Investigating Household Common Coping Strategies in Northern Rajasthan using Kendall's Coefficient of Concordance (*W*)

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Abstract

This study was designed to identify common coping strategies in Northern Rajasthan using Kendall's coefficient of concordance approach. The study used primary data from 300 households following multistage random sampling process in the study area. The study found that, the general sequence of coping strategies that all households follow depends on the assets they own and sequence of coping strategies choice agrees each other. Searching for subsidy price, sale of livestock and wage employment are the three topmost coping strategies by overall sampled household in Northern Rajasthan and the Kendall's 'W' of 0.856 indicates that there is 85.6 percent agreement between the respondents in the ranking of the coping strategies among households.Poor householdstopmost three coping strategies arewage employment,relay on less preferred foods and limit portion of size at meal. The coefficient of concordance forPoor households rankingis0.879 with 6 degrees of freedom implies that, there is 87.9 percent agreement among rankings of the respondents concerning the coping strategies of poor households choose to live always the same level of welfare. Searching for subsidy price, sale of livestock, purchase food on credit and wage employment were topmost four coping strategiesranked by non-poor households to live always the same level of welfare. Kendall's coefficient of concordance is 0.943with 6 degrees of freedom fornon-poor households. The value of W shows that 94.3 percent of the sampled non-poor households were in agreement with the order of ranking of the coping strategies.

Key words:*coping strategies,Kendall's coefficient of concordance, Rajasthan, India*

Introduction

A number of studies of household economics have suggested that people who live in conditions which put their livelihood strategies at recurrent risk, will develop strategies to minimize risk to their livelihood. In most studies, the household is taken as the unit of analysis because it is assumed that decisions about production, investment and consumption are taken primarily at the household level.

In economic terms shocks can result in income loss or asset loss but shocks can also cause other disutility like pain, grief or depression. Since the majority of rural households engage in agricultural production, they are particularly prone to ecological shocks, e.g. drought, flooding, crop pests or livestock diseases which cause damage on agricultural output and in turn reduce income from agriculture (Tongruksawattana et al. 2008; Asiimwe and Mpuga, 2007; Pandey et al., 2007).

Concerning responses to shocks, existing studies found that in their choice of coping actions households take types of shocks and household resources into account (e.g. Watts 1983 and 1988). The choice of coping actions also depend on household characteristics, most importantly the diversity and stability of household income sources, household assets and education of the household head (Rashid et al., 2006).

For example, households compensate agricultural income loss through off-farm or non-farm employment, asset sales and borrowing (Kochar, 1999; Newhouse, 2005; Kijima et al., 2006).

The decision whether or not to cope depends not only on types of shocks but also on accumulated effects of all shocks that a household faced. A household is more likely to take a coping action especially when they suffer more often from shocks and the aggregated shock severity is high. Apart from shock-related factors, household and village characteristics may also influence the capability and possibility to take a coping action and choice of a specific coping activity

Several different classifications of coping strategies are used the coping strategy literature. Cutler (1986) describes sequence of coping strategies which fall into three distinct stages as: adaptive strategies (sale of livestock, labor migration, use of credit, and self-employment), sale of key productive assets (sale of tools, sale of animals, sale of land) and mass migration.Rahmato(1987) suggests that the elements of household risk copingstrategiesmay be groupedinto four sequential series of activities. In the first stage of this sequence households would cope with a risk to their livelihood by austerity and reduced food consumption. At the same time there would be increased reliance on loans and transfers of food and assets within and between families. Temporary migration in search of wage employment formed the second stage. Once these options had been exhausted farmers would rely on divestment, but this is selective and gradual and the exact sequence in which assets were sold or mortgaged depended very much on currentmarket conditions. The fourth and terminal stage of these strategies was crisis migration and the decision to resort to this was often taken at a community as well as a household level.According to Frankenberger (1992), when households suffer a shock such as the floods, they do not remain passive but employ several coping strategies. These coping strategies are fallback mechanisms for when habitual means of meeting needs are disrupted. The first thing households do when they suffer a shock is to attempt to minimize risks and manage losses to ensure some minimal level of sustenance. The second strategy employed by households in distress is divestment, or the gradual disposal of assets. Frankenberger (1992) classifies asset disposal as a coping strategy into several phases, with liquid assets, such as jewelry, being disposed of first and productive assets later. When productive assets are disposed of, it becomes more difficult for the person or household to return to a pre-crisis state. Finally, the household or individual may embark upon distress migration, which is a sign of failure to cope with the crisis.

Understanding coping strategy and their pattern of adoption is essential for developing effective poverty alleviation strategies that strengthen household wellbeing. Rural households in Northern Rajasthan continue to adopt different coping strategies. But, these coping strategies were not addressed in detail in literature. Therefore, this study was designed to use primary household survey data to identify common coping strategies in Northern Rajasthan using Kendall's coefficient of concordance approach.

Methodology

Sampling Technique

Multistage stratified random sampling procedure was adopted for the selection of 300 sampled respondents from Northern Rajasthan. Northern part of Rajasthan was purposively selected for this study because of absence of detail similar study.In the second stage, out of seven districts in Northern Rajasthan, giving equal chance for each district, three districts namely Bikaner, Sri Ganga Negar and Nagaur were selected. In the third stage, two *tehsils* from each selected district were selected randomly. Namely: in Bikaner district, Bikaner and Lunkaransar whereas in Sri Ganga Negar, Sadulshahar and Sri Ganganagar further in Nagaur, Merta and Khinwsar *tehsils* were selected randomly.In the fourth

stage, three villages from each selected *tehsil* were selected randomly. Thus, totally eighteen villages from six selected *tehsils* were selected for further selection of households. In the fifth stage, list of all households residing in each selected village from village *Patwari and* voters list available in the village *Sarpanch* were applied to pick out targeted households' using systematic sampling technique. Hundredhouseholds were selected based on size proportional to household size from six randomly selected villages of a *tehsil* by using systematic sampling technique from each district. Thus, total three hundred household's primary data collected with the aid of interview using schedules administered by the researchers were however found useful for this study.

Analytical Techniques

Household coping strategies refer to all the strategically selected acts that households use to survive at the same level and not fall too far below their society's level of welfare. They are householdadjustment strategies made by households in response to internal and external factors, to survive at the same level or attain upward mobility. Different household traditional coping strategies that have been adopted at the household and community level in Northern Rajasthan are important for poverty alleviation policy.

Numerous methods for testing ranking of coping strategieshave been identified from literature and notable among them are Garrett's ranking score techniques, Friedman's two-way analysis of variance and Kendall's coefficient of concordance. There is close relation between Friedman's test and Kendall's coefficient of concordance (Legendre, 2005). They address hypotheses concerning the same data and use Chi squarer test for testing. However, they differ in the formulation of their respective hypothesis. Whereas Friedman's test focuses on the items being ranked, the hypothesis of Kendall's test focuses on the rankers themselves. Garrett's ranking score techniques on the other hand uses average score of the rankers and arrange them in either ascending or descending order. However, the limitation of this method is that it involves a number of steps and it does not test the level of agreements between rankers. Kendall's coefficient of concordance was employed by this study because the Kendall's (*W*) provides the test of agreement of the rankers (respondents), among their rankings which the Friedman's and Garrett's test lack.

For execution of Kendall's coefficient of concordance, data was collected by using the following procedure. For each sampled household, hypothesized seven coping strategies were explained by the enumerator and the household have been asked to rank a list of seven coping strategies, from the most recent option to the last option coping strategies. Following similar procedure, 300 sampled households ranked hypothesizedseven coping strategies. In this section we were interested to create methodology that provides answer for, what are the most widely usedcoping strategies by the households in Northern Rajasthan? Is copping strategies the same among poor and non-poor households? Is there coping strategies ranking agreement among poor and non-poor sampled households? Majority were answered by calculating Kendall's coefficient of concordance (*W*).The formula for the coefficient of concordance W is then given by:

$$w = \frac{\sum\left[T^2 - \left(\sum T\right)^2/n\right)/n]}{m^2(n^2-1)/12} \quad \text{---------- (25)}$$

The formula is further simplified as follows:

$$w = \frac{12\sum\left[T^2 - \left(\sum T\right)^2/n\right)]}{nm^2(n^2-1)} \quad \text{---------- (26)}$$

Where; T = sum of ranks for each coping strategies being ranked.
m= number of rankers (sampled households) and
n = number of coping strategies being ranked

Hypothesis

The following three hypotheses were tested for the coping strategies ranking agreement among sampled households in the study area.

Hypothesis-1

H_0: There is no agreement among the coping strategies by sampled households.

H_1: There is agreement among the coping strategies by sampled households.

Hypothesis-2

H_0: There is no agreement among rankings of coping strategies of poor households.

H_1: There is agreement among rankings of coping strategies of poor households.

Hypothesis-3

H_0: There is no agreement among rankings of coping strategies of non-poor households.

H_1: There is agreement among rankings of coping strategies of non-poor households.

To test the hypotheses Kendall's coefficient of concordance was calculated from our data using Statistical Package for Social Science (SPSS 16.0) and it ranges from 0 (no agreement) to 1 (complete agreement). If the test statistic *W* is 1, then all the survey respondents have been agreed, and each sampled households has assigned the same rank order to the list of coping strategies. If *W* is 0, then there is no overall trend of agreement among the sampled households, and their responses may be regarded as essentially random. The Coefficient of concordance *W* is tested for significance using the F distribution.

Result and Discussion

Household coping strategies are thus,step by step strategic acts based on a conscious assessment of existing, past events and future expectations on factors that are correlated with family welfare.Household choosecoping strategies that are proportionately the most useful to them using their past experience, availability of internal and external household resources (monetary and non-monetary)and agreement with thecommunity norms.It does not mean that all households are using similar coping strategies, but some coping strategies are common to all households.

The main focuses of this study is to get answer for the following key questions. What are the most widely usedpoverty coping strategies by the households in Northern Rajasthan? Is coppingstrategies the same among poor and non-poor households? Is therecoping strategies ranking agreement among poor and non-poorsampled households?

We believe that the coping strategiesdiffer among poor and non-poor sampled households because of difference in asset, income and saving. In this case we could evaluate each group separately, to get comprehensive agreement or dis-agreement coefficient figures on coping strategies.Sampled households coping strategiesrankedaccording to the survey is presented in table 1. *(Note:- this study is sub-part of poverty study done using the same questionnaire, poor and non-poor classification was adopted from that study).*

Table 1:- Coping strategiesin Northern Rajasthan

Coping strategies	Sum of ranks	Ranking
Searching for subsidy price	437	1
Sale of Livestock	574	2
Wage employment	902	3
Purchase food on credit	1189	4
Limit portion of size at meal	1480	5
Relay on less preferred foods	1816	6
Consumption of seed stock	2003	7

Source: Authors' computations, based on household survey data, 2015.

The results ontable 1 depict common coping strategiesin Northern Rajasthan. It is important to note that the sums of ranks were arranged from the least to the highest and the least sum of rank was considered the 1st rank. The reason for this is that, sevencoping strategies were ranked and a value of one (1) was assigned to the mostimmediatecoping strategiesand seven (7) the lastcoping strategiesto survive always the same level of welfare.The results show that searching for subsidy price, sale of livestock and wage employment are the three topmost coping strategies by the sampled household in Northern Rajasthan. Consumption of seed stockwas ranked the least in terms of their ranking.More than comparing total ranking scores, averages gives a good picture of overall household coping strategies agreement and helps to see degree of agreementwith the order of ranking of the coping strategies.

Table2:- Coping strategies using mean rankin Northern Rajasthan

Coping strategies	Mean rank
Searching for subsidy price	1.46
Sale of livestock	1.92
Purchase food on credit	3.02
Wage employment	3.97
Limit portion of size at meal	4.92
Relay on less preferred foods	6.04
Consumption of seed stock	6.67
Number of observation	300
Kendall's Coefficient of Concordance(*W)*0.856	
Chi-square	1540
df	6
Assymp. Sig.	0.000

Source: Authors' computations, based on household survey data, 2015.

Table 2 show sampled households coping strategies in Northern Rajasthan according to the survey.The Kendall's 'W' is found to be 0.856and significant at 1% level.The resultindicates that there is high level of agreement among the coping strategiesby sampled households.The null hypothesis is rejected in support of the alternate hypothesis. The Kendall's 'W' of 0.856indicates that there is 85.6 percent agreement between the respondents in the ranking of the coping strategiesin Northern Rajasthan. Among the identified coping strategies, searching for subsidy price,sale of livestock,purchase food on credit andwage employment are the top four most coping strategies in the area (Table2).Purchasing itemsfrom subsidized centers is common and topmostcoping strategies in Northern Rajasthan. In economics subsidized center buying is called 'price buying',price buying does save money, but it costs a great deal of time. People engage in time consuming shopping trips to save a few rupees. Each livestock species playing an integral and interconnected role in rural households lives not only in regular time but also in critical time. In the study are households meaningfully using sale of livestock as their coping strategies.The process is generally selective and gradual. Our key informants informed that, depending on type and level of severity of the crisis faced by household,households start by selling their smaller stock,followed by young cattle,then cows and finally buffalo.Selling buffalo is the last option to cope with the crises. Also,at time of heavy income stress, households often resort to selling small animals so as to get money.In the study area, households can take coping strategy actions such aspurchase food on credit when they do not have enough food or money to buy food. Households purchase food on credit from private stores, shops, to increase short-term availability of food. This coping strategy choose also agrees with the outcome of Palak Gupta, etal (2015) on their research around Delhi they found that 13.2 percenthouseholds used purchase food on credit coping strategy. Similarly, households in the study area also practiced wage employment,limit portion of size at meal,relay on less preferred foods and consumption of seed stock coping strategies but they ranked them as the last optioncoping strategies.

Poor and non-poor differ in asset and income; they use their asset and income in different ways. We assume, this asset and income difference also can create difference in coping strategies they adopt. Table 3 presents the rankings of the coping strategies poor households choose to livealways the same level of welfare.The total sum of their ranks on each coping strategiesis then used to determine the relative importance of coping strategies.

Table 3:- Poor sampled householdscoping strategiesin Northern Rajasthan

Coping strategies	Sum of ranks	Ranking
Wage employment	74	1
Relay on less preferred foods	117	2
Limit portion of size at meal	122	3
Searching for subsidy price	221	4
Sale of livestock	262	5
Consumption of seed stock	323	6
Purchase food on credit	336	7

Source: Authors' computations, based on household survey data, 2015.

As expected, poor sampled households coping strategy is different from non-poor.For Poor households, wage employment,relay on less preferred foods and limit portion of size at meal are topmost three coping strategies.Theimmediate coping strategy forpoor households iswage employment; they tend to increase labour supply to maintain a minimal level of consumption for their family members. They depend onlabour supplybecause they do not have sufficient savings. The higher its level of labour supply, the more likely it is to finding a supplementary job to increasing home consumption.Poor household cope byrelay on less preferred foods. They cope with this strategy because less preferred foods cost less price and increase continuous availability of food in the family. They also cope with limitingportion of size at meal, by shrinking usual kitchen dishes to smaller size to prepare lesser volume of food. Additionally, poor household cope with depending onsubsidedprice, sale of livestock, consumption of seed stock and purchasefood on credit. For poor households,purchasefood on credit is last optionbecause they do not have secured future income for compensation of the debt. The rankingsmade by poor sampled household on coping strategy agree to each other or not is presented on table 4.

Table 4:-Poor sampled households coping strategiesin Northern Rajasthan

Coping strategies	Mean rank
Wage employment	1.42
Relay on less preferred foods	2.25
Limit portion of size at meal	2.35
Searching for subsidy price	4.25
Sale of livestock	5.05
Consumption of seed stock	6.22
Purchase food on credit	6.46
Number of observation	52
Kendall's Coefficient of Concordance(*W)*0.879	
Chi-square	274.12
df	6
Assymp. Sig.	0.000

Source: Authors' computations, based on household survey data, 2015.

The coefficient of concordance is 0.879 with 6 degrees of freedom. This coefficient is significant at 1 percent. This implies that, there is 87.9 percent agreement among rankings of the respondents concerning the coping strategies of poorhouseholds choose to livealways the same level of welfare. The asymptotic significance was 100%, which represents the fact that, there was a 100% agreement among the various rankings that 87.9 percent of the coefficient of concordance is correct. Hence, the null hypothesis which states that there is no agreement among poor households concerning the coping strategieschooses ranking to livealways the same level of welfareis rejected in favour of the alternative thus; there is agreement among poor householdsconcerning the coping strategieschooseranking to livealways the same level of welfare.

Results from Kendall's Coefficient of concordancealso match with the sum of ranking result on table 3 to identify principalcoping strategies.Indicate that, wage employment had a mean rank of 1.42,

representing themost immediate option ranking order by poor households, relay on less preferred foods withmean rank of 2.25,limit portion of size at meal withmean rank of2.35,searching for subsidy pricewithmean rank of 4.25,Sale of livestockwithmean rank of 5.05,consumption of seed stockwithmean rank of 6.22 and purchase food on creditwithmean rank of 6.46 were found in similar order as revealed on table 5.

Table 5:- Non-poor sampled householdscoping strategiesin Northern Rajasthan

Coping strategies	Sum of ranks	Ranking
Searching for subsidy price	322	1
Sale of livestock	455	2
Purchase food on credit	748	3
Wage employment	975	4
Limit portion of size at meal	1232	5
Consumption of seed stock	1510	6
Relay on less preferred foods	1702	7

Source: Authors' computations, based on household survey data, 2015.

Table 5 depicts non-poor sampled households coping strategies rankingin the study area.Searching for subsidy price is topmost immediate optionof coping strategychoose by non-poor households tolivealways the same level of welfare. Sale of livestock, purchase food on credit and wage employment were amongst some of the pressing coping strategies ranking 2nd, 3rd and 4th with the total sum rank of 455, 748 and 975 respectively.Relay on less preferred foods and consumption of seed stockcoping strategies were ranked as last optioncoping strategies with the total sum rank of1,702 and1,510respectively. The possible reason is that, non-poor households more likely to use existing assets like livestock and saving to buy preferred foods from subsidized shops rather than consuming seed stock. More than comparing total ranking scores, averages gives a good picture of overall household coping strategies agreement and establishes baseline for monitoring trends of coping strategies overtime.Accordingly, averagedranking agreement result among non-poor sampled households presented on table 6 also helps to see howcoping strategies ranked by non-poor households agree to each other in the study area.

Table 6:-Non-Poor sampled households coping strategiesin Northern Rajasthan

Coping strategies	Mean rank
Searching for subsidy price	1.30
Sale of livestock	1.83
Purchase food on credit	3.02
Wage employment	3.94

Limit portion of size at meal	4.96
Consumption of seed stock	6.08
Relay on less preferred foods	6.86
Number of observation	248
Kendall's Coefficient of Concordance(*W)*0.943	
Chi-square	274.12
df	6
Assymp. Sig.	0.000

Source: Authors' computations, based on household survey data, 2015.

Table 6 result shows that Kendall's coefficient of concordance is 0.943with 6 degrees of freedom.This coefficient is significant at 1 percent.The value of W shows that 94.3 percent of the sampled non-poor households were in agreement with the order of ranking of the coping strategies.The asymptotic significance was 100%, which represents the fact that, there was a 100percent agreement among the various rankings that 94.3 percent of the coefficient of concordance is correct. Hence, the null hypothesis which states that there is no agreement among non-poor households concerning the coping strategies choose order of ranking to livealways the same level of welfareis rejected in favour of the alternative thus; there is agreement among poor householdsconcerning the coping strategieschoose order of ranking to livealways the same level of welfare.

Due to varying degrees of wealth among non-poor households, different coping behaviors are adopted by households at different livelihood levels.But, the following coping strategies were identified to be the most used in the study area bynon-poor households.Searching for subsidy price was identified as the most immediate option coping strategies while relay on less preferred foods was identified as the last optioncoping strategiesby sampled non-poor respondents, with a mean rank of 1.30and6.86 respectively. Next to subsidy price, depending on the status of family livelihood, non-poor household can adopt also livestock salewith mean ranking of 1.83, purchase food on creditwith mean ranking of 3.02, wage employmentwith mean ranking of 3.94, limit portion of size at mealwith mean ranking of 4.96 and consumption of seed stockwith mean ranking of 6.08coping strategies. Generally clear differences exist in the use of the strategies depending on the welfare level of households.

Conclusions and Recommendations

Searching for subsidy price, sale of livestock and wage employment are the three topmost coping strategies by the sampled household in Northern Rajasthan. Consumption of seed stockwas ranked the least in terms of their ranking.The Kendall's 'W' is found to be 0.856and significant at 1% level.The resultindicates that there is high level of agreement among the coping strategiesby sampled households.The Kendall's 'W' of 0.856indicates that there is 85.6 percent agreement between the respondents in the ranking of the coping strategiesin the study area.

Poor sampled households coping strategy is different from non-poor.For poor households, wage employment,relay on less preferred foods and limit portion of size at meal are topmost three coping strategies. For poor households,purchasefood on credit is last optionbecause they do not have secured future income for compensation of the debt.Theimmediate coping strategy forpoor households iswage employment; they tend to increase labour supply to maintain a minimal level of consumption for their family members. They depend onlabour supplybecause they do not have sufficient savings.The

coefficient of concordance is 0.879 with 6 degrees of freedom. This coefficient is significant at 1 percent. This implies that, there is 87.9 percent agreement among rankings of the respondents concerning the coping strategies of poorhouseholds choose to livealways the same level of welfare. The asymptotic significance was 100%, which represents the fact that, there was a 100% agreement among the various rankings that 87.9 percent of the coefficient of concordance is correct.Indicate that, wage employment had a mean rank of 1.42, representing themost immediate option ranking order by poor households, relay on less preferred foods withmean rank of 2.25,limit portion of size at meal withmean rank of2.35,searching for subsidy pricewithmean rank of 4.25,Sale of livestockwithmean rank of 5.05,consumption of seed stockwithmean rank of 6.22 and purchase food on creditwithmean rank of 6.46.

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Results indicate that the general sequence of coping strategies that all households follow depends on the assets they own and agrees each other. Further the result shows there is a general sequence of different types of strategies that households adopt sequentially as stress becomes more prolonged, initially adopting strategies that will not jeopardize future earnings, and only resorting to strategies that will reduce future earnings if necessary.Tomaintain always the same level of welfare for rural households,policy instruments thatdiversity and secures stable sources of incomeor securing more stable forms of employment like social safety nets on village level are important.

References

Asiimwe, J.B. and P. Mpuga (2007).Implications of Rainfall Shocks for Household Income and Consumption in Uganda.AERC Research Paper 168. African Economic Research Consortium, Nairobi.

Cutler, P. (1986) The Response to Drought of Beja Famine Refugees in Sudan. Disasters. Vol. 10, No. 3, pp. 181-188.

Frankenberger, T. 1992. Indicators and data collection methods for assessing household food security. In Household food security: Concepts, indicators, measurements. A technical review, ed. S. Maxwell and T. Frankenberger. New York and Rome: UNICEF and IFAD.

Kijima, Y., Matsumoto, T. and T. Yamano (2006) Nonfarm Employment, Agricultural Shocks, and Poverty Dynamics: Evidence from Rural Uganda.Agricultural Economics.Vol. 35, supplement, pp. 459-467.

Kochar, A. (1999) Smoothing Consumption by Smoothing Income: Hours-of-Work Responses to Idiosyncratic agricultural Shocks in Rural India. The Review of Economics and Statistics. Vol. 81, No. 1, pp. 50-61.

Legendre, P. (2005). Species Associations: The Kendall Coefficient of Concordance Revisited. AmericanStatistical Association and the International Biometric Society, Journal of Agricultural, Biological.

Newhouse, D.L. (2005) The Persistence of Income Shocks: Evidence from Rural Indonesia. Review of Development Economics. Vol. 9, No. 3, pp. 415-433.

Pandey, S., Bhandari, H., Ding, Sh., Prapertchob, P., Sharan, R., Naik, D., Taunk, S.K. and A. Sastri (2007) Coping with Drought in Rice Farming in Asia: Insights from a Cross-country Comparative Study. Agricultural Economics. Vol. 37, No. 1, pp. 213-224.

Rahmato.D. (1987).Famine and survival strategies: A case study from Northeast Ethiopia, Food and Famine Monograph Series No. 1, Institute of Development Research (Addis Ababa: Addis Ababa University).

Rashid, D.A., Langworthy, M. and S. Aradhyula (2006) Livelihood Shocks and Coping Strategies: An Empirical Study of Bangladesh Households. Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Long Beach, California, July 23-26, 2006.

Tongruksawattana, T., Schmidt, E. and H. Waibel (2008).Understanding Vulnerability to Poverty of Rural Agricultural Households in Northeastern Thailand.Tropentag, Hohenheim.

Watts, M. (1983) Silent Violence: Food, Famine and Peasantry in Northern Nigeria. Berkeley, CA, USA: University of California Press.

Watts, M. (1988) Coping with the Market: Uncertainty and Food Security Among Hausa Peasants. In Coping with Uncertainty in Food Supply, I. De Garine and G.A. Harrison, eds., 260-290. Oxford: Clarendon Press.