



Bank of Papua New Guinea

# FINANCIAL DIARIES OF LOW INCOME HOUSEHOLDS IN PAPUA NEW GUINEA

## TOPICAL BRIEF: LIVELIHOODS



Created by the Pacific Financial Inclusion Programme and Microfinance Opportunities

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## TOPICAL BRIEF: LIVELIHOODS

### ACRONYMS

**PGK** Papua New Guinean Kina

### DEFINITIONS

**Active Respondent** An active respondent is a respondent that has more than 5 weeks of data; those weeks do not have to occur consecutively.

**Cash Transfers** A cash gift or an intra-household transfer of cash.

**Informal Network** An unregulated financial network based primarily on relationships between family members, friends, and associates. This is in contrast to a formal network which contains regulated, government-recognized providers of financial services.

**Intra-Household Cash Transfer** A cash transfer between two members of a family who live in the same home. For instance, a husband transferring money to his wife would be an intra-household cash transfer while a father transferring money to his adult son in another home is not.

**Wantok** An informal social network on which an individual can call for assistance.

### ABOUT THIS BRIEF

This brief focuses on the sources and patterns of income on which respondents in the Financial Diaries study relied for their livelihoods. This helps shed light on the economic strengths and dependencies of individuals in the study. In addition to analyzing major sources of income, analyzing livelihoods provides detail on the wide variety of earnings flows that different individuals experience, for example intermittent flows versus regular flows. Categorizing these flows, creates a typology of livelihoods that provides insights into the different types of financial management challenges that respondents face. This typology provides a segmentation of the population according to behavior, rather than socio-economic characteristics, that can help the private sector and policy-makers more accurately tailor their product and service offerings and policy interventions to the needs of individuals in different segments.

### KEY FINDINGS

- On the whole, the vast majority of income flows were the result of the sale of a range of agricultural products.
  - While there is diversification of these products (oil palm, coffee, fisheries, etc.) across Papua New Guinea, a crop failure within a specialized agricultural community could be devastating.
  - This suggests that crop insurance, or something similar, could have significant value for many individuals.
- Echoing both the “Share of Wallet” and “Financial Networks” briefs,<sup>1</sup> people’s livelihoods are subject to significant transaction costs associated with the lack of physical and financial infrastructure.
  - Men travelled relatively farther than women both to perform income generating activities as well as complete business related expenditures.
  - These transactions costs varied significantly for each site and were not as pronounced for business expenditures as they were for household expenditures.
  - Regardless, this serves as further evidence that stakeholders interested in financial inclusion must address ways to mitigate individuals’ transaction costs.
- Respondents fell into one of four income flow segments:
  - High variability and high vulnerability
  - High variability and low vulnerability
  - Low variability and high vulnerability
  - Low variability and low vulnerability

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<sup>1</sup> For this and other references to these briefs, see *MFO/PFIP (2013). Financial Diaries of Low Income Households in Papua New Guinea – Topical Brief: Share of Wallet and Topical Brief: Financial Networks*

## TOPICAL BRIEF: LIVELIHOODS

- The clearly defined behavior associated with these flows suggests that financial service providers will need to offer multiple products in tandem to meet the diverse needs of the population.

### STUDY SAMPLE OVERVIEW

This Financial Diaries study was conducted between November 2012 and May 2013 in Goroka, Kimbe, and Port Moresby. Field workers travelled to respondents' homes each week and interviewed them about their transactions from the previous week. Through this process, field workers collected 2,057 person-weeks of data from 149 active respondents in 149 different households.

The sample was reasonably balanced by gender in each site; respondents from Kimbe accounted for the majority of the final sample. The age distribution of respondents was relatively consistent across the sites with some variation between males and females. The age range for respondents was concentrated around the life period in which income earning capacity and dependent support requirements are at their highest. The average household size and number of dependent children varied between the three locations. There was a clear difference between Port Moresby and the other research sites with regard to the number of children per household (see **Table 1**).<sup>2</sup>

**Table 1: Study Sample**

	Sample Size			Average Age		Average Household Size	
	Male	Female	Total	Male	Female	Total	Children
Goroka	19	16	35	40	41	5.9	3.7
Kimbe	36	38	74	43	37	6.4	3.9
Port Moresby	17	23	40	41	37	4.7	2.0

There were significant differences in reported levels of education across the three locations. In each of the locations, women tended to participate in formal education less than men. Non-participation was particularly high in Port Moresby and very low in Kimbe. Additionally, previous studies<sup>3</sup> found a correlation between functional English literacy and participation in the formal financial system. As shown in **Table 2**, the correlation between level of education and bank account ownership was also found in this study.

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<sup>2</sup> There was greater attrition in the Goroka sample than the other two locations. This resulted in a concentration of sampling in locations in or proximate to the Goroka Township and a reduction in sampling in more remote villages. This has impacted the data, biasing numbers like income, spending, and education upwards making it appear more different from Kimbe, the other predominantly rural location in the study, than it otherwise would be.

<sup>3</sup> *'The Financial Competency of Low Income Households in PNG'*, Sibley Jonathan, Pacific Financial Inclusion Programme, UNDP Pacific Centre, 2013

**Table 2: Levels of Education and Bank Account Ownership**

	Goroka		Kimbe		Port Moresby		All Sites % of Bank Account Ownership
	Male	Female	Male	Female	Male	Female	
None	21.05%	31.25%	0.00%	2.63%	11.76%	56.52%	12%
Primary	42.11%	56.25%	42.86%	50.00%	52.94%	26.09%	50%
Secondary	36.84%	12.50%	57.14%	44.74%	35.30%	17.39%	55.35%
Post-Secondary	0.00%	0.00%	0.00%	2.63%	0.00%	0.00%	100%

The study sample was selected through a randomized process.<sup>4</sup> Nevertheless, in a country as diverse as Papua New Guinea, it is not possible to conduct a Financial Diaries study with a sample that is representative of the country as a whole, without considerable expense. Thus, even though the data and findings are of a high quality and instructive of the financial lives of people in Papua New Guinea, the results are not meant as a statistically representative picture of the entire country. Extrapolation to other populations within Papua New Guinea and abroad should be taken with care.

### INFLOWS

The data suggest that the vast majority of respondents' incomes (by volume in PGK<sup>5</sup>) came from one of three major categories: employment, food sales, or sales of recreational substances like Beer, Betel Nut, Cigarette and Tobacco. On aggregate, food was the predominant income category; however, defining the inflows at this macro level masks the significant variation within each category.

A closer look shows that that the majority of inflows came from one of six "buckets":

- 1) Beer Sales
- 2) Betel Nut, Cigarette, and Tobacco Sales
- 3) Formal Employment (defined by an individual who earns a salary or wage)
- 4) General Food Sales (including various items sold, likely at small shops; examples include noodles, buns, Tang, day-to-day produce items, etc.)
- 5) Protein-Source Food Sales (including major sources of animal based protein including chicken, fish, lamb or pig)
- 6) Cash Crop Sales (including crops deliberately grown to sell at market or to a distributor like oil palm, coffee cherry, bananas, etc.)

One of these six buckets served as the primary income source for 93 percent of all respondents and accounted for 83 percent of all income (see **Table 3**). Sales of recreational substances appear to have been the most lucrative primary income sources, although this was driven by the anomalously high income brought in by two respondents who primarily

<sup>4</sup> For a full explanation of the sampling process, please see our final report on the Financial Diaries project in Papua New Guinea

<sup>5</sup> As of October 29, 2013, PGK 1 = \$.36 so every PGK 10 is approximately \$3.60

## TOPICAL BRIEF: LIVELIHOODS

sold beer. Respondents whose primary income source was the sale of cash crops had the lowest average weekly income per respondent. It is likely that the lower average was the result of the necessarily sporadic nature of agriculture, with certain crops being available for harvest and sale at certain times.

**Table 3: Total Income Earned by Primary Income Category**

Primary Income Source	Number of Respondents	Number of Weeks	Total Income (from All Sources)	Average Income Per Respondent Per Week
Beer	2	22	43,258	1,966.27
Betel Nut, Cigarettes, and Tobacco	18	222	50,232.4	226.27
Employment	31	456	88,127.52	193.26
General Food	34	457	70,882.7	155.10
Cash Crop	37	563	31,147.4	55.32
Protein Source Food	16	180	44,993.7	249.97
No Income	1	18	0	0.00
Other	10	139	66,631.5	479.36
Grand Total	149	2,057	395,273.22	192.16

These groupings also make clear the economic strengths and dependencies of the different sites. Predictably, in Port Moresby, the most urban research site, wages from formal employment were the predominant source of income. Respondents from Kimbe, on the other hand, primarily depended on cash crops and fisheries for their livelihood. Respondents in Goroka displayed an almost even split between food sales and sales of recreational substances (see **Figure 1**).

Figure 1: Share of Income by Category based on Total of Inflows across Each Site<sup>6</sup>



\*For this figure, only categories with at least a five percent share of the total are labeled. However, the legend at left outlines all the major categories seen in the figure.

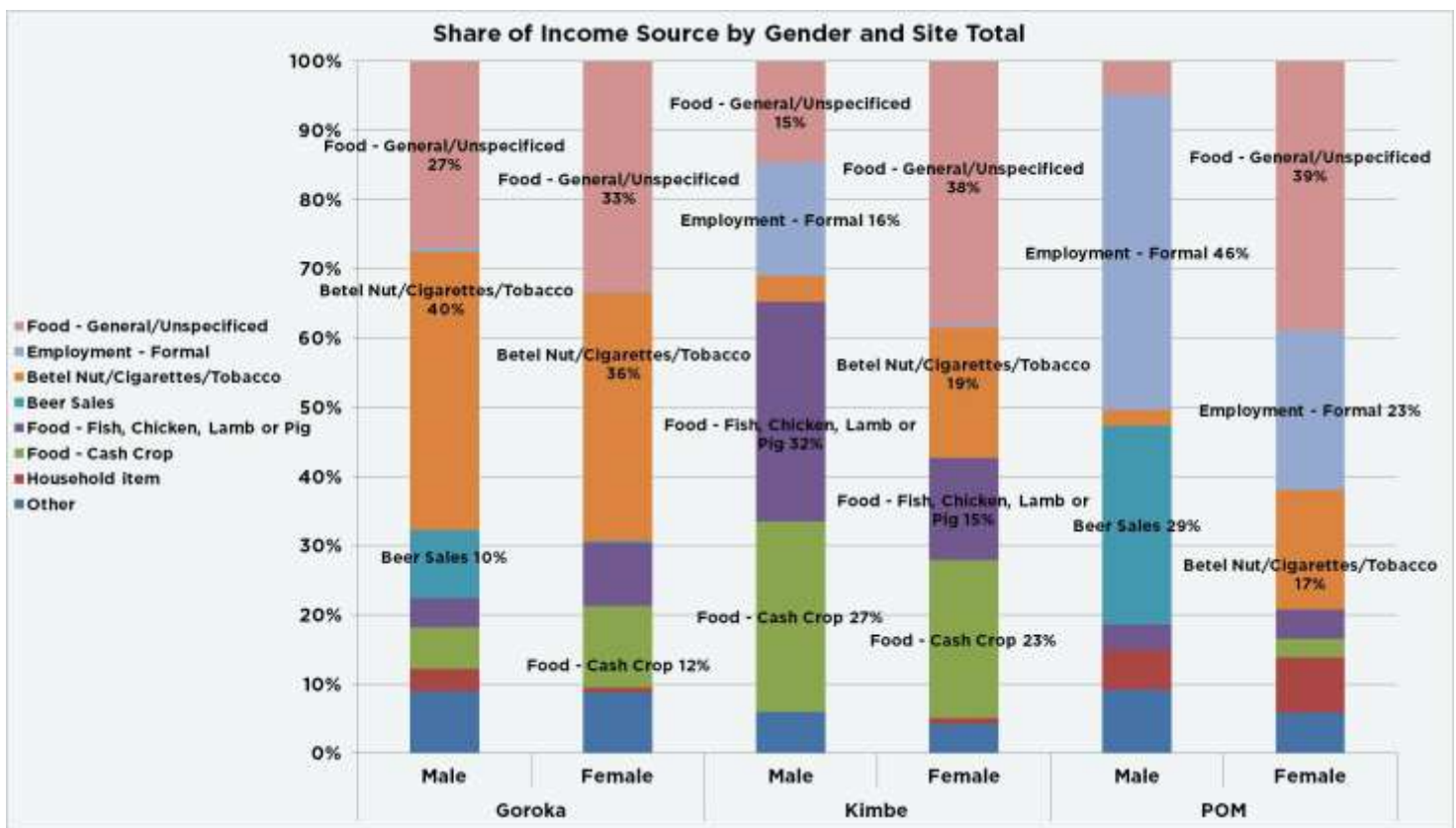
### Disparity by Gender

When the income data are disaggregated by gender and site, it is clear that males earned the majority of income (about 64 percent). The differences in the shares of income between the genders in each site are especially interesting. For example, men dominated the share of income from formal employment with the exception of Goroka where neither gender fell in this income category. Both genders received a large share of their income from the sale of recreation substances, but women in each site dominated the sale of general food items (see **Figure 2**).

<sup>6</sup> Additionally, total income earned was concentrated in Port Moresby, where PGK 206,978 was earned over the study period. Respondents in Goroka earned a total of PGK 118,645 while respondents in Kimbe earned only 69,649.32.



Figure 2: Share of Income Source by Gender Total and Site\*



\*For this figure, only categories with at least a ten percent share of the total are labeled. However, the legend at left outlines all the major categories seen in the figure.

### Disparities in Distance Traveled

Figure 3 looks at the distance traveled by each gender and each site based on the share of total business transactions (both inflows and outflows) that occurred within a given distance from a respondent’s home. The analysis shows that men tended to travel farther than women to partake in business transactions. Additionally, there is a clear moderation in the distance traveled as one moves from rural to urban areas as demonstrated by the higher volume of transaction performed near the home in Port Moresby.

Figure 3: Share of Transactions Distance by Gender for Business Transactions

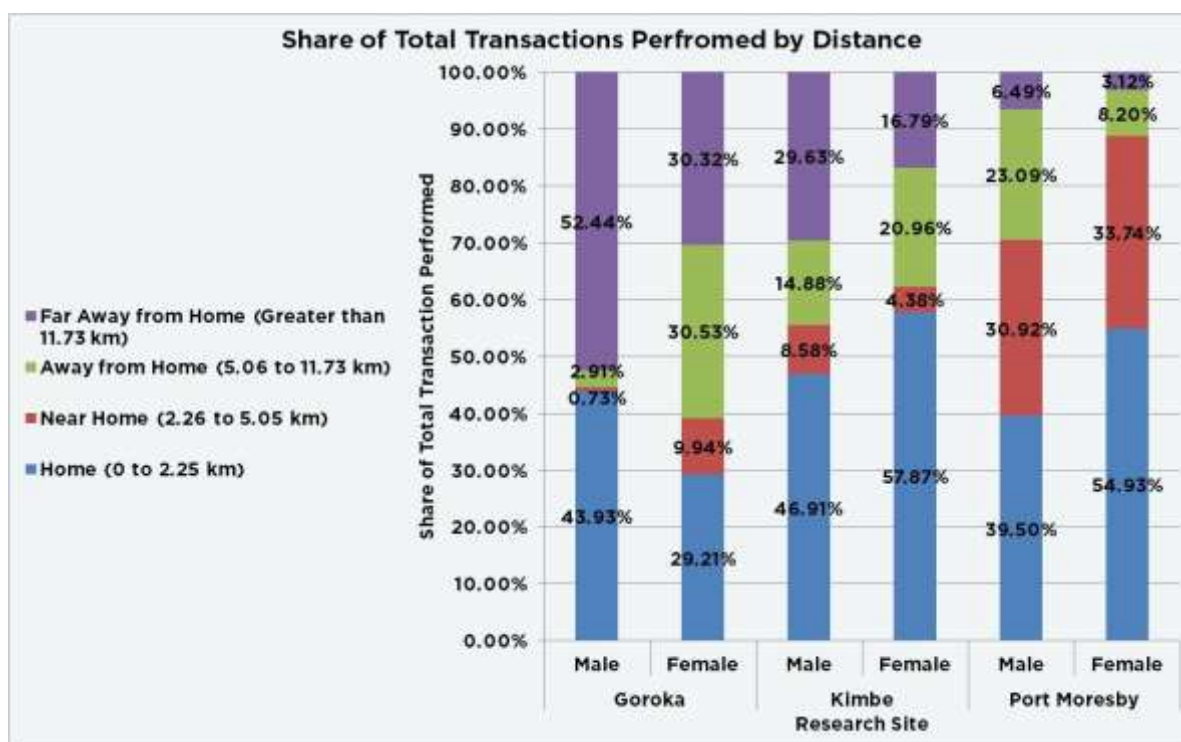


Table 4 shows that the discrepancy between the genders is quite vast. Men traveled almost twice as far as women, on average, when performing transactions.

Table 4: Average Distance Traveled Per Transaction

Gender	Goroka	Kimbe	Port Moresby	Grand Total
Distance from Home (km)				
Male	22.84	11.89	4.60	14.84
Female	14.77	7.05	2.93	7.63
Grand Total	18.76	9.24	3.39	10.57

## ANALYZING FLOWS

### Determining Variability and Vulnerability

Cash flows were examined by looking at two dimensions of respondents' income: *variability* of income and *vulnerability* of income.

The variability of income measure looks at the range<sup>7</sup> of possible gross weekly earnings a respondent is likely to receive during the majority of the year. These ranges were compared and individuals were grouped into either low variability or high variability based on gross income quartiles.

<sup>7</sup> The range was determined with a 68% confidence interval (1 standard deviation away from the mean). With this method, we are essentially looking at the likelihood that an individual's income would fall within a particular range during a similar 22 week period.

## TOPICAL BRIEF: LIVELIHOODS

Income vulnerability was examined by looking at negative income shocks. Specifically, the lower bound of an individual's variability was examined. The more often this number is zero the more vulnerable he or she is; the less often the number is zero, the less vulnerable an individual is because even during their most barren income week he or she would likely receive some income. To provide a practical perspective to these dimensions, the average number of zero income weeks per respondent within each category is included as an additional indicator of variability and vulnerability (see **Table 5**). Individuals whose data were determined to be an outlier<sup>8</sup> in either category were excluded from the analysis, leaving 125 of 149 respondents for analysis.

**Table 5: A Typology of Flows**

	High Variability	Low Variability
High Vulnerability	<p>Respondents' weekly income varied from the average by anywhere from PGK ± 137 to 459</p> <p>Income shock would likely result in a zero or near zero income week</p> <p>On average, a respondent had 1.73 zero income weeks every month</p> <p>Number of Respondents: 25</p>	<p>Respondents' weekly income varied from the average by anywhere from PGK ± 3 to 135</p> <p>Income shock would likely result in a zero or near zero income week</p> <p>On average, a respondent had 2.38 zero income weeks every month</p> <p>Number of Respondents: 26</p>
Low Vulnerability	<p>Respondents' weekly income varied from the average by anywhere from PGK ± 137 to 459</p> <p>Income shock would likely NOT result in a zero income week</p> <p>On average, a respondent had .37 zero income weeks every month</p> <p>Number of Respondents: 53</p>	<p>Respondents' weekly income varied from the average by anywhere from PGK ± 3 to 135</p> <p>Income shock would likely NOT result in a zero income week</p> <p>On average, a respondent had .43 zero income weeks every month</p> <p>Number of Respondents: 21</p>

### Analyzing the Typology of Livelihoods: Segmentation by Behavior

An analysis of the typology of livelihoods reveals a number of dynamics at play within our sample of respondents. These different dynamics are of significance to financial service providers as each segment would benefit from slightly different financial products. Below, descriptions of each profile with potential services are listed. In **Table 6**, a more detailed breakdown of the typology is provided.

#### **High Variability and High Vulnerability**

Individuals with high variability and vulnerability earned large incomes sporadically. Since their earnings were irregular, it could be difficult for them to meet regular expenditures (like a monthly fee or insurance premium). These individuals would likely derive significant

<sup>8</sup> As measured by Average + 1.5\*Inter-Quartile Range. The inter-quartile range is the difference between the first and third quartile of a set of data.

## TOPICAL BRIEF: LIVELIHOODS

benefit from products that help them capture and manage funds during periods when they are receiving a windfall in order to mitigate financial management and risk management issues in the short term or for purposes of asset accumulation.

### ***High Variability and Low Vulnerability***

Individuals with high variability but low vulnerability may see their income change dramatically from week to week but will still likely have meaningful earnings relative to their income profile. These individuals would likely be excellent targets for asset accumulation services, like interest bearing savings accounts or savings-linked insurance products, because of their higher levels of income.

### ***Low Variability and High Vulnerability***

Individuals with low variability and high vulnerability are people who earn low, regular incomes. They are the most at-risk segment of the population because their incomes are low and they are highly vulnerable to zero-income weeks. They are prime candidates for small balance savings accounts, helping them capture small amounts on a regular basis. Their relatively steady income puts them in a position where planning expenditures is likely much easier, but awareness of potential income shocks is a necessity. This may also make them prime candidates for low-cost insurance products.

### ***Low Variability and Low Vulnerability***

Individuals with low variability and vulnerability tend to earn steady incomes. The fact that they are less likely to experience income shocks means that they can engage in longer-term financial planning but will still probably not be able to engage in asset accumulation over the short or medium term. They are a group that could benefit from micro-credit services or products that offer services for small, regular payments.

## **Demographic and Earning Profiles of the Typology Segments**

**Table 6** shows demographic and earning profiles for each segment. The percentages shown below are based on the total number of respondents in each segment. Several interesting patterns emerge from the analysis. There appears to be a correlation between the high variability and low vulnerability segment, living in an urban area, and earning higher average incomes. This is likely a function of higher levels of formal employment and lower levels of agriculturally-dependent respondents. This view is enforced when one compares the low variability and high vulnerability segment. Eighty-one percent (81 percent) of respondents in this segment live in a rural area and 42 percent earn the bulk of their income from cash crops, the highest proportion of any segment.

Additionally, individuals who experience high vulnerability are more likely to own a bank account according to the data, but identifying logical correlations to other factors is difficult. For instance, this analysis reaffirms the apparent correlation between bank account ownership and education. The high vulnerability segments have higher proportions of respondents with a secondary education than low vulnerability segments and higher rates

## TOPICAL BRIEF: LIVELIHOODS

of bank account ownership. However, we would also expect bank account ownership to be correlated to earning income from employment and cash crops because respondents generally rely on payments via direct deposit in these industries, but both of these industries dominate in the high and low variability segments respectively which also earn the bulk of their income from employment and cash crops, thereby negating the theory. It is possible that the correlation only applies to specific types of employment (like formal, waged employment in Port Moresby) or cash crops (like oil palm) thus masking the relationship in these aggregated categories.

**Table 6: Analyzing the Typology of Livelihoods**

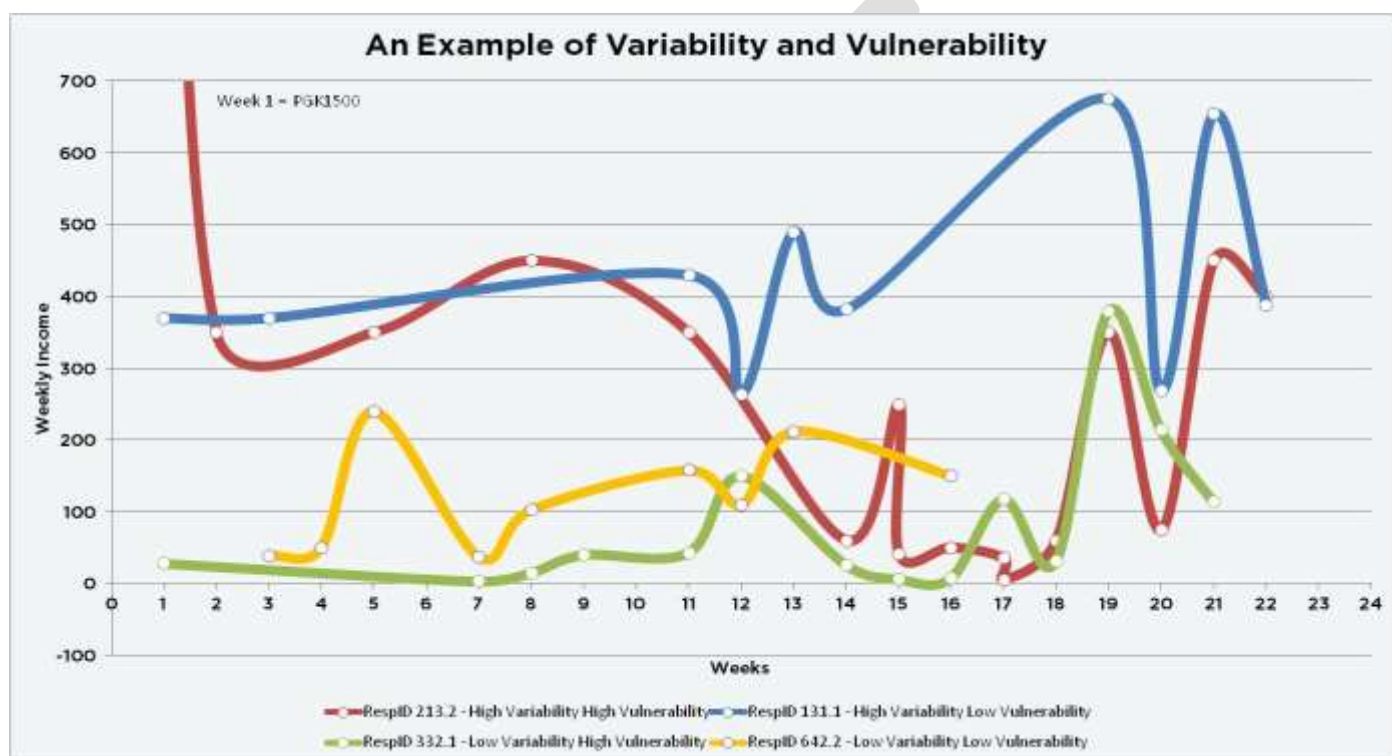
Demographics															
	Sample	Research Site			Gender		Education			Bank Account Ownership		Household		Urban vs. Rural	
Type	% of Total Sub-Sample	Goroka	Kimbe	Port Moresby	Male	Female	None	Primary	Secondary	No Bank Account	Has Bank Account	Household Size	Number of Children	Rural	Urban
High Variability High Vulnerability	20%	28%	44%	28%	48%	52%	16%	44%	40%	48%	52%	5	2.9	76%	24%
High Variability Low Vulnerability	21%	50%	12%	38%	50%	50%	31%	38%	31%	69%	31%	5.8	3	27%	73%
Low Variability High Vulnerability	42%	6%	92%	2%	42%	58%	6%	49%	43%	40%	60%	5.96	3.6	81%	19%
Low Variability Low Vulnerability	17%	19%	43%	38%	48%	52%	19%	48%	29%	67%	33%	6.3	3.7	62%	38%
Total	100%	21.6%	57.6%	20.8%	46%	54%	15%	46%	38%	52%	48%	5.8	3.3	77%	23%

Earnings Profile											
	Income Profile				Primary Income Source						
Type	Avg. Gross Weekly Income	Avg. Number Zero Income Weeks	Avg. Lower Bound*	Avg. Upper Bound	Beer	Betel Nut, Cigarettes, and Tobacco	Employment	General Food Sales	Cash Crops	Protein Items	
High Variability High Vulnerability	169	5.44	0	398	NA	16%	32%	20%	28%	4%	
High Variability Low Vulnerability	367	1.15	96	637	NA	22%	30%	26%	4%	17%	
Low Variability High Vulnerability	38	8.45	0	100	NA	8%	16%	24%	42%	10%	
Low Variability Low Vulnerability	129	1.19	44	214	NA	11%	11%	32%	37%	11%	
Total	148	5	6	291	NA	13%	21%	25%	31%	10%	

\*For both high vulnerability groups, the average lower bound was a negative number. For ease of interpretation, we have expressed a 0 instead. These negative numbers account for the very low but positive average lower bound.

**Figure 5** displays examples of respondents’ gross weekly inflows over the study period for each typology. Characteristics of each typology can be seen in their respective examples. RespID 131.1 has a highly variable income but it is generally higher than other respondents. RespID 213.2 averages about PGK 350 during the start of the study and has a very high income in Week 1; at the end of the study, incomes become highly variable and vulnerability increases dramatically, especially between weeks 15 and 18. RespID 332.1 tends to live in on a subsistence level of income. RespID 642.2 probably has the most stable income overall; despite her lower average, she seems unlikely to experience a zero income week.

**Figure 5: Examples of the Typology<sup>9</sup>**



**Financial Product Use by the Typology Segment**

The financial transactions of individuals in each segment were analyzed. Rather than looking at specific financial instruments, a decision was made to look at the broad types of transactions people were performing. This included transactions for both business and personal use. This was done because inflows will be highly correlated with outflows, which is to say that individuals with higher variability and lower vulnerability may be more likely to lend for personal or business reasons as a result of periodically having more disposable income. Echoing the “Financial Networks” brief, the analysis shows that respondents used a diverse set of financial instruments and channels to manage their cash flows.<sup>10</sup>

<sup>9</sup> RespID 213.2 is a female participant from Port Moresby. RespID 131.1 is a male from Port Moresby. RespID 332.1 is a male from Goroka. RespID 642.2 is a female from Kimbe.

<sup>10</sup> References to Direct Deposits and Cash Withdrawals are omitted in this analysis because the analysis showed that they were rarely used to manage flows. Instead, an individual (most often a wage worker in Port

**Table 7: Livelihoods and Financial Product Use**

	High Variability High Vulnerability			High Variability Low Vulnerability			Low Variability High Vulnerability			Low Variability Low Vulnerability		
	Count	Days Btwn.	Avg. Value	Count	Days Btwn.	Avg. Value	Count	Days Btwn.	Avg. Value	Count	Days Btwn.	Avg. Value
<b>Inflow</b>	<b>331</b>	<b>7</b>	<b>144</b>	<b>275</b>	<b>9</b>	<b>142</b>	<b>747</b>	<b>8</b>	<b>53</b>	<b>189</b>	<b>9</b>	<b>58</b>
Cash Transfer	178	13	56	166	15	54	350	16	47	73	24	43
Loan Borrowed	27	88	69	15	163	88	4	1425	33	2	886	100
Loan Repayment from Borrowers	11	216	115	20	123	183	3	1899	47	16	111	126
Money Transfer	8	298	293	2	1225	85	2	2849	100	1	1771	100
Savings Withdrawal	22	108	78	0	NA	NA	306	19	29	87	20	41
Wages	5	476	261	0	NA	NA	22	259	112	0	NA	NA
<b>Outflow</b>	<b>354</b>	<b>7</b>	<b>135</b>	<b>308</b>	<b>8</b>	<b>122</b>	<b>585</b>	<b>10</b>	<b>46</b>	<b>190</b>	<b>9</b>	<b>46</b>
Cash Deposit	6	397	279	5	490	187	9	633	80	1	1771	140
Cash Transfer	205	12	47	201	12	31	276	21	27	97	18	16
Loan Given	7	340	56	15	163	138	6	950	37	8	221	218
Loan Repayment to Lender	38	63	90	12	204	116	28	204	30	5	354	116
Money Transfer	1	2380	100	3	817	167	1	5698	100	1	1771	300
Savings Deposits	22	108	57	1	2450	446	227	25	38	71	25	39
Wages	0	NA	NA	4	613	38	2	2849	75	0	NA	NA

**Table 7** highlights how people in different groups use financial services to manage their cash flow. All groups used cash transfers frequently, but only individuals with low variability used both cash transfers *and* home savings to manage their flows. The higher rate of savings may indicate the awareness of potential financial shocks suggested previously, while reliance on cash gifts and intra- household cash transfers demonstrates their reliance on their informal social network. There are several other money management practices worth noting:

- Individuals with high variability and low vulnerability – the highest income segment – were the most frequent provider of loans (albeit at two every year, it was still not a regular occurrence) while individuals with high variability and vulnerability borrowed loans more frequently than any other segment.
- Individuals with higher variability engaged in larger volume transactions than their low variability counterpart.

Given the prominence of informal networks, this last finding may indicate that people tend to transact with people who are in a similar income band. Several causes for this are possible: people in similar economic groups tend to cluster, particular *wantoks* may be in

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Moresby or palm oil seller in Kimbe) would receive a direct deposit from the business and then withdraw it almost immediately.

## TOPICAL BRIEF: LIVELIHOODS

better financial positions, or there is a high correlation between the incomes of people in specific geographic locations and these people tend to transact with each other.

### IMPLICATIONS

The results of this analysis have several implications for the private sector and policy-makers.

First, the financial dependency on food products represents a significant weakness within the Papua New Guinean economy, which opens the door to target financial products toward individuals who are at risk of losing their livelihood because of a weather event or equipment failure. For instance, crop insurance for coffee and oil palm growers would help insulate these industries from a catastrophic failure. Fishermen may also be interested in insurance for their boats or formal loans that could fund a capital investment.

Second, distance is also a prominent factor with regard to livelihoods. Although not as pronounced as what was seen in the “Share of Wallet” or “Financial Networks” briefs, it serves as another reminder that connectivity matters. Connectivity – either physical or electronic – will help reduce transaction costs and increase people’s availability to trade. As Papua New Guinea works to expand its physical infrastructure, mobile money services could help to fill a critical void.

Third, individuals’ livelihoods should be a prominent factor in considering how to design and target financial products. This brief has identified four market segments. This serves as evidence that no singular marketing campaign or product will bring a critical mass of Papua New Guineas into the fold. It also shows that there are products that would be meaningful even to people with only meager amounts of income.