Seasonal Consumption Smoothing in Rural Zambia

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Abstract

The purpose of this article is to investigate how farmers smooth their consumption level against fluctuating income. We discuss several issues using household survey data collected in rural Zambia from November 2007 to October 2009. First, we demonstrate that farmers smooth their consumption levels of staple foods, and vegetables and fruit, and that they use animal/fish products and non-food items as buffers. Second, we illustrate that cash in hand plays a critical role in smoothing consumption levels of staple foods, and vegetables, and fruit. Finally, we show that wild food items collected from the bush are also important in smoothing the consumption levels of vegetables and fruit when these are not available from the farmers' own land.

1. Introduction

It is widely recognized that while rural farmers face a number of income risks, they have developed a variety of strategies to mitigate these, including the diversification of income sources, risk-sharing with friends and relatives, and settlement in safe areas (Fafchamps, 2003). From the viewpoints of economics, farmers will improve their welfare if they smooth their consumption levels. However, a change in consumption and its sources are in themselves important strategies to manage unexpected falls in income, although consumption levels do not appear to be smoothed by such strategies (it is possibly their utility that may be smoothed). Nevertheless, existing literature provides little empirical evidence regarding changes farmers may make to their consumption to mitigate income shocks during and after a shock event. One explanation for a lack of evidence is that there is no dataset available to enable such an empirical study. However, household survey data sourced from the Resilience Project includes high-frequency panel data regarding household consumption during a period when farmers suffered through heavy rainfalls. This data provided us with a rare opportunity to investigate the consumption adjustment behavior of farmers when they experienced income fluctuations. Thus, the aim of this article is to describe how surveyed households change the composition and source of consumption over a two-year period, to better enable us to develop an empirically testable hypothesis for future research.

2. Survey Outline and Methodology

The household survey data used in this paper were collected in rural Zambia as part of the Resilience Project. The study area is located in Choma and Sinazongwe districts, Southern Province, Zambia, and is divided into three ecological zones: site A (a lower flat land zone near Lake Kariba), site B (a middle slope zone), and site C (an upper land zone on the plateau). Five villages were selected for the household survey; two villages are in site A (Sianemba and Siameja),

two are in site B (Chanzika and Kanego), and one is in site C (Siachaya). Sixteen households were chosen from each study site and were subject to weekly interviews beginning November 2007 (Sakurai 2008).

This article uses data from a two-year period, November 2007–October 2009, and employs a descriptive statistics analysis. The total value of household consumption per week was divided by adult equivalent household size, and then averaged for each site and each month. The monthly consumption per week per adult equivalent for each site was further deflated by a site-specific price index obtained from our survey data. Thus, we have a series of real consumption covering a two-year period for each site. However, due to flaws in the survey data, we omitted data regarding June 2008 for all sites, and January and April 2008 for site C. In addition, site C data from November 2007 to October 2008 are unreliable and the figures are presented for reference only.

3. Results and Discussion

First, in this section, we will illustrate the overall seasonal consumption changes to enable a better understanding of seasonal consumption smoothing. Second, we examine the role of non-food goods in smoothing food consumption levels. Finally, we divide food items into three categories (staple foods, vegetables and fruit, and animal products) and examine each category.

3.1. Overall seasonal consumption change

Table 1 shows the monthly consumption level per week per adult equivalent averaged over a two-year period for each study site. Comparisons among the three sites show that consumption per adult equivalent is highest in site B and lowest in site A. With regard to consumption composition, average consumption levels for food range from 83.7% to 88.5% for the three sites and 11.5% to 16.3% for non-food items (e.g., household goods and services). Moreover, the average consumption levels for cereals (non-processed and processed staple foods) range from 50.5% to 52.6%, 12.8% to 20.1% for vegetables, and animal products range from 8.2% to 9.6%. Although site C does not have the highest total consumption rate, its consumption share for household goods and services is the highest among the three sites.

Table 1. Average Value of Consumption per Week per Adult Equivalent[1]

	non–processed staple foods	vegetables	fruits	processed staple foods	animal products	food items collected in the Bush	Industrial Food Products	Household Goods	Service	total
SITE A	11775	6959	186	5677	3305	234	2474	2506	1447	34563
	34.1%	20.1%	0.5%	16.4%	9.6%	0.7%	7.2%	7.3%	4.2%	100.0%
SITE B	18825	5953	383	5750	5756	823	3493	3935	1745	46663
	40.3%	12.8%	0.8%	12.3%	12.3%	1.8%	7.5%	8.4%	3.7%	100.0%
SITE C	13626	7299	207	8651	3607	561	2817	5308	1832	43908
	31.0%	16.6%	0.5%	19.7%	8.2%	1.3%	6.4%	12.1%	4.2%	100.0%

1 Numbers are in ZMK deflated by price index (=1 as of November 2007 in site A)

Figure 1, presents monthly changes in average consumption per week per adult equivalent. Although most households are farmers and obtain their main income only at harvest time, average consumption levels appear to be smoothed. However, when we examine each consumption category individually, consumption levels seem to fluctuate. We will discuss each consumption category in the remainder of this section.
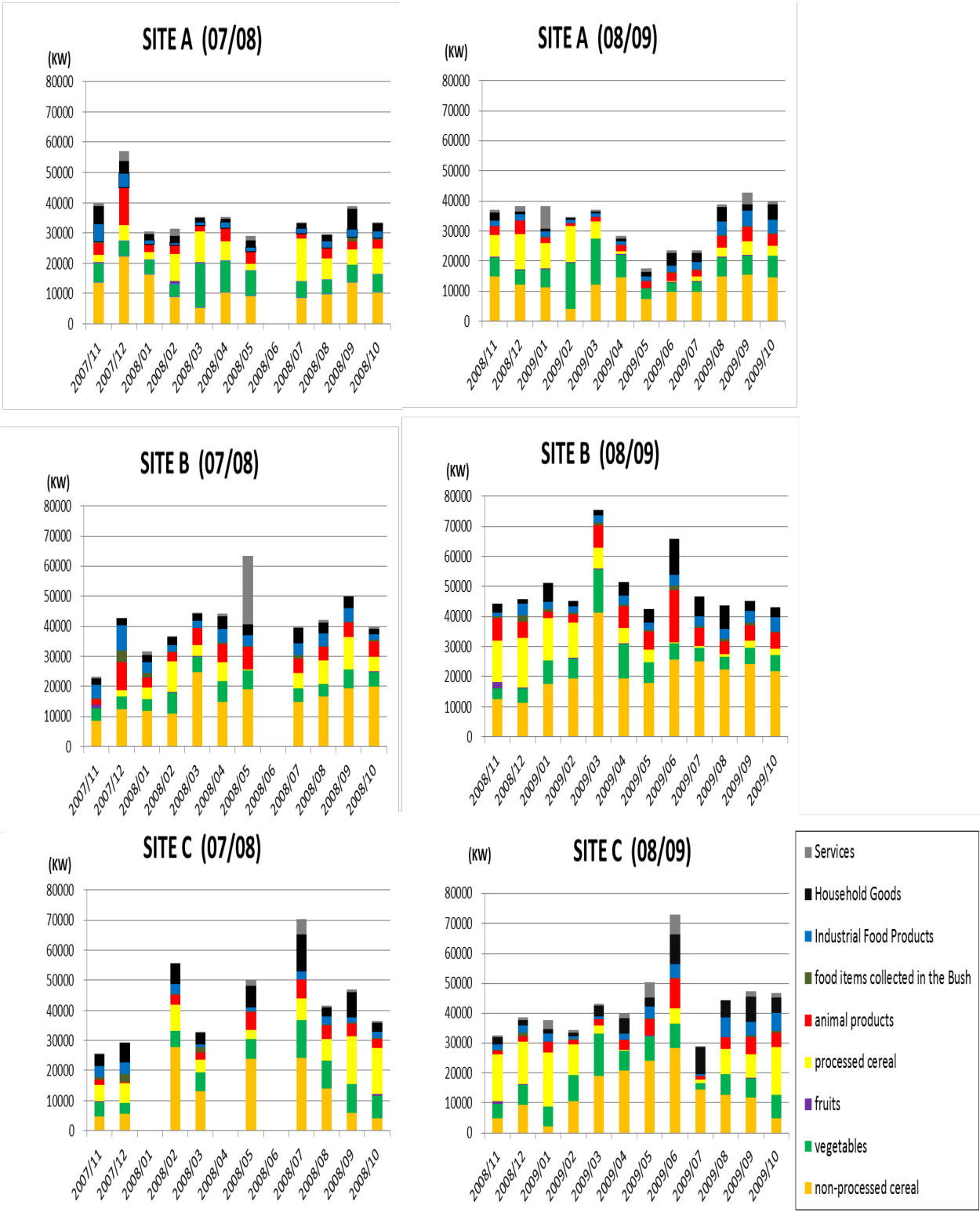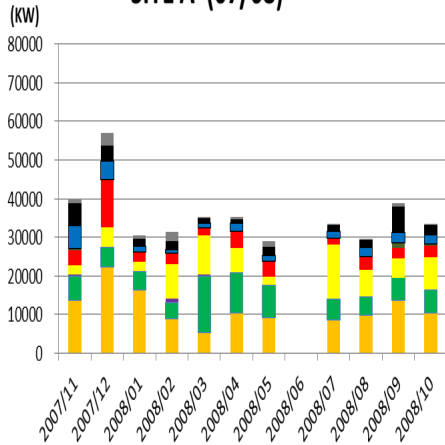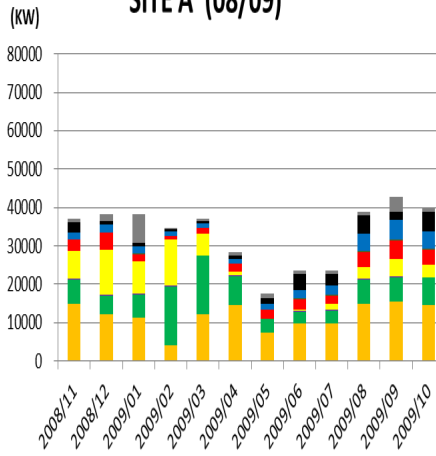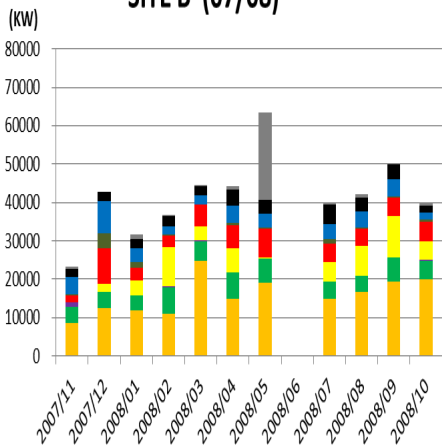

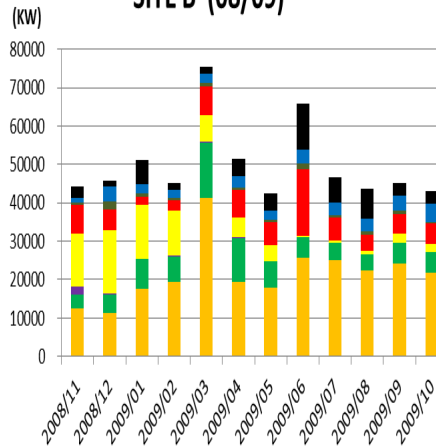**Figure 1. Monthly Changes in Consumption Levels and Composition**

SITE A (07/08)

SITE A (08/09)

SITE B (07/08)

SITE B (08/09)

SITE C (07/08)

SITE C (08/09)

Legend:
- Services
- Household Goods
- Industrial Food Products
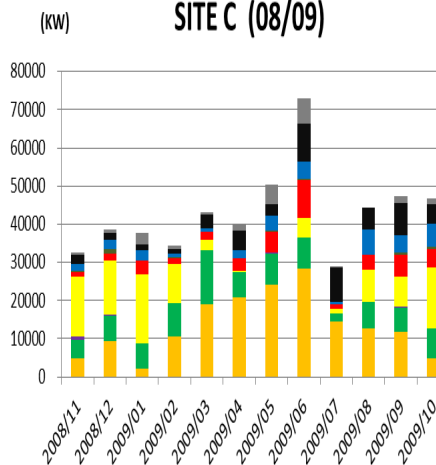- food items collected in the Bush
- animal products
- processed cereal
- fruits
- vegetables
- non-processed cereal
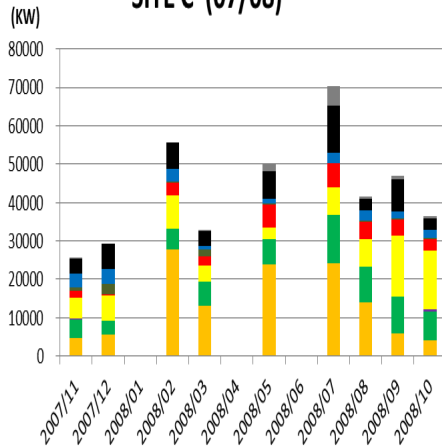
3.2. Comparison of food and non-food consumption

Figure 2 shows the diremption of monthly consumption levels from the mean consumption levels[1] for each site. This figure demonstrates that there is a positive correlation between diremption of total consumption and that of non-food consumption. Moreover, compared with the diremption of total consumption food, the diremption of non-food consumption fluctuates more widely. These points imply that non-food item may be serving as a buffer for food consumption.
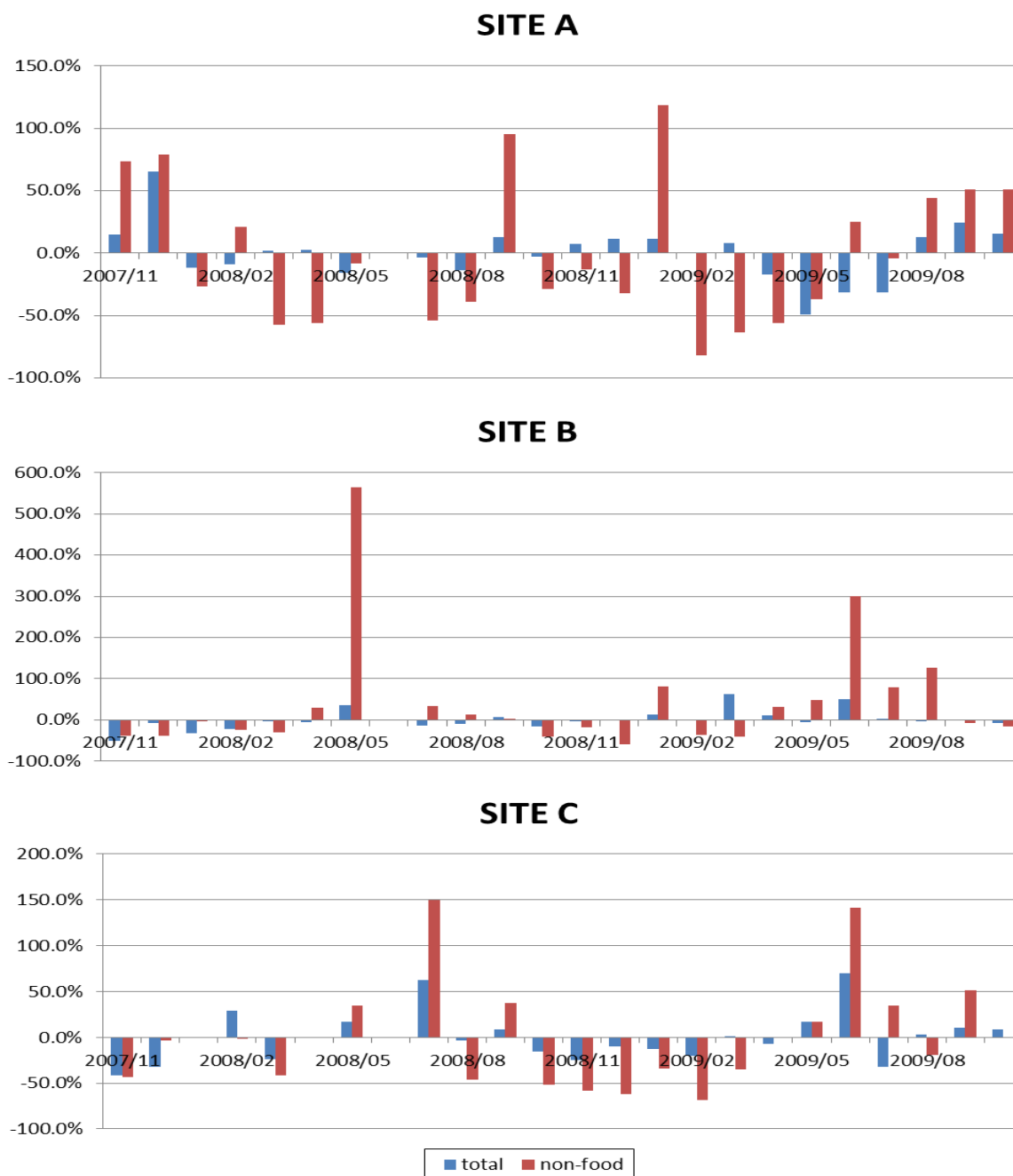

Figure 2 Diremption of Total and Non-Food Consumption from the Means

[1] Diremption = (consumption level–average consumption level)/average consumption level $\times$ 100. The average level is based on monthly data from November 2007 to October 2009.

3.3. Food consumption and food sources
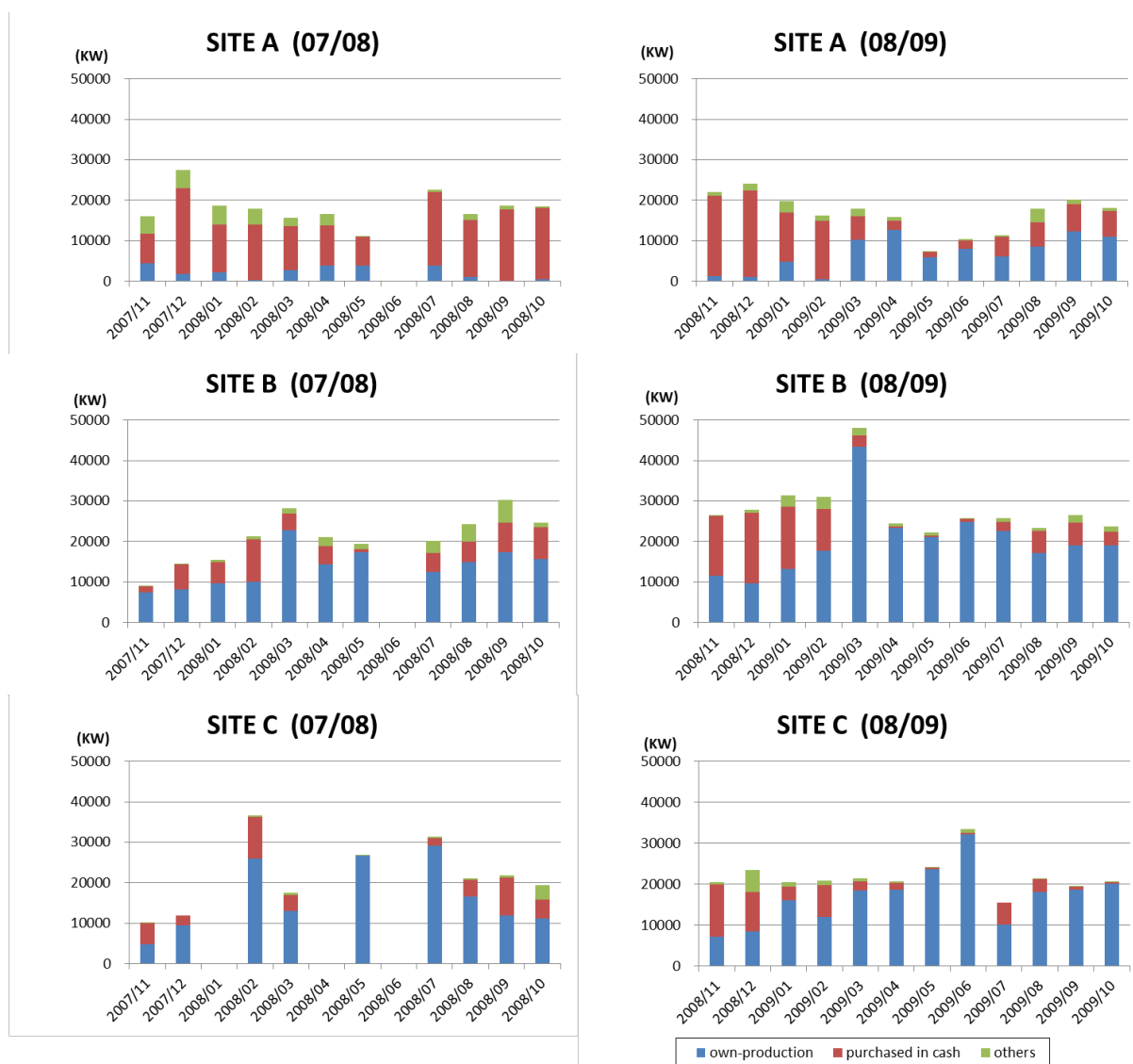
3.3.1 Staple foods

Figure 3. Monthly Staple Food Consumption and Food Sources

Figure 3, illustrates monthly real values for staple food consumption (cereal, beans, and potatoes) and the source of the items (please note, maize constitutes more than two-thirds of staple food consumption in the study sites). The following salient points are shown in Figure 3. First, while households in sites B and C use mainly self-produced staple foods, households in site A rely more on cash purchases than on self-produced food items. This suggests that cash earning activities, such as non-agricultural businesses, livestock sales, and cotton production, play critical roles in obtaining staple food items for site A households. Second, aside from a couple of exceptions, total consumption levels regarding staple foods appear to be smoothed throughout the survey period. Third, cash purchases play an important role in smoothing staple food consumption. For example, in sites B and C, even though consumption levels for self-produced items vary each month during

the 2008/09 crop year, total consumption remains relatively stable year-round because households purchase staple foods using cash. In contrast, if we compare staple food consumption in site B between the two crop seasons, i.e., between November and February 2007/08 and again in 2008/09, the consumption level for self-produced items is relatively stable but the total consumption level is much higher in 2008/09 than in 2007/08. One explanation for these results is that these farmers failed to purchase staple food items using cash during the 2007/08 crop season for some unknown reason. Finally, we observed food obtained from "other" sources, especially from November 2007 to April 2008 at site A and from July to October 2008 at site B. The majority of food sourced in this manner was wheat distributed as food aid. However, judging from the source of consumed staple foods, farmers in site B appear to have already owned sufficient quantities of staple foods in July–October 2008. This suggests that food aid may not have been distributed when it was really needed.
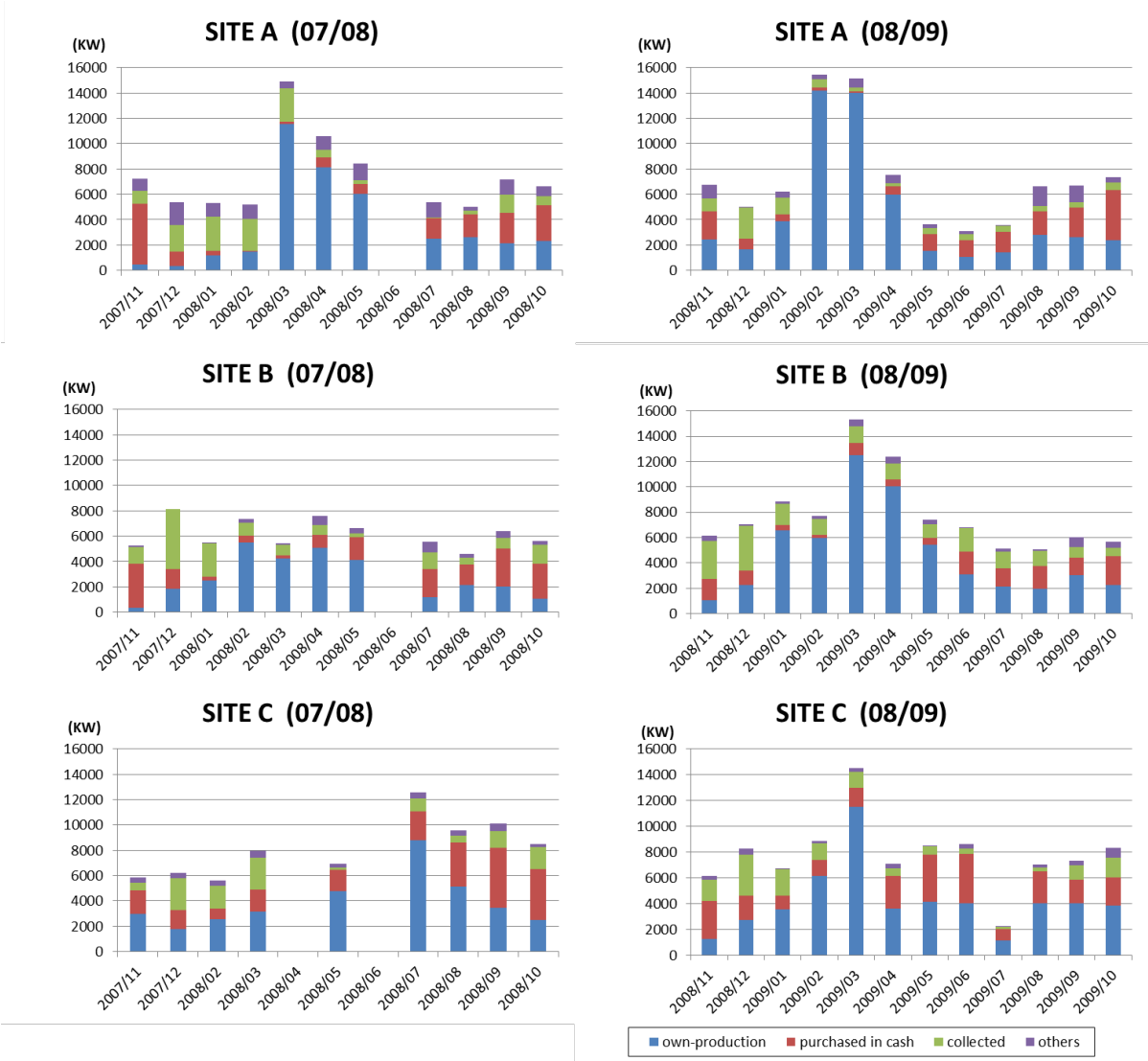

Figure 4. Monthly Vegetable and Fruit Consumption and Sources

3.3.2 Vegetables and fruit (including wild food items collected from the bush)

Figure 4, illustrates the monthly consumption of vegetables and fruit and their sources. Interestingly, from February to April each year during the harvest period, farmers consume large quantities of self-produced vegetables (and lesser amounts of fruit). With the exception of this period, consumption levels regarding vegetables and fruit are virtually smoothed year-round, with self-produced items representing a significant share. Considering the perishable nature of vegetables and fruit, self-production implies that farmers (at least some of them) have access to water even in the dry season and are able to grow produce. However, to smooth their consumption levels, the collection of wild food items is also important. For example, from December to February during the rainy season, the collection of wild vegetables and fruit comprises the majority of consumed items in sites A and B. Please note, all natural plants, including mushrooms, are classified as vegetables and fruit in this study and only a small number are considered to be a staple food item (e.g., a wild tuber).
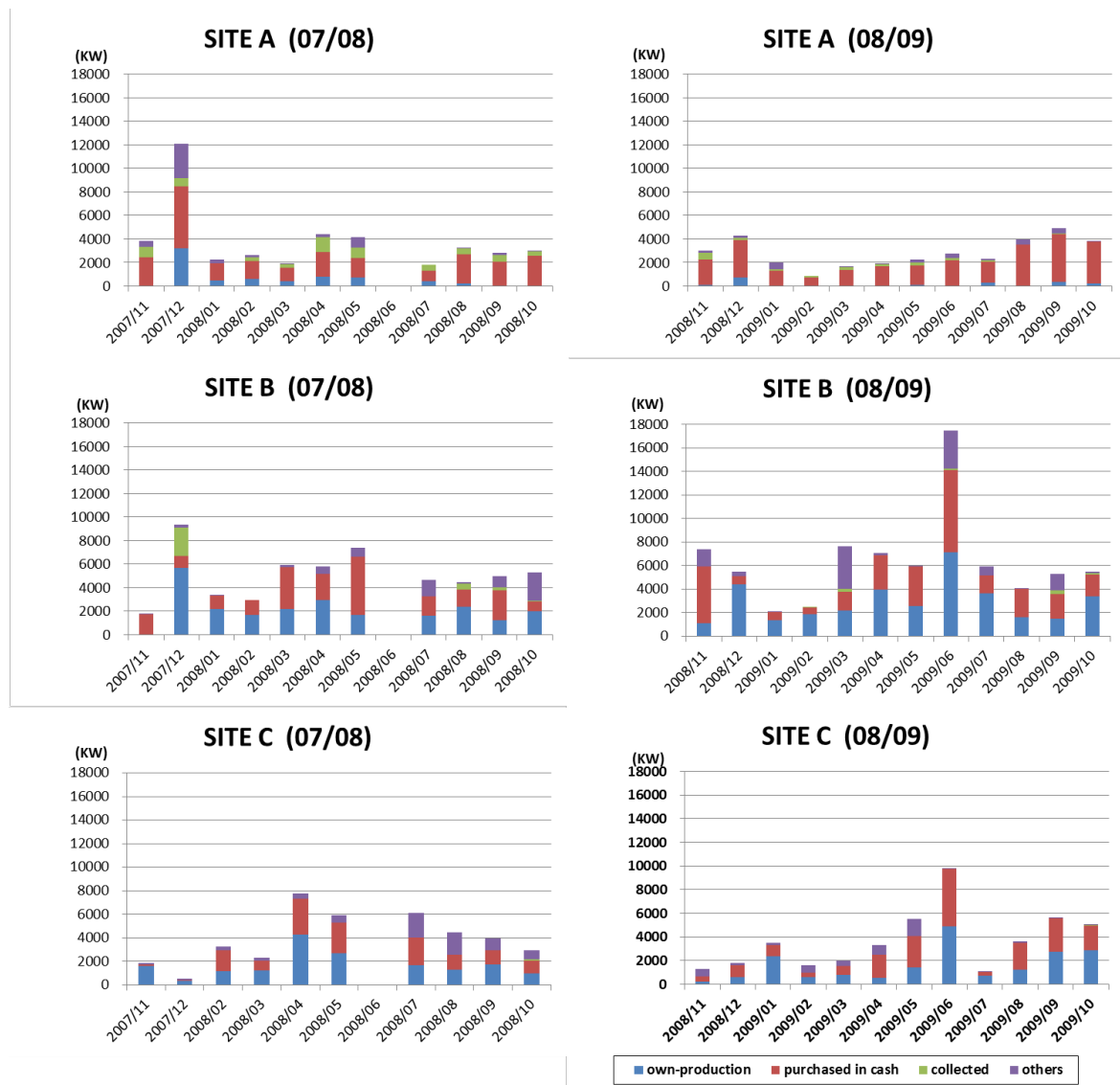

Figure 5. Monthly Consumption of Animal/Fish Products

3.3.3 Animal and fish products

Figure 5, illustrates the monthly consumption of animal and fish products (e.g., animal/bird meat, milk and eggs, and fish) and their sources. In contrast to other food items, the total value of consumption does not appear to be smoothed. The December 2007 peak for site A represents a high level of meat consumption during the Christmas season. Consumption levels show a reduction for Christmas 2008, possibly due to economic hardship after a poor agricultural season in 2007/08. Similar consumption patterns are observed in site B to some extent, but are not seen for site C, although they also celebrate Christmas as Christians. In contrast, there is a peak in June 2009 (we are unable to confirm if there was a peak in June 2008 due to missing data) for sites B and C. We are unable to provide any explanation regarding these high meat consumption levels as those surveyed commented that the consumption was "usual".

Figure 6, shows the diremption from the mean consumption levels at each site. Like non-food items, there is a positive correlation between the diremption of total consumption and that of animal/fish consumption. In addition, compared with the diremption of total consumption, the diremption of animal/fish consumption fluctuates in a wider region. These results imply that animal/fish products are a buffer for the consumption of staple foods, and vegetables and fruit.

4. Conclusion

This article has discussed how farmers in rural Zambia adjust consumption levels and its composition to mitigate the impact of income fluctuations. First, we demonstrated that farmers smooth their consumption level of staple foods, and vegetables and fruit, and that they use animal/fish products and non-food items as buffers. Second, we illustrated that cash purchases played a critical role in smoothing consumption levels regarding staple foods, and vegetables and fruit. Finally, we showed that the collection of wild food items also played an important role in the smoothing of consumption levels for vegetables and fruit.

In this article, we focused on descriptive analyses for consumption, while fluctuations in income levels occurred naturally in the study sites. Thus, further studies are required to examine the relationship between consumption and income. Moreover, this article does not examine how farmers obtain their money. As the surveyed farmers have varying abilities to earn money, it would be wise to investigate this further to determine which households are better able to smooth consumption. Lastly, farmers are not only receiving income from non-agricultural sources, but may also be smoothing their income by agricultural means. Further work is required to determine how farmers are in fact smoothing their income.

References

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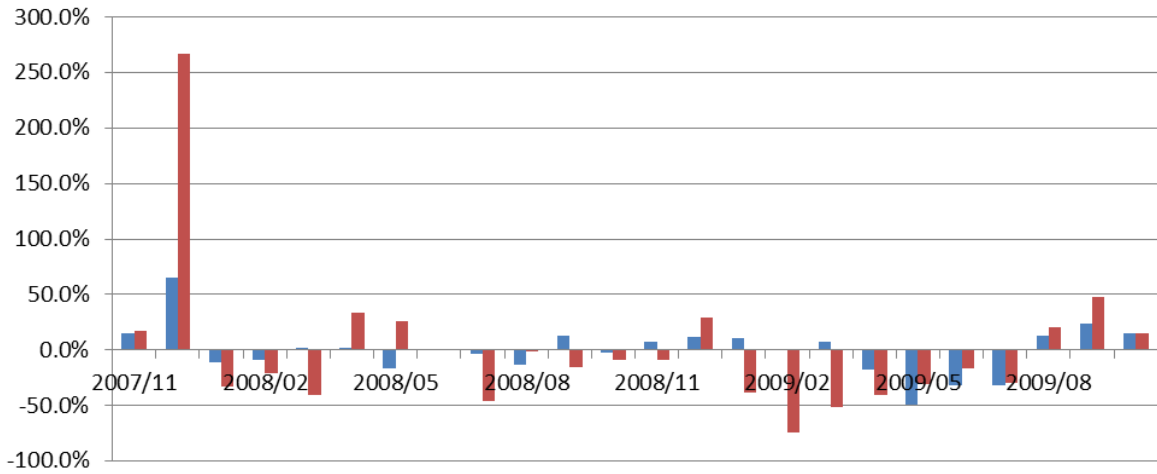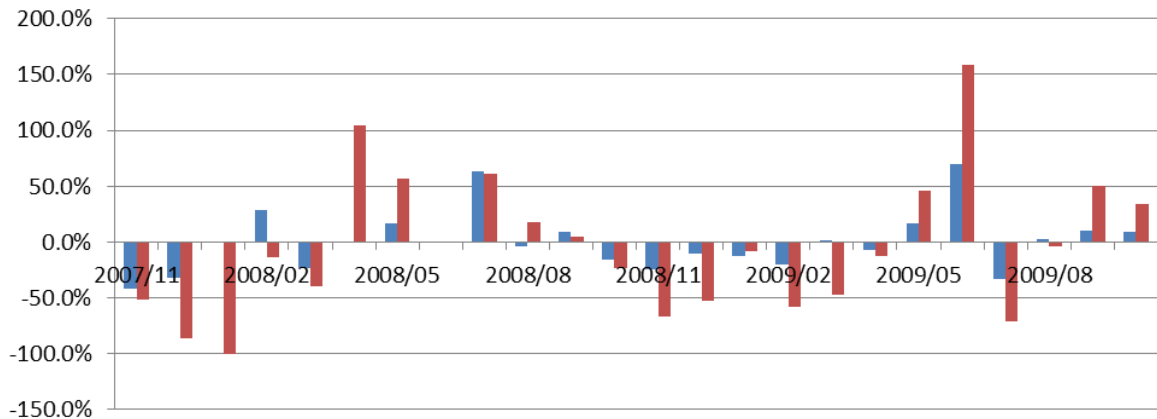
Figure 6 Diremption of Total and Animal/Fish Consumption from Mean Values