anwar, 2005).

The Planning Commission of Pakistan (GoP, 2002) produces an official poverty line, uniform for the country as a whole. It is based on a measure of the expenditure needed to ensure a calorie intake of 2350 calories per adult per day, with an additional consumption expenditure on non-food items. The fact that the same poverty line is used across regions and sectors can be problematic. Systematic differences in the cost of living for different regions and districts do justify adjusting poverty lines in line with local prices. There is no consensus among researchers in Pakistan on the most appropriate way of making this adjustment. There are several contentious issues like selection of overall and regional price indices for national and regional poverty lines, their adjustment in nominal terms for different years and determination of calorie based adult equivalence weights by gender and age (GoP, 2003). However, sticking to the official nationwide poverty line will enable comparability of our results with other studies. The distributions of

consumption for each survey year were normalized using the poverty line of the relevant base year.

REULTS AND DISCUSSIONS

Growth and poverty dynamics across different agro-climatic zones during 1998-2011 decade: Growth dynamics in terms of real mean growth rate in consumption expenditure (proxy of income) across agricultural (Agr. HHs) and non-agricultural (Non Agr. HHs) households for whole and sub-periods over the decade have been summarized in Table 1.

Table 2 presents poverty dynamics, variations in its distribution and contribution by different agro-climatic zones over time. Results indicate consistent lower poverty levels in Rain-fed areas of Northern Punjab and Rice-wheat zone across all the households over the years. During the studied period, overall poverty has reduced across all the households situated in different zones. Amongst agricultural households, maximum poverty reduction is found in Mixed Punjab (73.44 percent), followed by Rice/Wheat Punjab (67.92 percent) and Cotton/Wheat Sind (64.82 percent). Inter-household comparison shows relatively high poverty amongst non-agricultural households situated in different zones of Punjab in 1998, contrary to other provinces.

Table 1. Real mean growth rate in welfare indicator (per capita consumption).

Zone/ Household types	1998-2002		2002-2004		2004-2006		2006-2008		2008-2011		1998-2011	
	Agri. HHs	Non Agri. HHs	Agri. HHs	Non Agri. HHs	Agri. HHs	Non Agri. HHs	Agri. HHs	Non Agri. HHs	Agri. HHs	Non Agri. HHs	Agri. HHs	Non Agri. HHs
I	-8.2	-18.2	14.1	15.5	8.2	9.8	13.0	27.2	-4.9	-4.9	21.8	25.3
II	-0.4	22.1	30.8	10.0	-5.1	0.9	19.6	21.0	1.0	8.7	49.2	78.2
III	-4.0	-6.2	26.4	21.4	-2.9	27.9	-1.5	-16.6	12.6	11.7	37.4	35.7
IV	1.9	17.6	25.1	-1.7	-2.9	9.7	0.8	-1.2	8.5	2.7	35.5	28.8
V	4.3	13.1	48.6	11.1	-14.6	9.7	14.3	-2.0	-10.0	-2.1	36.1	32.2
VI	-18.4	-17.0	31.1	21.7	-10.3	-4.4	6.7	6.6	19.3	3.6	22.1	6.5
VII	-16.4	-11.5	19.4	1.3	-10.3	-6.5	8.2	13.1	11.0	0.5	7.3	-4.8
VIII	-3.7	-8.8	13.0	6.4	9.1	10.4	8.3	9.0	-1.0	1.5	27.3	18.5
IX	-20.0	-16.0	18.1	13.1	23.8	-17.7	6.5	-2.2	39.3	20.2	6.7	-8.2

Table 2. Poverty dynamics across different agro-climatic zones.

Zone/Household types	HCR 1998		HCR 2011		%age Change in HCR (1998-2011)		HCR Contribution in 2011		HCR Ranking in 2011	
	Agri.	Non Agri.	Agri.	Non Agri.	Agri.	Non Agri.	Agri.	Non Agri.	Agri.	Non Agri.
I	27.4	37.0	8.79	17.08	-67.92	-53.84	6.10	7.50	3	2
II	44.8	64.7	11.90	23.76	-73.44	-63.28	8.26	10.43	4	5
III	46.9	59.9	21.86	34.49	-53.39	-42.42	15.18	15.14	7	8
IV	59.0	61.8	30.67	41.30	-48.02	-33.17	21.30	18.13	9	9
V	20.9	22.5	7.63	9.32	-63.49	-58.58	5.30	4.09	1	1
VI	40.7	35.8	14.32	32.09	-64.82	-10.36	9.94	14.09	5	7
VII	45.4	35.9	22.44	28.83	-50.57	-19.69	15.58	12.66	8	6
VIII	42.2	41.0	18.58	20.60	-55.97	-49.76	12.90	9.04	6	4
IX	23.0	23.0	8.83	20.30	-61.60	-11.74	5.44	8.91	2	3

However, overall rural poverty amongst non-agricultural households is found much higher in 2011 across each zone. This increase may be fuelled by adverse price shock in the food and fuel prices across the world (Chen and Ravallion, 2008).

Major crops areas/zones (Cotton-Wheat and Rice-Wheat of Punjab and Sind) collectively contributed to over 41 percent of total rural poverty amongst agricultural households in 1998, increased marginally by 2011. Cotton-Wheat belt of Sothern Punjab and Sind contribute to over one-fourth of total poverty amongst agricultural households. High extent of poverty in these major crops areas is largely attributed to by highly skewed land distribution, land tenure pattern, high ratio of crops (over two-third of total income) to overall income and low possibility of diversifying income. On the other hand, rain-fed region of Northern Punjab is the least contributor to overall national poverty. Low poverty in this region is likely due to its close proximity to national capital, large employment in off-farm economic activities, overseas migration and foreign remittances, high literacy level and integration of its rural areas with prosperous urban sectors (Malik, 2005).

Pro-poor growth among the farming households during

1998-2011: PEGR estimates providing overall picture of growth, its distributional effect and poverty reduction among agricultural/farming households across different agro-climatic zones for the full period are presented in Table 3. Households in different regions experienced varied real growth rate and poverty changes for various measures – headcount ratio (HCR), poverty gap ratio (PGR) and severity of poverty (SoP). Net real growth remained positive across each zone except Balochistan in which growth has been negative but poverty reduced due to improvement in inequality.

Decomposition of total poverty elasticity into growth and inequality effect on changes in poverty shows positive growth effect in poverty reduction for all the measures and zones, except for Baluchistan. The positive growth effect on poverty reduction has been reinforced (counteracted) by decreasing (rising) inequality for zones (I, VI, VII, VIII and IX) and (II, III, IV and V), respectively. The analysis shows high (low) poverty reduction effectiveness of changing inequality in low and negative (high and moderate) growth scenarios.

The contribution of growth to the measured total poverty growth elasticity has largely been less than unitary for all

Table 3. Pro-poor growth across different agro-climatic zones during (1998-2011).

Poverty Index/Zone	Real growth rate	Change in poverty measure	Poverty elasticity (δ)	Relative growth effect with inequality unchanged (η)	Relative inequality effect (ζ)	Absolute growth effect with inequality unchanged (η*)	Relative PEGR (Pro-poorness)	Absolute PEGR(Pro-poorness)
HCR/I	22.30	-18.15	-0.81	-15.62	-2.53	-23.26	1.16 (Yes)	0.78 (No)
PGR/I	22.30	-5.03	-0.23	-3.71	-1.32	-7.44	1.36 (Yes)	0.68 (No)
SoP/I	22.30	-1.85	-0.08	-1.26	-0.59	-3.06	1.47 (Yes)	0.60 (No)
HCR/II	59.03	-35.22	-0.60	-36.31	1.09	-46.03	0.97 (No)	0.77 (No)
PGR/II	59.03	-11.41	-0.19	-11.96	0.55	-20.06	0.95 (No)	0.57 (No)
SoP/II	59.03	-4.61	-0.08	-4.85	0.24	-11.85	0.95 (No)	0.39 (No)
HCR/III	34.01	-23.74	-0.70	-25.51	1.77	-33.87	0.93 (No)	0.70 (No)
PGR/III	34.01	-8.8	-0.26	-8.8	0.00	-14.80	1.00 (Yes)	0.59 (No)
SoP/III	34.01	-3.96	-0.12	-3.66	-0.30	-7.75	1.08 (Yes)	0.51 (No)
HCR/IV	32.17	-24.5	-0.76	-27.57	3.07	-32.94	0.89 (No)	0.74 (No)
PGR/IV	32.17	-9.25	-0.29	-9.09	-0.16	-15.19	1.02 (Yes)	0.61 (No)
SoP/IV	32.17	-4.05	-0.13	-4.33	0.28	-7.86	0.94 (No)	0.52 (No)
HCR/V	34.51	-12.95	-0.38	-18.03	5.08	-24.94	0.72 (No)	0.52 (No)
PGR/V	34.51	-2.17	-0.06	-3.69	1.52	-7.45	0.59 (No)	0.29 (No)
SoP/V	34.51	-0.49	-0.01	-1.03	0.54	-3.40	0.48 (No)	0.14 (No)
HCR/VI	11.32	-10.88	-0.96	-10.27	-0.61	-13.75	1.06 (Yes)	0.79 (No)
PGR/VI	11.32	-3.47	-0.31	-2.85	-0.62	-4.80	1.22 (Yes)	0.72 (No)
SoP/VI	11.32	-1.3	-0.11	-0.97	-0.33	-1.85	1.34 (Yes)	0.70 (No)
HCR/VII	0.63	-14.28	-22.67	-0.38	-13.90	-0.56	37.58 (Yes)	25.50 (Yes)
PGR/VII	0.63	-6.06	-9.62	-0.17	-5.89	-0.29	35.65 (Yes)	20.90 (Yes)
SoP/VII	0.63	-2.66	-4.22	-0.06	-2.60	-0.12	44.33 (Yes)	22.17 (Yes)
HCR/VIII	23.99	-21.51	-0.90	-20.73	-0.78	-28.47	1.04 (Yes)	0.76 (No)
PGR/VIII	23.99	-5.71	-0.24	-5.33	-0.38	-8.94	1.07 (Yes)	0.64 (No)
SoP/VIII	23.99	-1.91	-0.08	-1.75	-0.16	-3.56	1.09 (Yes)	0.54 (No)
HCR/IX	-5.09	-7.63	1.50	-4.23	-3.40	-6.09	1.80 (Yes)	1.25 (Yes)
PGR/IX	-5.09	-1.92	0.38	-0.92	-1.00	-1.70	2.09 (Yes)	1.13 (Yes)
SoP/IX	-5.09	-0.64	0.13	-0.28	-0.36	-0.58	2.29 (Yes)	1.10 (Yes)

measures in all agro-climatic zones except Rice/other Sind (VII). The contribution of rising inequality to poverty reduction has counteracted positive growth effect on poverty reduction in all regions of Punjab except zone I. Reduction in poverty would have been larger in case of unchanged or declining inequality. Conversely, poverty in zones (VI-IX) would have increased more if inequality would have been unchanged or rising.

The progressive effect of inequality reduction on poverty reduction implies that the relative PEGR, the rate of growth which would have delivered the same poverty reduction observed but in the absence of any changes in inequality, are higher than the observed growth rates for the all the poverty measures. This entails that growth has been relatively pro-poor only in zones I, VI, VII, VIII and IX for each measure and thus benefited groups in poverty more than proportionately during 1998-2011. On the other hand, growth in absolute terms has only been pro-poor for zone VII and IX for each poverty measure. This suggests that poor clustered immediately below the poverty line benefited more in absolute terms. It is interesting to note that growth is

found strongly pro-poor in moderate, low and negative growth zones and anti-poor in high growth zones.

In short, positive growth has been strongly poverty reducing in majority of agro-climatic zones (I-V and VIII), moderately poverty reducing in zones VI and VII and poverty reducing negative growth in zone IX. The same conclusions apply to the poverty gap and poverty gap square which provides a stronger perspective on extreme poverty and poverty reduction. From the above discussion, it can be safely opined that poverty reduction effectiveness of growth has been low (high) in relatively high (low) growth zones as result of rising (declining) inequality.

Pro-poor growth dynamics during sub-periods of 1998-2011: The findings reported in the previous section established overall pro-poorness (anti-poorness) of relative (absolute) growth for all poverty measures across different agro-climatic zones during the period under investigation. However, the general trend hides considerable volatility in the quality of growth during different sub-periods as summarized in Table 4. Study of Table 1 in conjunction with Table 4, representing growth inconsistency during different

Table 4. Pro-poor growth across different agro-climatic zones during different sub-periods.

Poverty Index /Zone	1998-2002 Pro-poorness		2002-2004 Pro-poorness		2004-2006 Pro-poorness		2006-2008 Pro-poorness		2008-2011 Pro-poorness	
	Relative	Absolute	Relative	Absolute	Relative	Absolute	Relative	Absolute	Relative	Absolute
HCR/I	Yes	No	Yes	Yes	No	No	No	No	Yes	No
PGR/I	Yes	Yes	Yes	No	No	No	No	No	No	No
SoP/I	Yes	Yes	Yes	No	No	No	No	No	No	No
HCR/II	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No
PGR/II	No	No	No	No	No	No	No	No	Yes	No
SoP/II	No	No	No	No	No	No	No	No	Yes	No
HCR/III	Yes	No	No	No	Yes	No	No	No	No	No
PGR/III	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No
SoP/III	Yes	Yes	No	No	Yes	Yes	No	No	No	No
HCR/IV	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No
PGR/IV	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No
SoP/IV	No	No	No	No	Yes	Yes	Yes	No	Yes	No
HCR/V	No	No	No	No	Yes	Yes	No	No	Yes	Yes
PGR/V	No	No	No	No	Yes	Yes	No	No	Yes	Yes
SoP/V	No	No	No	No	Yes	Yes	No	No	Yes	No
HCR/VI	Yes	No	No	No	Yes	No	No	No	No	No
PGR/VI	Yes	Yes	No	No	Yes	Yes	No	No	No	No
SoP/VI	Yes	Yes	No	No	Yes	Yes	No	No	No	No
HCR/VII	Yes	No	No	No	Yes	No	No	No	Yes	Yes
PGR/VII	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No
SoP/VII	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No
HCR/VIII	Yes	Yes	No	No	No	No	No	No	No	No
PGR/VIII	Yes	Yes	No	No	No	No	No	No	No	No
SoP/VIII	Yes	Yes	No	No	No	No	No	No	Yes	No
HCR/IX	Yes	No	No	No	Yes	No	No	No	Yes	No
PGR/IX	Yes	Yes	No	No	No	No	No	No	Yes	No
SoP/IX	Yes	Yes	No	No	No	No	No	No	Yes	No

sub-periods, help to elaborate nexus between quantity and quality of growth.

The economy experienced general depression during 1998-2002 with negative real mean growth among different household categories in all zones except low cropping intensity and rain-fed regions (zone IV and V) of Punjab. The recession was attributed to by the catastrophic drought which adversely affected agriculture sector in general and major crops in particular (GoP, 2002). Resultantly, poverty increased with few exceptions in which growth has either marginally been positive or negative growth turned to be poverty reducing as result of counteracting effect of declining inequality (zone II and IV). The recession at large proved pro-poor in all zones except zone V, suggesting decline in average growth rate of poor's income smaller than decline in ordinary growth rate of farming household's income (Table 4). Positive growth rate of over four percent in zone V proved anti-poor in both relative and absolute terms as result of counteracting effect of rising inequality (Table 1). On the other hand, high growth period (2002-2004) proved anti-poor as result of rising inequality. This high growth period is again followed by negative growth period (2004-2006), particularly amongst agricultural households in majority of regions. Thus growth proved pro-poor amongst those farming households who experienced negative contrary to positive growth rate. High growth period (2006-08) for the most part turned to be anti-poor in both relative as well as absolute terms. Similar conclusions with marginal variation also apply to the poverty gap and severity of poverty. Different zones exhibited varied growth pattern with inverse relationship between growth rate and degree of pro poorness during the terminal period (2008-2011).

 Above explanation identify few important characteristics of economy, like random walk growth pattern with more pronounced variations in farming households' income in contrast to non-farming household; rising inequality during high growth period substantiate highly skewed farm resource distribution; and, pro-poorness of low or negative growth periods suggest reduction in societal income inequality. This clearly substantiates the notion that poverty reduction is twin function of growth and inequality. Therefore, two pronged policy including increase in growth along with equitable farm resource distribution would help increase effectiveness of poverty reduction policies in rural Pakistan.

Conclusions: There has been practice of addressing quantitative aspects of growth and changes in poverty in Pakistan's perspective ignoring its qualitative aspects. The present study has stitched both quantitative and qualitative aspect of growth and poverty reduction at disaggregated levels of nine different agro-climatic zones. The results show variant growth pattern and contribution of poverty by different regions to overall rural poverty. On average, net real growth and reduction in poverty has relatively been higher among farming households in comparison to non-farming households. High contribution of major cropping zones to overall rural poverty substantiates highly skewed farm resource distribution, specifically land and high ratio of crops to overall rural income. Moreover, inter-relationship between growth and poverty reduction is not point-to-point and depends on extent and direction of changes among these variables.

PEGR analysis for the overall studied period shows relative pro-poorness of growth for all poverty measures for zone I, VI, VII, VIII and IX while it turned to be anti pro-poor for zone II and zone V with mixed trends for different measures on remaining zones. On the other hand, growth has been pro-poor in absolute terms for low and negative growth zones (VII and IX). However, considerable volatility in the quality of growth has emerged during different sub-periods. High (low) growth periods are largely found to be anti-poor (pro-poor) while negative growth turned to be pro-poor as well as poverty reducing pro-poor in certain cases. High rural poverty with spatial distribution suggests region specific fiscal incentives and socio-political interventions to increase off-farm employment avenues and curtail rural resource inequalities for convergence in welfare among different segments of rural population for effective reduction in poverty.

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