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Working Paper

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GLO Discussion Paper, No. 441

Provided in Cooperation with:

Global Labor Organization (GLO)

Suggested Citation: Helmy, Imane (2020) : Livelihood Diversification Strategies: Resisting Vulnerability in Egypt, GLO Discussion Paper, No. 441, Global Labor Organization (GLO), Essen

This Version is available at:

<https://hdl.handle.net/10419/210455>

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Livelihood Diversification Strategies: Resisting Vulnerability in Egypt

Imane Helmy¹

Abstract:

Livelihood diversification is attracting considerable interest as a tool to cope with economic shocks and resist vulnerability. This paper investigates the evolution of livelihood diversification in Egypt with a particular focus on wealth and urban-rural divides. Using Egypt Labor Market Panel data from 2006 to 2018, I find that rural households have a more diversified livelihood portfolio, yet they diversified away from farming over time. Poor rural households remained dependent on informal livelihood strategies due to the high entry barriers to formal employment. Urban households had significantly less livelihood diversification than rural households. Wealthy households in urban areas tended to depend on relatively more specialized livelihood clusters which were stable over time. These findings imply that distress is a potential reason for diversification in urban areas.

Keywords: livelihood, diversification strategies, vulnerability, informality, Egypt

JEL Classification: O10, D1, D60,

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1. INTRODUCTION AND BACKGROUND

Livelihood diversification is adopted by poor households as a tool to cope with economic shocks and resist vulnerability. A livelihood strategy is a combination of assets and activities to earn income. Livelihood diversification is a process by which households build a portfolio of different activities and assets in order to survive and improve their standards of living (Ellis, 1998). The decision to diversify is closely tied with risk mitigation strategies adopted by households. Households seek to reduce their risks by reducing income variability (Heitzmann, Canagarajah, & Siegel, 2002; Holzmann & Jorgensen, 1999; World Bank, 2001).

Understanding livelihood strategies plays a vital role in designing poverty reduction interventions that enable countries to achieve the first Sustainable Development Goal (SDG): *End poverty in all its forms everywhere*. In a world where 10 percent of the population lives below the poverty line of \$1.90 per day (2011 PPP) and 46 percent lives below \$5.50 per day (2011 PPP), understanding livelihood strategies is instrumental in improving the ability of the poor to manage risks (World Bank, 2018).

Households diversify their livelihood as result to different factors that could be categorized into 1) *Push Factors*: income seasonality, credit market failure and liquidity constraints; 2) *Pull Factors*: improvement in education, technology, labor markets, infrastructure, or market access. The former factors are commonly leading to low return strategies (survival-led strategies) while the latter are related to opportunities in the market leading to high return activities (opportunity-led strategies) (Barrett, Reardon, & Webb, 2001; Ellis, 1998; Loison, 2015; Loison & Bignebat, 2017; Mutenje, Ortmann, Ferrer, & Darroch, 2010).

A sustainable livelihoods framework, Figure 1, shows the key factors affecting the choice of livelihood strategies including assets: human capital (education, health, skills), physical capital, social capital (social networks), financial assets (savings and credit) and natural resources. These assets are mediated by trends in population or technology as well as macroeconomic conditions and shocks which affect livelihood activities. The livelihood strategies affect income, consumption, food security and poverty dynamics (DFID, 1999; Ellis, 1999; Loison, 2015; Scoones, 1998).

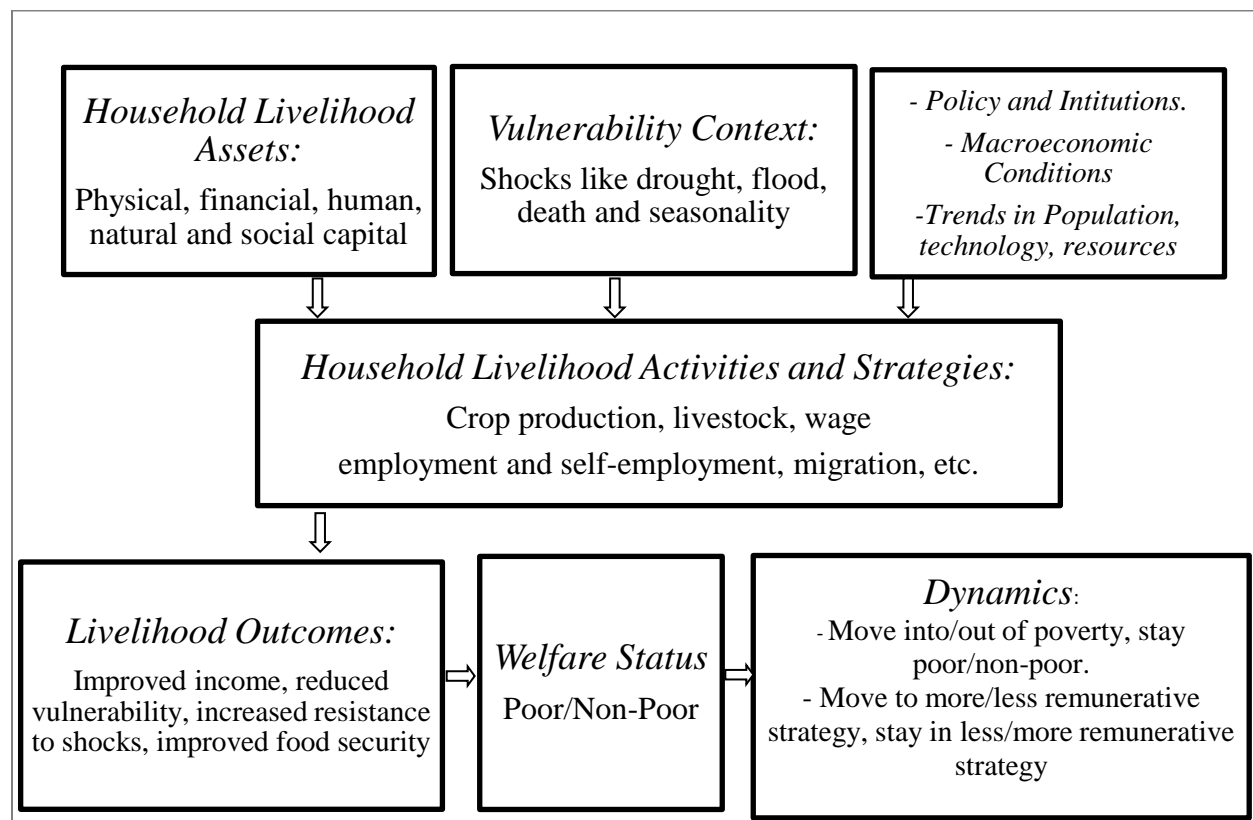


Figure 1 Sustainable Livelihood Framework- Synthesized from (DFID, 1999; Ellis, 1999; Scoones, 1998).

The livelihood framework has been used in a growing body of literature on rural livelihood choices, their determinants, and dynamics. Studies categorized livelihood activities into three main types: 1) farm activities (e.g. crops and livestock); 2) off-farm activities (wage labor on farms);

and 3) non-farm activities (e.g. employment and self-employment unrelated to agriculture) (Babulo et al., 2008; Barrett, Reardon, et al., 2001; Ellis, 1998, 2000; Khatiwada et al., 2017; Loison & Bignebat, 2017; Martin & Lorenzen, 2016; Mutenje et al., 2010; Nielsen, Rayamajhi, Uberhuaga, Meilby, & Smith-Hall, 2013; Orr & Mwale, 2001; Rahut & Micevska Scharf, 2012; Walelign, 2016; Yenesew, Eric, & Fekadu, 2015).

A number of studies, mostly on rural areas of Africa, have examined livelihood outcomes and dynamics. Some of these studies concluded that diversification to off-farm and non-farm strategies is positively associated with improved income, consumption, nutrition and food security (Babatunde & Qaim, 2010; Barrett, Reardon, et al., 2001; Ersado, 2003; Gautam & Andersen, 2016; Khatiwada et al., 2017; Loison, 2015). Diversification is also crucial in reducing vulnerability to shocks (Barrett, Reardon, et al., 2001; Ersado, 2003; Rahut, Mottaleb, & Ali, 2018).

Other studies found that poor households are more likely to diversify to low-return activities due to the entry barriers of high-return activities, which then remain unequally distributed in favor of higher income households (Gautam & Andersen, 2016; Loison, 2015; Rahut & Micevska Scharf, 2012; Smith, Gordon, Meadows, & Zwick, 2001; Woldenhanna & Oskam, 2001). However, a study in Ethiopia using panel data found that poor households who accumulate capital through low-return non-farm activities could subsequently access high-return activities. Thus, opportunity-led strategies could play a role in upward mobility (Bezu, Barrett, & Holden, 2012). In a nutshell, the effect of diversification on poverty, income inequality, and welfare dynamics remain mixed (Bezu et al., 2012; Bithal, Negi, Jha, & Singh, 2014; Davis et al., 2010; Liao, Barrett, & Kassam,

2015; Loison, 2015; Martin & Lorenzen, 2016; Rahut, Ali, Kassie, Marennya, & Basnet, 2014; Reardon & Taylor, 1996; Van Den Berg & Kumbi, 2006).

There is a wealth of literature that discusses diversification strategies of rural households, but little attention has been given to the role of livelihood diversification in urban settings. Urban households share some of the same risks as their rural counterparts, such as varying returns to labor, market failures, and risks associated with macroeconomic policy changes (Ersado, 2003). Therefore, this paper presents new evidence on livelihood diversification in Egypt with a particular focus on wealth and urban-rural divides.

Studying livelihood diversification strategies in Egypt extends the literature beyond the intensive research on rural Africa and to a lesser extent on Asia and Latin America. Moreover, analyzing the Egyptian case makes an important contribution given that the two studies addressing livelihood diversification in Egypt were conducted using cross-sectional household data in 1997 and had entirely focused on rural Egypt (Adams, 2002; Croppenstedt, 2006). These studies concluded that diversification to non-farm income and livestock-keeping decreases income inequality given that they are not strongly linked to landownership which is unequally distributed in Egypt (Adams, 2002; Croppenstedt, 2006).

Furthermore, very little is known about diversification strategies in the context of shocks, particularly covariant (macro) economic shocks compared to (micro or meso) health and environmental shocks. Several studies have explored the role of HIV/AIDS shocks (Mutenje et al., 2010), the effect of weather shocks (Ersado, 2003), climate shocks (Afsaw et al., 2015), crop shocks (Schwarze & Zeller, 2005) and agroclimatic shocks (Reardon & Taylor, 1996) on livelihood strategies. These studies found that shocks push households to diversify their income

as a coping strategy. In the rural areas of Côte d'Ivoire, exchange rate devaluation was associated with changes in livelihood strategies from 1993 to 1995, yet poor households remained stuck in low-income strategies (Barrett, Bezuneh, & Aboud, 2001).

Following the January 25th revolution in 2011, the political turmoil in Egypt took a toll on the economy leading to decreased investment and revenue from tourism, high inflation, unemployment, rising fiscal deficits, and public debts. In 2014, the government embarked on an economic reform program to restore macroeconomic stability and promote inclusive growth and jobs. The program's key measures included the gradual removal of universal energy and food subsidies, devaluation of currency, the introduction of value added taxes, and tight monetary policy to contain the excessively high inflation,² while still expanding social protection programs (International Monetary Fund, 2014, 2019). These economic challenges have and are expected to continue to affect the livelihood and livelihood diversification of Egyptian households³ which motivates further research on the case of Egypt.

This paper contributes to the aforementioned empirical literature on livelihood choices by addressing three main research questions:

1. What are the livelihood diversification strategies used by urban and rural households in Egypt?
2. What are the factors influencing the diversification of livelihood strategies?

² Following the currency devaluation in November 2016, the headline inflation reached around 33 percent in January 2017 compared to around 15 percent in September 2016.

³ The poverty rate in Egypt, using the national poverty line, reached 27.5 percent in 2015 and 32.5 percent in 2017 (Central Agency for Public Mobilization and Statistics, 2019).

3. How do livelihood diversification strategies change over time with the occurrence of economic shocks?

This paper differentiates between strategies used by poor households and better-off households. Furthermore, this study accounts for the heterogeneity of the non-farm sector by disaggregating detailed livelihood activities which were superficially addressed by the literature focusing on rural activities. Given the importance of looking at the portfolio of activities rather than participation in single livelihood activity (Barrett, Reardon, et al., 2001; Ellis, 1998; Rahut et al., 2014), this paper groups livelihood activities using a cluster analysis technique before applying an ordered logit model to explore the determinants of diversifying livelihood strategies.

The remainder of this paper is organized as follows. Section 2 describes the data and Section 3 is devoted to the research methods. Section 4 discusses the results and Section 5 concludes the paper.

2. DATA

This paper pools data from three rounds of the Egypt Labor Market Panel Survey (ELMPS): 2006, 2012 and 2018. The 2006 data were collected before the January 2011 revolution while the 2012 data follows the momentous events of the Arab Spring. Lastly, the 2018 round reflects the economic shocks following the economic reform program of 2014.

The 2006 ELMPS data are a nationally representative sample of 8,351 households which contain 37,140 individuals (Assaad & Krafft, 2013; Barsoum, 2007; OAMDI, 2006). The sample of the 2012 round was 12,060 households including a total of 49,186 individuals. The 2018 round included 15,746 households and 61,231 individuals (Krafft, Assaad, & Rahman, 2019; OAMDI,

2018). Attrition and weights of the rounds are extensively discussed by Assaad and Krafft (2013) as well as Krafft et al. (2019).

For all rounds, the fieldwork was carried out by the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS) in collaboration with the Economic Research Forum (ERF). The survey provides a rich source of data that suits the objectives of this study. The ELMPS includes two questionnaires: 1) household questionnaire that collects data about demographic characteristics of all household members, ownership of durable goods and assets, housing conditions, services, and facilities as well as household enterprises and 2) individual questionnaire asking about education, employment, job characteristics and unemployment, among others.

3. METHODS

3.1 Cluster Analysis (CA)

Multivariate techniques to explore livelihood activities include methods that reduce the dimensionality of data (e.g. factor analysis, discriminant analysis, and principal component analysis) as well as approaches that create homogenous groups, such as cluster analysis (Dossa, Abdulkadir, Amadou, Sangare, & Schlecht, 2011; Jolliffe, 2002; Liao et al., 2015; Walelign, 2016). Given the exploratory nature of the first research question (what are the livelihood diversification strategies used by urban and rural households in Egypt?), I use descriptive analysis of livelihood activities at the household level in addition to cluster analysis (CA)⁴. CA is a rigorous technique that produces categories of households with similar characteristics like using the

⁴ The author attempted to use PCA before the CA following studies such as Makate & Mango (2017), Khatiwada et al. (2017), Walelign (2016). This approach did not lead to different results and hence they are not reported in this paper.

livelihood diversification strategies. CA produces a high level of homogeneity of strategies within clusters and heterogeneity between clusters (Makate & Mango, 2017; Pienaar & Traub, 2015).

Participation in various livelihood strategies was measured with a binary variable, taking the value of 1 if at least one member of the household participates in the strategy. The livelihood strategies used in the analysis are described in Table 1.⁵ The categories include the primary job of farming, wage work in agriculture, raising livestock, formal and informal employment⁶/self-employment in non-agriculture sectors. Furthermore, having any secondary job is taken into consideration in addition to familial migration, contributory and non-contributory social assistance.

Table 1 Description of Livelihood Activities

	Livelihood Strategy	Description
Primary job	Farming	Self-employed, employer or unpaid family worker in agriculture sector working on harvesting crop or other farming activities.
	Wage worker in agriculture	Wage worker (agriculture sector)
	Livestock	Owning/raising livestock
	Formal wage employee (public)	Formal wage employee in government/public sector (non-agriculture sector)
	Formal wage employee (private)	Formal wage employee in private sector (non-agriculture sector)
	Informal work inside establishment	Informal wage employee inside establishment (non-agriculture sector)
	Informal work outside establishment	Informal wage employee outside establishment (non-agriculture sector)
	Informal self-employment	Informally self-employed, employer or unpaid family worker in non-agriculture sector.
	Formal self-employment	Formally self-employed, employer or unpaid family worker in non-agriculture sector.
Secondary Job		Having a secondary job in addition to the primary job.
Migration		Having a family member living or working abroad

⁵ The standard market definition of labor market status is used with a three-month reference period for employment.

⁶ Formal employment is defined as employment with either social security coverage or a contract while informal employment does not have either. Irregular work includes seasonal work or intermittent work.

Non-labor income	Pension	Receiving contributory pension.
	Social Assistance	Receiving non-contributory cash transfer from the government, non-governmental organization or religious institutions.
	Rents and Profits	Receiving returns on rents or interest on financial investment

Source: Author's compilation

Clustering households follows two steps: 1) perform hierarchical agglomerative cluster analysis using Ward's linkage; 2) running K-means cluster analysis to identify a number of clearly defined clusters using an iterative process that divides n observations into K clusters, in which each observation is assigned to the group with the closest mean (Hamilton, 2013).

Following the identification of specific livelihood clusters, each household is assigned to one and only one cluster. The clusters are named based on the distribution of binary activities (Walelign, Pouliot, Larsen, & Smith-Hall, 2017). For instance, a cluster includes livestock and farming while another cluster including public wage employee and having a secondary job, etc.

3.2 Ordered Logit Model

For the second research question (what are the factors influencing the livelihood strategies?), an ordered logit model (OLM) was deployed (Equation 1). Let y be an ordered response that takes on the values of J ($0, 1, 2, \dots, J$). Let y depend on K independent variables ($X_1, X_2, X_3, \dots, X_K$)

$$Prob(Y_i = j|x_i) = \frac{\exp(\beta'x_i)}{1 + \sum_{k=1}^J \exp(\beta'kx_i)} \quad (1)$$

The dependent variable here is diversification levels derived from the categorization of livelihood clusters from the first research question into: a) less diversified; b) moderately diversified; and c) highly diversified. The independent variables examine the correlates of the diversification level. The logistic regression techniques are powerful in analyzing livelihood choices and their determinants given their suitability for modeling categorical dependent variables (Babulo et al., 2008; Bealu, 2019; Dedehouanou & McPeak, 2019; Khatiwada et al., 2017; Makate & Mango, 2017; Mutenje et al., 2010; Negeri & Demissie, 2017; Rahut & Micevska Scharf, 2012; Walelign, 2016; Yenesew et al., 2015).

The explanatory variables are presented in Table 2 and are derived from the Sustainable Livelihood Framework (Figure 1). They are in line with previous studies exploring key determinants of livelihood strategies (Abdulai & CroleRees, 2001; Agyeman, Asuming-Brempong, & Onumah, 2014; Croppenstedt, 2006; Escobal, 2001; Janvry & Sadoulet, 2001; Khatiwada et al., 2017; Makate & Mango, 2017; Rahut & Micevska Scharf, 2012; Schwarze & Zeller, 2005; Yenesew et al., 2015).

These variables include demographic characteristics of the head of household including sex, age, and education. The education variable measures the proportion of household members whose educational level is above intermediate or who have a university degree. Other variables include household size, number of adults between 18 and 64 years old, educational level of mother and father, geographic location, and wealth tertile⁷.

⁷ Variables reflecting access to services like distance to market, school and hospital as well as access to water were included in earlier versions of the model, and were later removed due to their minor, insignificant impact.

The Sustainable Livelihood Framework indicates a dynamic interdependence among some variables which might lead to endogeneity problems (Babulo et al., 2008). Accordingly, I adopted a stepwise approach to add variables related to financial capital (such as access to credit and land-rented/owned) at a second stage given that land and credit market failures are expected to affect diversification of livelihood (Ellis, 2000).

Table 2 Description of Explanatory Variables

Explanatory Variable	Description
Sex of Head of HH	Dummy variable that takes the value of 1 if the household is headed by a female
Age of Head of HH	Age (years)
Education of Head of HH	Education attainment (categories): illiterate, read and write, less than intermediate, intermediate, above intermediate, university and higher.
Education of HH members	Proportion of HH members with secondary or higher education
Household size	Total number of HH members
Working age members	Number of household members whose age is between 15 and 64 years
Working age female members	Number of female household members whose age is between 15 and 64 years
Mother's education-Head of HH	Mother's level of education attained (Categories): illiterate, read and write, less than intermediate, intermediate, above intermediate, university and higher.
Father's education-Head of HH	Father's level of education attained (Categories): illiterate, read and write, less than intermediate, intermediate, above intermediate, university and higher.
Geographic location	One if located in urban area.
Wealth tertile	Categorical variable that uses household wealth scores ⁸ to assign households to three categories: low-, medium- and high-wealth.

Source: Author's compilation

⁸ Wealth scores are calculated for urban and rural households in ELMPS based on a wealth index that accounts for household assets and housing conditions.

4. Results and discussion

This section starts by describing the participation of households in livelihood activities followed by presenting the livelihood clusters used by Egyptian households before analyzing the determinants of the diversification.

4.1 Household participation in livelihood activities

Table 3 shows the percentage of households participating in different livelihood activities. Generally, there are marked differences in livelihood activities between urban and rural households and by household wealth. Poor urban households commonly engage in informal wage employment outside establishments and informal self-employment in addition to receiving pensions and social assistance. Participation in informal regular wage employment increased in 2018, yet this increase might be explained by the expansion of sectors that used to hire irregular workers (e.g. construction). Hence, the indicators of working inside and outside establishments are used in the analysis. Informal work outside establishments had notably increased from 12 percent in 2006 to 19 percent in 2012 and 26 percent in 2018.

Formal wage employment in public sector increases in prevalence for the wealthy households both in rural and urban areas, even with the noteworthy decline of this type of livelihood activity in 2018. This trend likely reflects the retrenchment component of the economic reform program. Formal employment in the private sector is highly relevant to urban households from the middle and high-wealth tertile. Characterized by relatively stable livelihood activities, the middle and high-wealth households in urban areas depend on public and private sector employment, informal

employment inside establishment as well as formal and informal self-employment and receiving pension.

Substantial changes in livelihood activities took place among the poor in rural areas over time. Participation in farming activities declined from 40 percent in 2006, to 23 percent in 2012, and 14 percent in 2018. After the major decline in raising livestock from 61 percent in 2006 to 23 percent in 2012 (most likely due to the avian influenza in 2006), this activity resurfaced as a popular choice among poor rural households in 2018, increasing to 31 percent for poor households compared to 25 percent for wealthy households.

This decline in farm activities was in contrast to an increase wage work in the agricultural sector across all wealth levels. Further, the results show that rural poor households have increasingly diversified out of reliance on agriculture activities by depending on informal employment outside establishments, secondary jobs in non-agriculture sectors, migration and social assistance. This diversification into the informal employment contradicts the findings of Adams (2002), that government employment is the dominant source of non-farm employment of poor rural households.

For middle and high- wealth rural households, there was a greater reliance in 2006 on farming and livestock, which declined in 2012 and 2018. There was a corresponding increase in participation in wage employment in the agriculture sector and informal employment outside establishments in non-agriculture sectors among middle-wealth households. In contrast, formal private wage employment increased among high-wealth households.

Table 3 Livelihood activities by wealth and location (Percentage of HHs participating in the activity), 2006-2018

	Poor Urban			Middle-wealth Urban			High-wealth Urban			Poor Rural			Middle-wealth Rural			High-wealth Rural		
	2006	2012	2018	2006	2012	2018	2006	2012	2018	2006	2012	2018	2006	2012	2018	2006	2012	2018
Farming	8.5	3.5	3.9	1.9	1.8	0.9	1.8	0.2	0.1	39.9	23.4	13.7	33.8	17.0	13.2	24.1	10.2	7.1
Wage worker in agriculture	2.9	2.4	4.6	1.3	0.9	1.7	1.1	0.1	0.9	16.3	19.0	23.8	8.8	12.0	13.3	4.4	4.5	7.7
Livestock	13.3	3.7	7.8	7.1	1.5	4.2	4.1	0.3	2.3	61.1	22.9	30.8	60.7	20.1	31.7	52.8	13.7	25.1
Public wage employee (Formal)	25.0	18.8	14.8	38.6	30.4	25.2	50.7	44.5	35.0	15.5	15.5	12.8	28.5	22.9	22.3	42.7	39.5	32.1
Private wage employee (Formal)	9.9	10.2	13.2	14.4	17.2	15.8	13.6	16.9	20.7	3.3	4.2	5.0	5.9	7.1	7.2	6.0	9.4	11.1
Formal self-employment	7.6	3.7	2.1	13.0	4.5	2.0	14.4	11.2	5.5	2.0	1.3	0.6	3.4	2.4	2.1	7.9	4.1	3.0
Informal self-employment	21.3	20.7	17.3	16.3	17.1	17.6	10.1	13.1	14.7	11.3	9.9	9.1	9.8	12.0	12.1	11.3	14.8	12.2
Informal work inside establishment	15.4	20.1	16.4	8.5	14.6	18.1	4.0	7.7	15.1	6.1	7.6	10.4	5.6	10.4	10.3	4.9	9.2	11.6
Informal work outside establishment	11.5	19.0	26.0	4.8	10.7	17.0	1.0	2.1	5.3	9.9	16.7	22.5	6.8	13.9	17.5	2.7	6.3	13.3
Secondary Job	5.7	5.1	5.8	6.9	5.8	4.9	8.0	8.3	6.5	13.2	13.1	12.9	15.0	13.7	12.5	18.3	17.3	13.3
Migration	1.9	2.0	1.2	2.8	2.3	1.7	5.2	6.4	4.3	4.2	6.1	3.0	6.2	8.1	4.5	9.9	10.3	9.6
Pension	32.0	30.1	30.8	34.9	28.0	34.5	33.8	31.9	32.7	17.8	15.6	25.1	15.8	14.3	20.0	18.8	14.1	17.0
Social Assistance	13.8	16.6	10.6	4.8	7.3	3.4	1.9	3.5	1.5	22.5	21.8	22.1	12.6	14.6	10.1	8.1	7.5	4.1
Rents and Profits	3.6	2.6	1.1	8.4	4.2	1.9	14.1	16.1	2.4	3.6	3.4	0.8	5.9	5.5	1.8	11.3	7.5	3.7
Number of Households 36,155	1,486	1,726	1,805	1,620	1,885	2,154	1,582	2,038	2,178	1,715	2,192	2,731	1,553	2,132	2,704	1,615	2,238	2,799

Source: Author's calculation based on ELMPS 2006, 2012 and 2018. Values above the mean value of participation in each activity are highlighted in bold.

4.2 Household livelihood clusters

Table 4 shows the livelihood clusters identified for households in the pooled 2006, 2012, and 2018 data. Around 43 percent of households were concentrated in the cluster of formal public and private employment, as well as informal employment inside establishments (Pub-Priv-Infin). However, the analysis shows that participation in this cluster declined from 45 percent in 2012 to 42 percent in 2018. Around 14 percent of households are dependent on informal self-employment (InfSelf).

The cluster including households who diversify their livelihood through farming activities, livestock, secondary job, migration, pension and social assistance (Far-Liv-Sec-Mig-Pen-SA) included 12 percent of the households. This cluster witnessed a notable decrease from 18 percent in 2006 to 18 percent in 2012 and 9 percent in 2018.

Around 12 percent of households had members who are employed informally outside establishments in addition to receiving social assistance (Infout-SA). This cluster grew from 6 percent in 2006 to 11 percent in 2012 and 17 percent in 2018. This cluster is followed by wage work in agriculture, owning/raising livestock and receiving social assistance (8 percent) (WAgri-Liv_SA).

Around 9 percent of households worked in the public sector in addition to owning/raising livestock, having a secondary job, receiving income from a migrant family member, and receiving profits from rent or financial investments (Pub- Liv-Sec-Pro). Around 5 percent of households were formally self-employed and received pension and profits. The latter cluster decreased from 8 percent in 2006 to 5 percent in 2012 and 3 percent in 2018.

Table 4 Participation of Households in Livelihood Strategies by Livelihood Clusters (percentage), 2006-2018

Clusters:	Pub-Priv-Infin	InfSelf	Far-Liv-Sec-Mig-Pen-SA	Infout-SA	WAgr-Liv-SA	Pub-Liv-Sec-Pro	FSelf-Pen-Pro
<u>Activities</u>							
Farming	0.0	0.0	87.5	0.0	0.0	0.0	0.0
Wage worker in agriculture	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Livestock	6.8	15.8	86.2	12.5	25.4	41.1	11.8
Formal wage employee (Public)	52.4	0.0	0.0	0.0	0.0	80.9	0.0
Formal wage employee (Private)	18.9	0.0	5.7	0.0	0.0	7.2	0.0
Formal self-employment	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Informal Self-employment	0.0	100.0	0.0	0.0	0.0	0.0	0.0
Work inside establishment	24.9	0.0	1.6	0.0	0.0	8.5	0.0
Work outside establishment	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Secondary Job	0.0	5.4	10.6	6.9	7.2	100.0	4.4
Migration	1.5	1.5	7.8	0.7	1.5	2.3	1.5
Pension	6.8	11.5	16.6	4.3	5.4	5.1	12.9
Social Assistance	3.5	9.9	15.0	10.6	13.9	5.6	4.5
Rents and Profits	3.3	3.7	3.3	1.1	1.2	5.2	8.1
N	11,105	3,489	3,119	3,026	1,993	1,911	1,199

Source: Author's calculation based on ELMPS 2006, 2012 and 2018

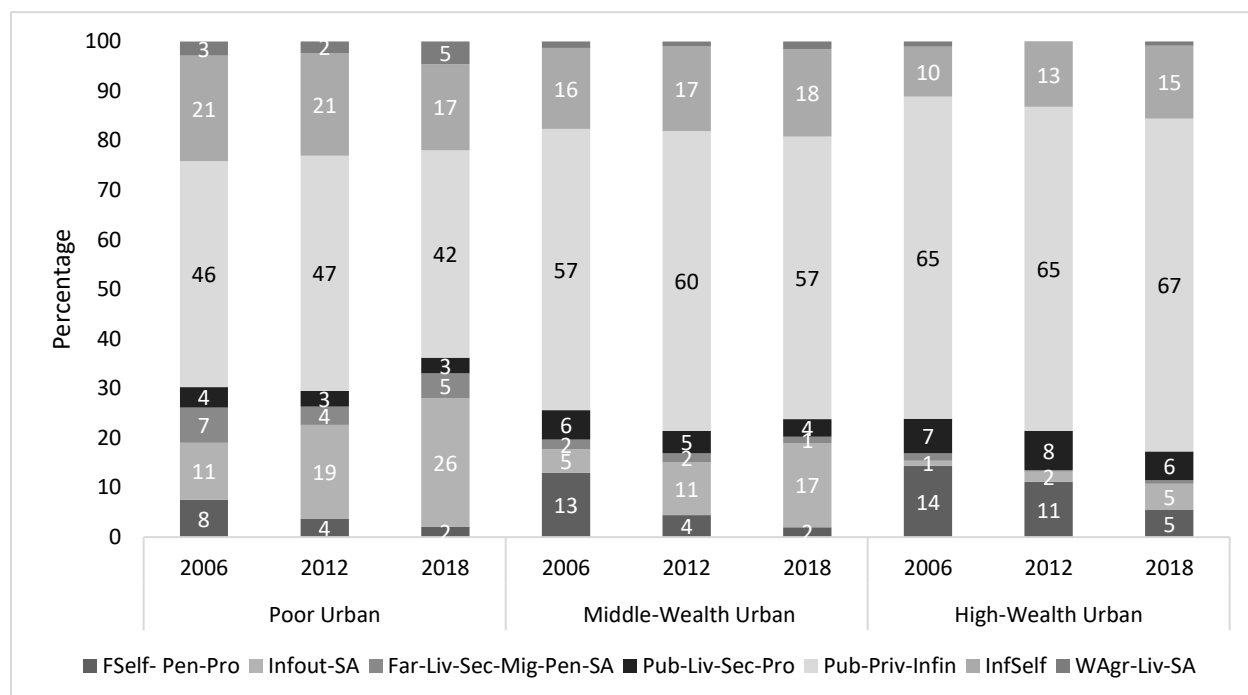
Values above the mean are in bold. Far: farming; WAgr: wage worker in agriculture; Liv: livestock; Pub: public wage employee; Priv: private wage employee; Infself: informal self-employment; FSelf: formal self-employment; Infin: wage employee inside establishment; infout: wage employee outside establishment; Sec: secondary job; Mig: migration; Pen: pension; SA: social assistance; Pro: profits.

4.3 Participation of households in livelihood clusters by wealth and location

The percentage of households who participated in each livelihood cluster by wealth and location is shown in Figure 2 and Figure 3. I found that urban poor households relied on multiple livelihood clusters with a wide range of diversified informal activities compared to middle and high-wealth households. Around 46 percent of poor urban households relied on public and private sectors employment and informal employment in establishment in 2006 compared to 42 percent in 2018. In contrast, there was an increase in informal wage employment outside establishment in addition to receiving social assistance from 11 percent in 2006 to 26 percent in 2018. By the same token, around 17 to 21 percent of poor households engaged in informal self-employment.

Middle and high-wealth households engage mostly in more specialized clusters. For instance, around 65 to 67 percent of high-wealth urban households depended on public and private sectors employment and informal employment in establishments. This high dependency remained evident over the years reflecting lower dynamics of livelihood among middle and high-wealth urban households. Nevertheless, the cluster comprising formal self-employment, pension and profit declined from 13 percent in 2006 to 2 percent in 2018 among middle-wealth households. Similarly, this cluster declined from 14 percent in 2006 to 5 percent in 2018 among high-wealth households.

Figure 2 Participation of in livelihood clusters by wealth and wave (percentage of households), 2006-2018, urban households



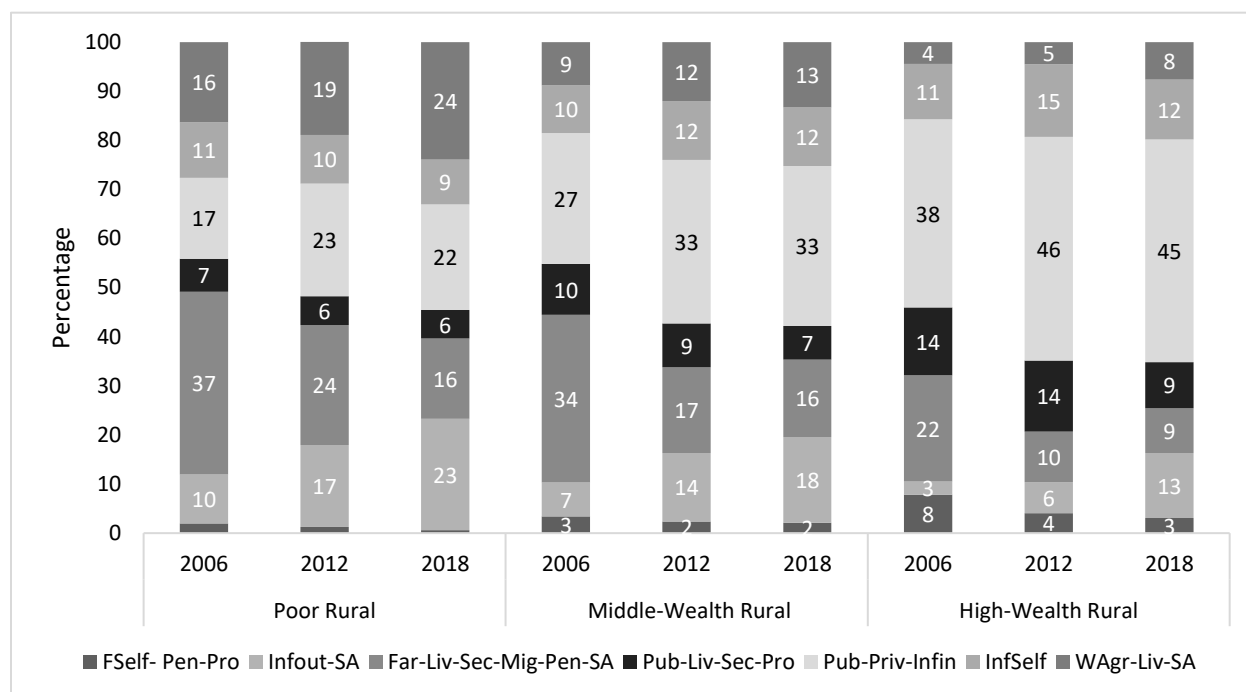
Source: Author's calculation based on ELMPS 2006, 2012 and 2018. Far: farming; WAggr: wage worker in agriculture; Liv: livestock; Pub: public wage employee; Priv: private wage employee; Infself: informal self-employment; FSelf: formal self-employment; Infin: wage employee inside establishment; Infout: wage employee outside establishment; Sec: secondary job; Mig: migration; Pen: pension; SA: social assistance; Pro: profits.

In 2006, the dominant cluster among poor households in rural areas was a highly diversified cluster. Around 37 percent of households relied on farming, livestock, secondary job in non-agriculture sectors, migration in addition to receiving non-labor income, pension and social assistance. This cluster declined from 37 percent in 2006 to 16 percent in 2018. The cluster of wage employment in agriculture sector, raising livestock and receiving social assistance increased from 16 percent to 24 percent in 2018. Similarly, informal wage employment outside establishment in addition to receiving social assistance increased from 10 percent in 2006 to 23 percent in 2018.

The remarkable decline in the cluster including farming activities was also evident among middle and high-wealth households. However, these groups diversified away from agriculture by depending on clusters that include public and private sectors employment, informal employment in establishment, and informal self-employment. These results support the potential high-entry barriers of poor households to the formal wage employment. Furthermore, there is evidence on the changing structure of the economy which is increasing the similarities of livelihood clusters used by urban and rural households.

The diversity of livelihood activities among middle and high-wealth rural households oppose the distress theory of diversification, in which a negative relationship is expected to be found like the one observed in urban areas (Martin & Lorenzen, 2016). These results indicate that in rural areas distress might not be the main reason for diversification as in urban areas.

Figure 3 Participation in livelihood clusters by wealth and wave (percentage of households), 2016-2018, Rural households



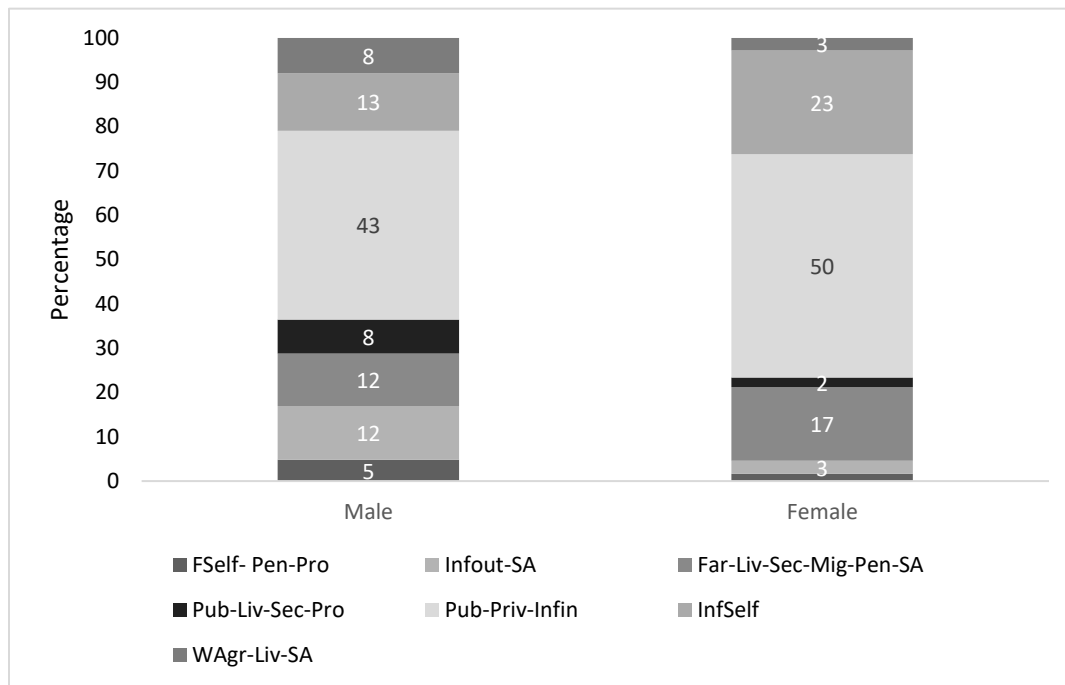
Source: Author's calculation based on ELMPS 2006, 2012 and 2018. Far: farming; WAgri: wage worker in agriculture; Liv: livestock; Pub: public wage employee; Priv: private wage employee; Infself: informal self-employment; FSelf: formal self-employment; Infin: wage employee inside establishment; infout: wage employee outside establishment; Sec: secondary job; Mig: migration; Pen: pension; SA: social assistance; Pro: profits.

4.4 Participation of households in livelihood clusters by sex

While female-headed households depend less on informal wage employment and more on informal self-employment than male-headed households do, overall, their livelihood strategies are not substantially different. Figure 4 shows livelihood diversification clusters by sex of head of household. However, the age groups of female-headed households points to the fact that around 5 percent of them are between 16 to 24 years old, 41 percent are between 25 to 54 years old, 24 percent between 55 to 64 and 30 percent of them are 65 years old or above. The percentage of

elderly female who are heading the households show that these indifferent results might be due to a ‘social’ definition of female headed households rather than an economic definition.

Figure 4 Participation in clusters of livelihood diversification by sex (percentage of households), 2006-2018



Source: Author’s calculation based on ELMPS 2006, 2012 and 2018. Far: farming; WAg: wage worker in agriculture; Liv: livestock; Pub: public wage employee; Priv: private wage employee; Infself: informal self-employment; FSelf: formal self-employment; Infin: wage employee inside establishment; infout: wage employee outside establishment; Sec: secondary job; Mig: migration; Pen: pension; SA: social assistance; Pro: profits.

4.5 Determinants of livelihood diversification

Table 5 shows the marginal effects of an ordered logit model exploring the determinants of livelihood diversification. The livelihood clusters derived from the CA were divided into three groups: (1) less diversified households if they rely on one wage or non-wage employment (FSelf-Pen-Pro; Infout-SA; InfSelf); (2) Moderately diversified households if they use two or three wage or non-wage employment activities (Pub-Liv-Sec-Pro; WAg-Liv-SA) and; (3) Highly diversified

households who use clusters including three or more wage or non-wage employment activities (Far-Liv-Sec-Mig-Pen-SA; Pub-Liv-Sec-Pro).

Table 5 Determinants of livelihood diversification level, marginal effects from an ordered logit model

	Low Diversification	Medium Diversification	High Diversification
Head Sex (Female)	-0.029**	0.008**	0.021**
Head Age	-0.005***	0.001***	0.003***
Head Education (illiterate omitted)			
Read and Write	0.098***	-0.041***	-0.057***
Less than Intermediate	0.066***	-0.025***	-0.041***
Intermediate	0.0004	0.0003	0.0001
Above Intermediate	-0.053***	0.010***	0.043***
University and post-grad	-0.060***	0.010***	0.049***
Mother's Education (illiterate omitted)			
Read and Write	-0.007	0.002	0.005
Less than Intermediate	-0.016	0.004	0.011
Intermediate	-0.034**	0.008***	0.026***
Above Intermediate	-0.051*	0.011***	0.040
University and post-grad	-0.076***	0.012***	0.065***
Father's Education (illiterate omitted)			
Read and Write	-0.007	0.002	0.005
Less than Intermediate	-0.008	0.002	0.005
Intermediate	-0.015	0.004	0.011
Above Intermediate	-0.010	0.003	0.007
University and post-grad	-0.021	0.006	0.016
Proportion of HH members with secondary education or higher	-0.020*	0.006*	0.014*
Working age members	-0.025***	0.007***	0.017***
Working age female members	0.006	-0.002	-0.004
HH Size	-0.011***	0.003***	0.008***
Urban	0.132***	-0.038***	-0.094***
Wealth tertile	0.020***	-0.006***	-0.014***
N= 25,841 HH			

Source: Author's calculation based on ELMPS 2006, 2012 and 2018.

*Significant at 10 percent; ** Significant at 5 percent; *** Significant at 1 percent.

Living in an urban area is associated with a 4 percentage point reduction in the probability of being in a moderately diversified level, and a 9 percentage point reduction in the probability of being in a highly diversified level, both statistically significant. Furthermore, the increase in wealth tertile by one category decreases the probability of moderate and high diversification by around 1 percentage point. While some studies have found that high- or middle-income households diversify their livelihood more than poor households (Abdulai & CroleRees, 2001; Smith et al., 2001), I find that the wealth status of households is negatively and significantly correlated with livelihood diversification.

Female-headed households have more diversified livelihoods, which could be due to their high vulnerability. Moreover, large households and those with greater numbers of working-age members have a higher probability of being moderately and highly diversified households. Additionally, the age of the head of household is positively correlated with more diversified livelihoods. This could be explained by higher prospects of diversifying livelihood with older and more experienced heads, which would corroborate the findings of Negeri & Demissie (2017).

The educational level of the head of household, the household members, and the head of household's parents' are important determinants of degree of livelihood diversification. Households with better-educated heads or members are more likely to be moderately or highly diversified compared to those with illiterate heads. By the same token, a higher educational level achieved by the head of household's mother is statistically significantly correlated with greater livelihood diversification. The head of household's father's education was also positively correlated with livelihood diversification but it was insignificant. These findings highlight that investing in education could enable households to get alternative sources of income and diversify

their livelihood. When added, the variables of access to land and access to credit had a positive and significant correlation with the probability of being a moderately or highly diversified households. However, we should be cautious about the interpretation of this relationship given that the direction of causality is not clear.

5. CONCLUSION

This paper explores the different livelihood diversification strategies in urban and rural Egypt and the factors influencing the level of diversification. Additionally, this study examines how households change strategies over time. I find that diversification is relatively higher among rural households compared to urban households.

In rural areas, there is a higher level of diversification away from agriculture, even among wealthy households, over time. Wealthy rural households tend to diversify into formal public or private employment. In contrast, poorer rural households diversified away from farming into wage employment in the agriculture sector, informal wage employment outside establishments, raising livestock and receiving social assistance. These results point out to the dynamic structure of the Egyptian economy that reduced reliance on agriculture activities. Furthermore, the analysis reinforces the high-entry barriers of poor households to formal employment.

The probability of selecting relatively more specialized livelihood clusters, which stayed stable across time, is positively and significantly associated with the wealth status and living in urban areas. The results of this study imply that distress might not be the main reason for diversification in rural areas while the opposite is found in urban areas.

Although the paper avoids suggesting a clear causal relationship between diversification and access to land or access to credit, they could potentially help households breaking out the trap of low-return activities. Additionally, targeted interventions that support access of poor rural households to remunerative non-farm activities could include asset transfer or livestock acquisition. This is especially true since livestock regained prominence in 2018 among poor rural households after the large decline witnessed from 2006 to 2012.

Education of heads, members, and mothers are important determinants of livelihood diversification. These findings highlight the importance of investing in education and skills to alleviate poverty and compensate for asset disadvantages. The paper reports mixed evidence on the importance of the sex of head of household in determining livelihood diversification. These mixed results points to the need for further research to better understand the effect of gender composition as well as the role played by the economic head of household in diversifying livelihood. Future research could use panel data to address the impact of transitions between livelihood clusters on household welfare and income inequality.

Acknowledgement

This research was supported by the Carnegie Corporation of New York through a fellowship on ‘*Economic Vulnerability in the Arab World*’ to the Humphrey School of Public Affairs at University of Minnesota. The author gratefully acknowledges the mentorship of Ragui Assaad, University of Minnesota; Caroline Krafft, St. Catherine University; Djavad Salehi-Isfahani, Virginia Polytechnic Institute and State University; and Mohamed Ali-Marouani, University of Paris 1-Panthéon Sorbonne. The paper benefited from the valuable comments of the fellows and editors. All views, interpretations and recommendations expressed in this paper are those of the author and not necessarily those of the supporting institutions.

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