

## Chapter 4

# Understanding the Complex Processes Underlying Well-Being of Rural Households

**Abstract** An analysis of rural livelihoods is carried out to understand the micro- and macro-level processes that shape the well-being of rural households during urbanization. The analysis is based on quantitative surveys and qualitative interviews and field observations across eight villages around Poyang Lake. I examine rural households' livelihoods against the broad development background in China, and within their local environmental contexts, which also define their exposure to flood hazards. While urbanization has a positive effect on reducing the sensitivity of rural livelihoods to flooding, a variety of constraints, including some institutional factors and macro-level processes, confront rural households in developing viable livelihoods. I discuss how development programs and policy may simultaneously promote rural development and mitigate flood impacts in the Poyang Lake area.

**Keywords** Rural livelihoods • Rural-urban connection • Policy and institutions • Urbanization • Flood impact mitigation • Understanding processes

### 4.1 Micro- and Macro-level Processes Affecting Rural Livelihoods

Amid ongoing and accelerated urbanization in China, micro- and macro-level processes affect both the livelihood options available to rural households and choices they make (Fig. 4.1). First of all, rural households have individual characteristics; five types of capital—natural, human, social, financial, and physical—provide resources and assets for them to form livelihood strategies and affect their capabilities (Ellis 1998; Bebbington 1999).

A variety of local social and environmental factors can affect their options and choices. The biophysical environment largely determines the quality of their farmland and other natural resources, as well as the flood risk. A village's characteristics, especially its social capital and location relative to a small or large urban center, can

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Part of the material from this chapter was published in the *Journal of Rural Studies* (Tian et al. 2016).

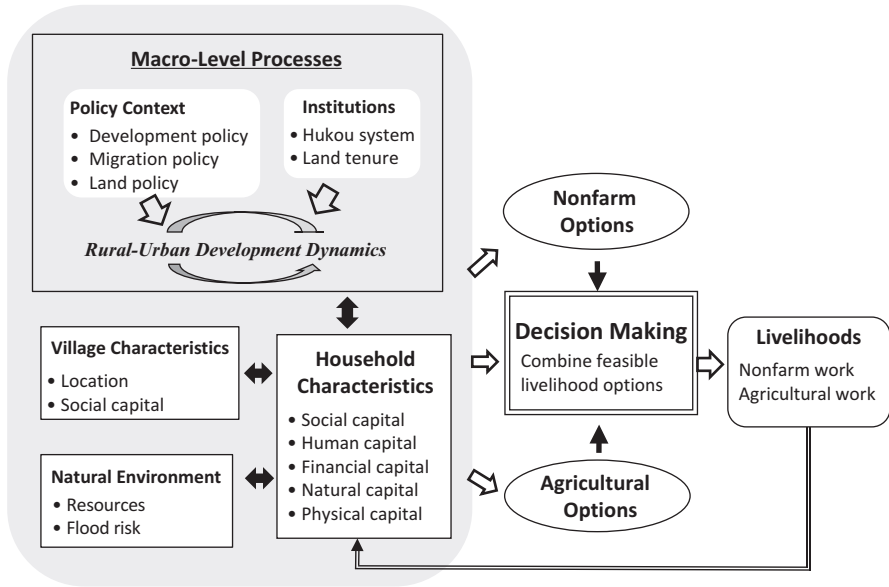


Fig. 4.1 Micro- and macro-level processes affecting rural livelihoods (Tian et al. 2016)

shape household livelihood options. These local factors interact with household characteristics to produce variations in livelihood strategies and outcomes.

Institutions and policy can also play an important role to affect or constrain rural household livelihood options, decisions, and development levels directly, or indirectly through influencing rural-urban development dynamics. The analysis in this chapter is intended to understand how household characteristics, and local and macro-level processes, interact to shape rural household livelihood options and choices, and ultimately the well-being of rural households.

## 4.2 Measuring Well-Being of Rural Households

Development at the household level is represented by income per capita. Low income is invariably the central issue for development in less developed areas. As I observed in the field, income often determines a farmer household’s living standards. I also use the survey data to verify this observation throughout this analysis. Overall, income per capita is found to be a fairly good proxy for most aspects of development (Ray 1998).

I examine household income sources to understand the sensitivity of a household’s livelihoods to flooding. Floods affect farm-based income—from crop cultiva-

tion, forestry, and livestock to fishing and aquaculture—more so than nonfarm income, such as wage- or salary-based migratory work and other business activities. The flood hazard zone in which a household is located reflects the degree to which the household is exposed to flooding, and I use it to examine the household's exposure to floods. These zones are defined in Chap. 3.

### 4.3 Household Surveys and Interviews

The analysis of rural livelihoods is based on surveys, interviews, and observations across eight villages around Poyang Lake. Primary surveys were conducted in 2007 during the Spring Festival (the Chinese New Year). The surveyed villages represent geographical and environmental variability in the Poyang Lake area (Table 4.1; Fig. 2.1); their distance to urban centers and flood risk are counted as major variables.

A comprehensive dataset about land use, livelihoods, and socio-demographic information for 192 households is compiled from the surveys (Tables 4.1, 4.2, and 4.3; Figs. 4.2 and 4.3). Data on crop cultivation and production are collected at the plot level. Demographic information, farmland endowment, education, social connections (in terms of government contacts), and income sources are collected directly or summarized for each household. All continuous variables are mean-centered for statistical analyses. Further details on survey data collection can be found in Tian et al. (2015). Note that the villages' real names are not used to protect their privacy.

Another visit to the surveyed villages, this time with a local assistant, took place in summer 2008, as a follow-up to the surveys. During this visit, I conducted formal and informal interviews with 49 farmer households, 10 village leaders, and 10 local government officials, 5 of whom worked at the county level and five at the township level (Table 4.1). We stayed with a household in villages ZJ, TJK, and HXL, spending 5–7 days with each, observing the daily life of villagers and engaging in informal conversations. We spent a half to a full day in each of the other five villages. In each village, we also visited the agricultural fields in the company of a farmer or village leader to familiarize ourselves with the natural environment. The photos that follow present some aspects of rural life in the villages (Fig. 4.4). The website <http://mason.gmu.edu/~qtian2/> has more information about my visits to the villages and rural life around Poyang Lake.

The formal interviews include a series of questions designed based on a preliminary analysis of the survey data and informed by opinions of local scientists in Jiangxi. Our conversations with farmers are, however, not constrained by these preset questions; following Holstein and Gubrium's (1995) active interviewing approach, we seek in-depth understanding of how floods and other factors affect their livelihoods. Staying with farmer households offers many opportunities for informal conversations and observations, and gives us additional insights into their decision-making processes.

**Table 4.1** Characteristics of surveyed villages

Village	ZJ	TJK	FJ	SZT	ZJYM	ZJQ	DWP	HXL
Village ID	34	41	22	13	15	26	47	48
Surveys and interviews	23	20	23	19	21	19	35	33
Number of households surveyed	13(3)	15(2)	2	3	5(1)	3(1)	3(1)	15(2)
Number of households interviewed								
Flood risk	2	5	3	3	4	4	1	5
Location	N	N	Y	Y	Y	Y	N	N
Close to county capital								
Income per capita (in CNY)	4,280.9	4,972.2	4,673.7	3,238.2	5,476.7	5,989.8	3,978.4	3,612.2
Total	1,803.9	338.5	1,202.9	1,162.4	466.4	2,674.4	245.0	201.7
Crop cultivation	0.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0
Forestry	183.5	80.8	0.0	2.2	338.1	203.3	41.1	124.3
Livestock	4.6	1,444.4	0.0	0.0	0.0	0.0	0.0	351.4
Fishing	183.5	464.6	0.0	0.0	0.0	0.0	0.0	0.0
Aquaculture	66.7	57.0	86.3	410.2	123.7	186.4	128.7	168.5
Other sources	97.7	112.1	0.0	14.8	100.8	138.9	202.5	5.7
Agricultural wage	1,681.7	1,257.6	3,037.9	1,593.7	3,011.9	1,051.1	1,903.3	2,366.3
Non-agricultural wage								
Salary-based	80.4	227.3	87.9	0.0	466.1	1,586.7	1,288.1	354.3
Business	178.9	989.9	258.6	54.9	957.6	148.9	169.8	40.0
Pct. nonfarm income	47.62	89.58	72.42	51.37	82.83	48.84	57.72	76.58

Loans	Avg. amount of loans	7,217.4	15,375	8,217.4	4,394.7	857.1	1,947.4	6,314.3	7,348.5
	Pct. bank loans	0.60	32.51	35.18	0.00	0.00	13.52	1.81	5.57
	Pct. loans used for business	0.60	65.02	2.64	0.00	0.00	0.00	0.00	8.25
Demo-graphics	Avg. number of laborer	3.0	3.3	4.0	3.7	4.3	3.5	3.5	3.6
	Avg. number of member	4.7	5.0	5.0	4.8	5.6	4.7	4.5	5.3
Land resources	Avg. farmland area per capita (mu)	2.9	0.6	1.4	1.9	1.7	1.2	0.9	0.6
	Avg. plot size (mu)	1.2	0.9	0.8	0.8	0.6	1	0.7	0.5
	Pct. flat area	100	83	100	100	76	100	100	67
Education	Pct. households with elementary (or below) education	10.00	8.70	26.32	4.76	15.79	17.14	33.33	10.00
	Pct. households with high school (or above) education	25.00	43.48	31.58	57.14	47.37	48.57	24.24	25.00
Social connection	Pct. households with government contacts	34.78	35.00	21.74	5.26	14.29	47.37	17.14	21.21

Note: One mu is about 0.067 ha

**Table 4.2** Description of categorical variables at the household level

Variable name	Description	Frequency ( <i>n</i> = 193)
Flood risk	1: In the very low hazard zone	35
	2: In the low hazard zone	23
	3: In the medium hazard zone	42
	4: In the high hazard zone	40
	5: In the very high hazard zone	53
Close2City	1: Village is close to its county capital	82
HaveBusinessIncome	1: Household has income from business	17
	NA: Data unavailable	16
HaveSalaryIncome	1: Household has salary-based income	20
OwnTV	1: Household owns TV set(s)	191
OwnRefrigerator	1: Household owns refrigerator(s)	36
OwnAC	1: Household owns air conditioner(s)	8
OwnComputer	1: Household owns computer(s)	9
OwnMotor	1: Household owns motorcycle(s)	103
OwnCellPhone	1: Household owns cell phone(s)	124
HouseStructure	1: Mud	11
	2: Brick	55
	3: Concrete-steel	114
	4: Others (mixed material)	10
	NA: Data unavailable	3
HaveLoans	1: Household has loans	84
HaveBankLoans	1: Household has bank loans	10
HouseholdType	1: Household has no children who are 6 years (or younger)	140
	2: Household has children who are 6 years (or younger) and senior citizens who are 60 years (or older)	16
	3: Household has children but no senior citizens	37
MoreFlatArea	1: Percentage of flat farmland a household manages is above the average percentage of 85%	40
	NA: Data unavailable	20
Education5Levels	The highest degree that the household members received	
	0: Illiterate	4
	1: Elementary	28
	2: Middle school	85
	3: High school	43
Education3Levels	4: College	33
	1: Elementary (or below)	32
	2: Middle school	85
WithGovContacts	3: High school (or above)	76
	1: Household has government contact(s)	46

**Table 4.3** Description of quantitative variables at the household level

Variable name	Description	Min	Max	Median	Mean	SD
Income per capita	Including income from all sources	0	32,620	3,778	4,537	3,824.7
Farming income per capita	Including income from crop cultivation, forestry, livestock, fishing, aquaculture, and agricultural wages	0	15,000.0	1,028.0	1,665.0	2,102.0
Non-agricultural wage per capita	Income from non-agricultural wage-based migration work	0	9,400	1,600	1,973	2,210.9
Salary-based income per capita	Income from salary-based work	0	12,000	0.0	545.6	1,733.7
Business income per capita	Income from business activities	0	20,000	0.0	353.3	2,161.9
Pct. nonfarm income	Percentage of nonfarm income, including non-agricultural wage, salary-based income and business income	0	100	67.94	55.97	38.10
Number of wage-based migration jobs	Number of household members who do non-agricultural waged-based work	0	8	1	1.20	1.28
Number of member	Total number of household members	2	10	5	5	1.68
Number of laborer	Total number of household members who are older than 16 years and younger than 60 years	0	7	4	3.6	1.39
DependenceRatio (%)	Percentage of the number of children and senior citizens	0	100	0.0	15.31	19.85
PctLabor (%)	Percentage of the number of laborers	0	100	75.00	74.06	23.43
Farmland area per capita (mu)	Total area of farmland per capita that a household manages	0	8.15	1.04	1.43	1.40
AvgPlotSize (mu)	Average size of plots	0	3.26	0.67	0.70	0.53
PctFlatArea (%)	Percentage of flat farmland	0	100.00	100.00	86.61	27.69

Note: All income measures are in CNY

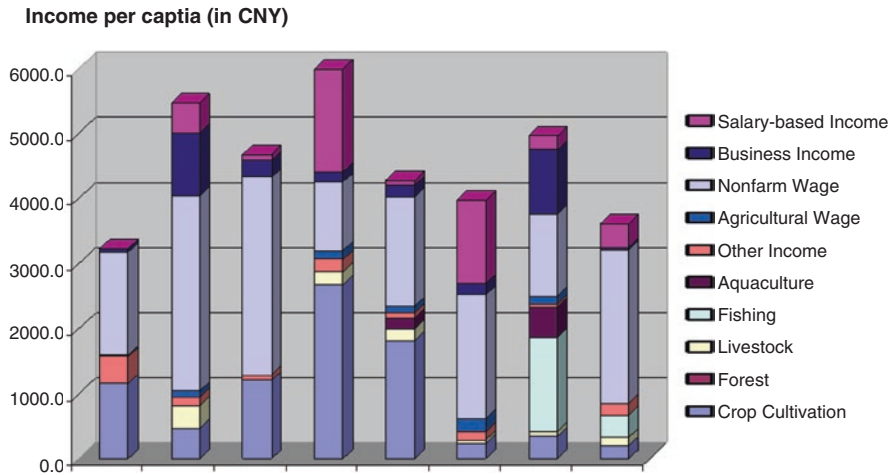


Fig. 4.2 Livelihoods and income composition in surveyed villages

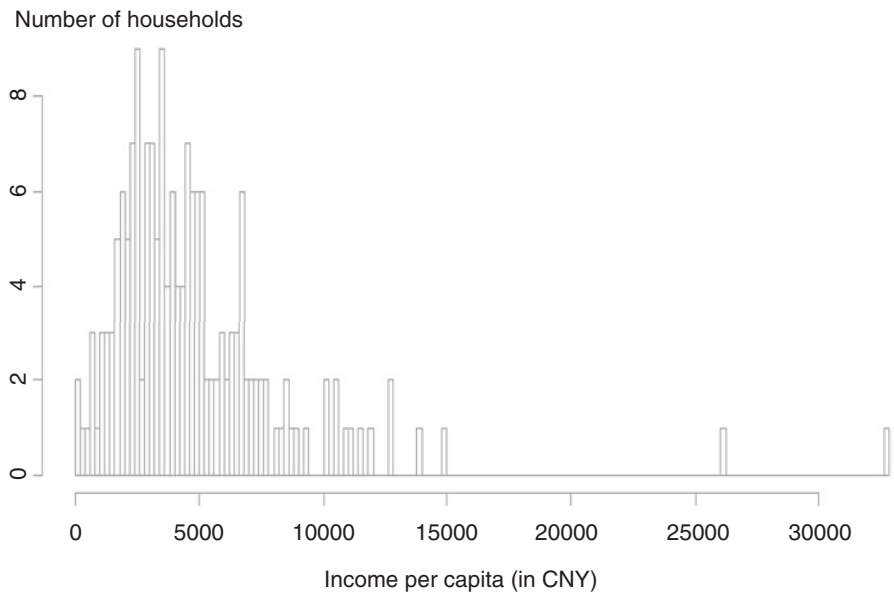


Fig. 4.3 Income distribution among surveyed households

#### 4.4 The Use of Quantitative and Qualitative Analyses

I examine the differences in livelihood strategies across the surveyed villages and compare their natural environments, locations, and social characteristics to understand how these local factors affect the household livelihoods. Based on the





**Fig. 4.4** Rural life in villages around Poyang Lake

variations in per capita income among surveyed households (Fig. 4.3), three groups of households with extreme income are identified. Group A has an extremely low development level, with per capita income below 1,000 CNY. Group B has an extremely high development level, with per capita income above 25,000 CNY. Group C has a high development level, with per capita income above 10,000 CNY, but below 15,000 CNY. In each group, I look at the livelihood profiles and household characteristics to analyze what makes a household better or worse off.

Finally, I turn to the majority of surveyed households and examine their decision making to illustrate various constraints they face in developing their livelihoods. While qualitative interviews and field observations allow a deeper understanding of their options and choices, the survey data complement and strengthen the qualitative understanding. The interviews also provide detailed information about crop-growth

cycles, which allows me to examine how flood hazards affect agriculture in the region. Additionally, I use the household survey data to explore the relationships between development level, sensitivity, and exposure.

## 4.5 Results

### 4.5.1 *Differences among Villages and Local Social, Environmental Factors*

The surveyed villages differ in mean income per capita (Appendix: Fig. 4.1), but the differences are not statistically significant due to large variations among the households within those villages (Appendix: Fig. 4.2). Income per capita at the village level does not consistently correlate with exposure to flood risk; those with lower exposure do not all have higher mean income per capita, and those with higher exposure do not all have lower mean income per capita (Table 4.1). In fact, villages ZJQ and ZJYM have higher mean income per capita than all other villages *and* a higher exposure than most.

Certain characteristics of a village, however, do provide advantages or disadvantages for the development of household livelihoods. Being located near an urban center, as are ZJQ and ZJYM, provides market accessibility to high-return income options, such as raising livestock or commercial vegetable production, as well as opportunities for seasonal nonfarm work. Households located near urban centers can combine these options to earn a good income without having to leave their homes (see also Veeck and Pannell 1989).

Villages endowed with special natural resources can use these resources to improve income quickly. For example, villagers in TJK made good money from river sand mining until the government began to regulate the practice in the Poyang Lake area amid concerns about environmental issues. Yet villages like TJK, with access to special types of natural resources, are few. While households in villages with rich, highly productive farmland, like ZJ, benefit from combining good farming income with wages from migratory work, households in farmland-poor villages, like HXL, have to leave their homes to seek migratory work. These advantages or disadvantages in natural resources are largely fixed, based on geographical locations.

The leadership of a capable farmer or household can play an important role in shaping the livelihoods of all the village households. Most villagers find migratory work through other farmers in their village (or, in some cases, through relatives). Therefore, the kind of migratory work available to them, which largely determines their income, depends on the overall social connections between the village and the outside world. If a few households in a village do very well, their success can inspire other households or create job opportunities for others. Our conversations with local officials reveal that even when government agencies choose villages for special development projects, they look at villagers' initiative; their experiences show that

a project is more likely to succeed if villagers demonstrate initiative and have the capacity to carry out the project.

Strong leadership can enhance a village's social capital. Its absence is often associated with a village's low development levels, and low morale, which reinforces a negative spiral. In almost every successful development story, there is a visionary and capable leader who takes the interests of the village to heart and pulls the villagers together (Zhang and Chen 2005). Such leadership was generally absent in the villages we visited, and can be enhanced.

### 4.5.2 Low-Income Households

The eight households with extremely low incomes share several characteristics (Table 4.4). They all rely completely on crop cultivation, and their income from crop cultivation is very low. They have very low education levels, generally only an elementary school education, with illiteracy not uncommon. Most have no government contacts. Four of the households consist of old couples who cannot do migratory work and barely get by growing subsistence crops. When an elderly couple has no sons to provide financial support, their household is called *Wu Bo Hu*. The *Wu Bo*

**Table 4.4** Group A: households with extremely low income

Variable	H1	H2	H3	H4	H5	H6	H7	H8
Village ID	22	34	47	26	48	26	15	13
Flood risk	3	2	1	4	5	4	4	3
Close2City	1	0	0	1	0	1	1	1
Income per capita	0	50	300	500	738	800	855	750
Total income	0	100	900	1,000	1,475	1,600	3,420	1,500
Nonfarm income	0	0	0	0	0	0	0	0
Motorcycle number	0	0	0	0	0	0	0	1
Refrigerator number	0	0	0	0	0	0	0	0
AC number	0	0	0	0	0	0	0	0
Computer number	0	0	0	0	0	0	0	0
Cell phone number	0	0	0	0	0	0	0	0
House structure	1	2	2	2	2	1	2	2
Farmland area (mu)	3.90	0.02	2.10	5.10	2.00	0.06	8.00	1.90
Number of household member	2	2	3	2	2	2	4	2
Number of laborer	2	0	2	2	2	0	2	2
Household of an elderly couple	N	Y	N	Y	Y	Y	N	N
Education5Levels	0	0	1	1	1	0	1	1
Number of government contacts	0	0	0	1	0	0	0	0

*Hu* receives some governmental assistance, but the amount is small and insufficient for a comfortable life.

The living standards of the low-income households are also very low. These villagers still live in mud or brick houses, while most households have houses made of reinforced concrete. They own no air conditioners, refrigerators, cell phones, motorcycles, or computers. They are found across seven of the eight surveyed villages, suggesting that extremely low development at the household level does not correlate with location or flood risk.

### 4.5.3 High-Income Households and Successful Livelihood Strategies

The top two households with extremely high income both make significant money from business (Table 4.5). The remaining high-income households, however, have mixed livelihood profiles (Table 4.6). All these households with high income enjoy

**Table 4.5** Group B: households with extremely high income

Variable	H9	H10
Village ID	41	15
Flood risk	5	4
Close2City	0	1
Income per capita	32,625	26,163
Total income	130,500	104,650
Nonfarm income	84,500	103,000
Farming income	46,000	1,650
Agricultural wage	0	0
Non-agricultural wage	0	0
Business income	80,000	75,000
Salary-based income	4,500	28,000
Motorcycle number	1	0
Refrigerator number	1	1
AC number	1	0
Computer number	0	1
Cell number	1	3
House structure	3	3
Farmland area (mu)	11.00	3.80
Number of household members	4	4
Number of laborers	1	4
Education5Levels	2	4
Number of government contacts	5	0
Bank loans (CNY)	100,000	0

**Table 4.6** Group C: households with high income

Variable	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
Village ID	47	48	26	26	47	26	15	15	26	22	34	34
Flood risk	1	5	4	4	1	4	4	4	4	3	2	2
Close2City	0	0	1	1	0	1	1	1	1	1	0	0
Income per capita	12,650	12,625	15,000	14,000	11,810	11,520	11,061	10,805	10,500	10,418	10,175	10,050
Total income	50,600	50,500	60,000	42,000	47,240	57,600	66,364	75,634	42,000	41,670	40,700	40,200
Nonfarm income	46,000	48,000	0	20,000	46,000	57,600	56,400	65,200	12,000	36,000	15,600	0
Farming income	4,600	2,500	60,000	22,000	1,240	0	9,964	10,434	30,000	5,670	25,100	40,200
Agricultural wage	0	0	0	0	0	0	0	0	0	0	0	7000
Non-agricultural wage	10,000	0	0	20,000	15,000	9600	56,400	29,200	0	36,000	0	0
Business income	0	0	0	0	0	0	0	36,000	0	0	15,600	0
Salary-based income	36,000	48,000	0	0	31,000	48,000	0	0	12,000	0	0	0
Motorcycle number	0	1	1	3	1	0	0	2	1	1	1	1
Refrigerator number	1	0	1	1	0	1	0	0	1	0	0	0
AC number	0	0	0	0	0	0	0	0	0	0	0	0
Computer number	0	0	0	0	0	2	0	0	2	0	0	0
Cell number	2	3	0	1	2	5	3	3	3	1	1	0
House structure	3	3	3	3	3	3	3	4	3	2	3	2
Farmland area (mu)	5.70	3.87	8.00	3.60	3.50	0.00	10.40	13.50	10.7	4.80	6.30	32.60
Number of member	4	4	4	3	4	5	6	7	4	4	4	4
Number of laborer	4	4	2	2	4	5	5	7	3	4	2	2
Education5Levels	3	4	3	2	4	4	4	3	3	2	4	2
Number of government contacts	0	0	0	1	2	1	0	0	1	0	2	1

relatively good living conditions. The top two households own air conditioners. Many of the high-income households own motorcycles, cell phones, and houses built of reinforced concrete. Half of them have refrigerators, and two own computers. They are distributed across all eight surveyed villages, suggesting that high development at the household level does not correlate with location or flood risk.

The livelihoods of these high-income households suggest that each of the four livelihood profiles as shown in Table 4.6 can lead to high development levels: (I) diversified near-home; (II) business-oriented high-return; (III) farming-based; and (IV) combined migratory work and farming. Certain household characteristics and some local factors are important for the success of these profiles (Table 4.7).

Among the wealthiest households are those that have success in business (Table 4.5). These households are few and appear to share a special kind of capability: they are willing to take risk. All the interviewed farmers seem to understand that high economic returns involve high risks, and some farmers are able to share suc-

**Table 4.7** Household characteristics, local factors, and successful livelihoods

Livelihood profile	Sub-type	Total labor	Education	Risk taking	Hard working	Social status and connections	Other factors
I. Diversified near-home profile	A member is a village leader		*	*		***	
	No member is a village leader		*	*		*	Location near urban centers
II. Business-oriented high-return profile	Business as the major income		*	***		***	Location near urban centers
III. Farming-based profile	High-cash-value crop cultivation			*	***		Location near urban centers
	Large-scale rice production			*	***	**	Good farmland resources
IV. Combined migratory work and farming profile	Salary-based work as the major income source	**	***			*	
	Wage-based migratory work as the major income source	***	**				

Note: The number of \* indicates the degree of importance

cess stories of risk takers. But very few of them are willing or able to assume such risks themselves.

Social connections are important for finding business opportunities and obtaining investment capital. Many of the business-oriented households lacked initial investment capital and borrowed money from friends, relatives, or banks to start their businesses. In interviews, farmers often use the term *Men Lu*. They explain that their bad situations have resulted from a lack of *Men Lu* and attribute the success of some other households to their possessing *Men Lu*. *Men* means “door” and *Lu* means “road.” The term *Men Lu* can be best understood in English as options that come through social connections.

As a special form of social connection, government contacts can provide access to information, help obtain bank loans, and sometimes offer business opportunities directly. More households with business income and bank loans have government contacts than do those that lack business income or bank loans (Appendix: Table 4.1). Business-oriented households do not necessarily have very high levels of education (Table 4.5), and there is no significant difference in business income among three education levels (Appendix: Table 4.2). Business-oriented households do not necessarily have large amount of labor either (Table 4.5) because they can and do often hire laborers.

Two common types of households are successful in creating a diversified near-home livelihood: those in villages near an urban center and those with a member who is a village leader (Table 4.6). The location of a village near urban centers facilitates the development of successful, diversified livelihoods through combining vegetable cultivation, livestock production, and near-home nonfarm work.

Villages are the lowest level of administrative divisions of China. Village leaders are appointed by higher-level administrative units or are often now elected by villagers. As the head of a village, village leaders usually have better connections with local government officials. These connections and a leader’s status in the village are important for acquiring contracts on special, often scarce resources, such as fish ponds. The village leaders are also better informed about the outside world and more aware of business opportunities.

Households with a farming-based livelihood profile can achieve high incomes through vegetable production or larger-scale rice cultivation (Table 4.6). These households are commonly hard working, in the sense that farmers must use great physical strength and tolerate all kinds of weather. Farming in the surveyed villages is mostly accomplished with human labor, although rice harvesting by machinery has been widely adopted in relatively flat areas.

Location near an urban center provides local market accessibility and facilitates vegetable production. There are success stories of commercial vegetable production in places far from any urban center, but these scenarios take extraordinary leadership and collective action. To form a scale of production large enough, for example, it is necessary to convert farmland over large areas—often including a whole village, town, or even a county—to vegetable fields. Sales channels and transportation must be arranged and coordinated for all the producers.

Living in an area with rich farmland makes it relatively easy for a household to acquire farmland, facilitating rice cultivation at larger scales. Social connections are, in general, useful for farmers to obtain land rental contracts. Some farmers have managed to contract large areas of farmland for rice cultivation in villages other than their own, and for these farmers, the social connections are even more important.

Education and labor amount are most important for the success of households with the combined farming and nonfarm work incomes (Table 4.6). Education plays a large role in influencing nonfarm income. The migrant workers usually earn higher incomes from salary-based jobs than from wage-based work, but salary-based jobs require higher levels of education. Migrant workers with low education levels often do temporary wage-based jobs that involve hard labor or poor working environments. The survey data show that households with high school education (and higher) on average have higher salary-based income, whereas households with elementary education (or below) have lower income from migratory work (Appendix: Table 4.2). Wages for migratory work do not vary significantly, and more nonfarm income can be accrued if more members participate in migratory work.

#### ***4.5.4 Most Households and Constraints on Rural Livelihoods***

Based on a regression analysis, per capita income, for the majority of surveyed households, is significantly associated with farmland area, demographic composition, education, number of members participating in wage-based migratory work, and whether a household has salary-based income or government contacts (Table 4.8). The fact that farmland area per capita is a significant factor suggests that farming is still an important component of rural livelihoods for most households, and farmland resources contribute to some between-household variations in per capita income.

Having children but no older people in the household (who can care for children) negatively correlates with per capita income. In such cases, parents may have to stay on the farm, though they could make more money doing urban migratory work. I have discussed the role of education and the differences between wage- and salary-based nonfarm work in Sect. 4.5.3. Government contacts can help secure salary-based jobs, in addition to providing access to information, bank loans, and business opportunities, as discussed in Sect. 4.5.3. A larger proportion of surveyed households with salary-based income have government contacts (Appendix: Table 4.1).

For most households, income per capita is not associated with location or flood risk (Appendix: Table 4.3). Their income largely correlates with other aspects of living conditions (Appendix: Table 4.4). Motorcycles are becoming a common transportation tool for most of them. Households that own computers or air conditioners are few (Table 4.2), and they have relatively high income.

These findings are consistent with the analysis of extreme-income households. In fact, most households rely on a combination of farming with nonfarm work, and have a livelihood profile IV. They execute it to varying degrees of success, depend-



**Table 4.8** Linear regression results

Category	Independent variable	Excluding all high-income households		Excluding top two households	
		Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Education	Education3Levels 2	651.95	0.14	1233.29	0.03*
	Education3Levels 3	1110.34	0.018*	2056.44	0.0006**
Demographics	HouseholdType 2	-476.69	0.47	-236.10	0.77
	HouseholdType 3	-701.27	0.12	-1043.69	0.06***
	DependenceRatio	0.23	0.98	-10.52	0.34
	PctLabor	8.91	0.19	9.99	0.23
Land resources	Farm area per capita	266.35	0.06***	272.18	0.14
	AvgPlotSize	-401.16	0.26	-105.82	0.82
Income sources	Number of wage-based migratory jobs	551.63	0.0005**	601.23	0.002****
	HaveSalaryIncome	1232.55	0.04*	2536.09	0.0004**
Social connection	WithGovContacts	597.11	0.099***	920.62	0.04*
Intercept		2062.31	0.0005**	1434.70	0.05***
Adjusted R-squared		0.1987		0.2819	

Note: \**p*-value  $\leq 0.05$ , \*\**p*-value  $\leq 0.001$ , \*\*\**p*-value  $\leq 0.1$ , \*\*\*\**p*-value  $\leq 0.01$

ing on their characteristics in education, demographics, social connections, and farmland resources. Those high-income households are able to achieve higher levels of development because they have advantages in some of these factors. On the other hand, a negative combination of these factors lead to livelihoods dependent on crop cultivation and low levels of development for extreme low-income households (see also Glauben et al. 2012).

These variations in livelihood options, strategies, and development levels among rural households mostly result from the interactions between household characteristics, village characteristics, and local environmental factors (Fig. 4.1). While local biophysical environments and certain village characteristics provide advantages or disadvantages for the development of rural livelihoods, individual households are not totally confined by them, as demonstrated by those high-income households.

In general, human capital (especially education) and social capital (connections) are most important among a household's five types of capital. They shape a household's feasible options and determine the outcomes of its livelihood strategy. They also affect how successfully the household can acquire additional farmland and accumulate financial capital.

The development of household livelihoods is also path dependent, and the outcomes of a household's livelihood strategy reinforce its characteristics and capabilities over time (Fig. 4.1). Some households in the villages, through their accumulation of investment capital during the early period of economic reforms, are now able to take risks to further diversify their economic activities. Poor households tend to be more cautious about borrowing money to invest in high-return livelihoods, are less likely to seek loans, and more likely to maintain traditional low-return livelihoods,

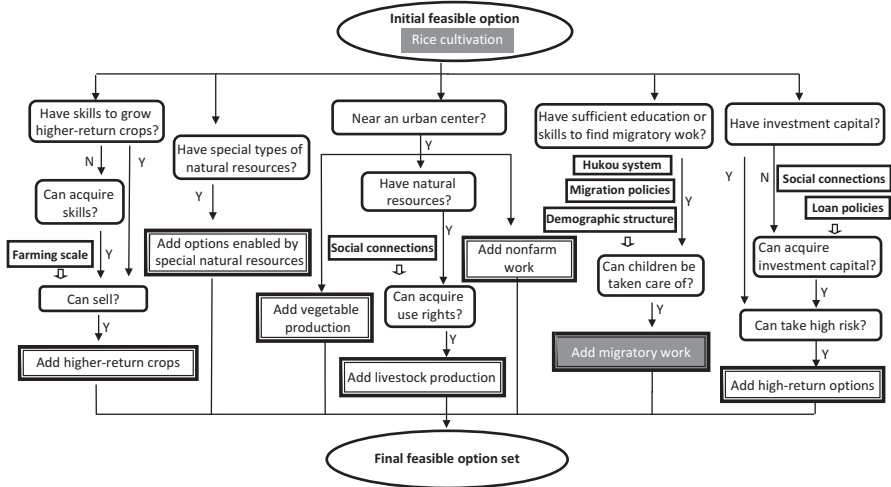


Fig. 4.5 Livelihood options and constraints on rural livelihoods (Tian et al. 2016)

thus falling into a poverty trap. Without external interventions, it will be difficult for these households to break the poverty cycle.

The interviews and field observations suggest that farmer households in the Poyang Lake Region are well informed about possible land-use and livelihood options, and able to articulate the costs and benefits associated with them, though they do not always have the assets or capabilities to implement them (Tian et al. 2015). The majority of the surveyed households are constrained in terms of feasible options (Fig. 4.5).

Most of the surveyed households do not live near an urban center or in a village endowed with special natural resources. The majority do not have government contacts or investment capital for high-return livelihoods, such as business; nor can they take the associated financial risk. Constrained by relatively low education, migrant workers typically seek work in the labor-intensive industrial sector and perform low-paying nonfarm jobs. In addition, their small farms produce low economic returns from crop cultivation, making it less likely that they can improve their incomes.

The increase in wages of migrant workers is slow also because the urban job market is flooded with a large rural migrant population. Some scholars use the theory of Unlimited Supply of Labor (Lewis 1954) to explain the slow wage growth for migrant workers in China, and argue that China now may have passed the “Lewis Point” (Cai 2010; Yao and Zhang 2010; Zhang et al. 2011).

In addition to the direct consequence of low agricultural income, the small farm-land size constrains rural livelihoods in other important ways. Small farms cannot adopt higher-value crop types because in a free-market economy, farmer households face difficulty finding sales channels for their alternative small-scale produc-

tion (Fig. 4.5). The small farmland size also discourages them from investing in agriculture, further preventing a rise in agricultural output (see also Tan et al. 2010). Across the surveyed villages (excepting ZJ, which has rich farmland), most adults are away from home doing migratory work, and the people we frequently see are the elderly, children, and some women; the overall effort in crop cultivation is low.

Though households can acquire additional farmland in land rental markets, most land rental contracts are privately negotiated, of short duration, and usually renewed on a yearly basis. The insecurity inherent in these short-term informal contracts discourages land exchanges. Some farmers in the surveyed villages say they would like to rent more farmland and specialize in agriculture, but they worry that the households to which the farmland was initially assigned may take back the rental land if they see improved productivity.

The *hukou* registration system affects not just the welfare and well-being of migrant workers in cities (Wong et al. 2007; Yin 2008). It can also constrain livelihood options for rural households (Fig. 4.5). As discussed earlier, when parents cannot find the means to take care of their young children, they cannot work in cities. Additionally, because of the differentiation of urban and rural *hukou*, migrant workers in the cities lack the same social security and benefits as urban populations and therefore regard farmland as their chief social safety net (see also Liu et al. 2014). This prevents those households that do well in cities from releasing their farmland to other households that want to specialize in agriculture. Across the surveyed villages, there are unoccupied new houses; their owners work somewhere else as migrants, but intend to come back and live in the village later. The recent *hukou* reform is expected to change this situation, which I will discuss in Sect. 4.6.1.

While low education and a lack of social capital and collective action all contribute to the average low levels of rural income, the constraints associated with institutional factors and macro-level processes cannot be resolved by individual households.

#### ***4.5.5 Sensitivity to Flooding and Inequality in Flood Impacts***

The livelihoods of most households are not greatly affected by flooding because of their participation in the urban economy. Income diversity exists across all the surveyed villages (Table 4.1; Fig. 4.2); on average, more than half of the total income is from nonfarm sources (Table 4.3). And the households that have experienced flooding more frequently in the past include greater proportions of nonfarm income (Tian and Lemos in review; Appendix: Table 4.5). But poor households are most affected by flood hazards because their crop-cultivation-dependent livelihoods are highly sensitive to flooding.

Commercial vegetable production and larger-scale rice cultivation appear to be most sensitive to flooding. However, the households that have these two types of livelihoods are not likely to be much affected by flood hazards for the following reasons. Commercial vegetable production is usually practiced in villages near an

urban center. Larger-scale rice cultivation is often found in areas with rich, highly productive farmland—these are major agricultural production centers. The urban centers and major agricultural areas in the PLR are protected by high-quality levees built and maintained by the government. The survey data also show that the households whose major income is from farming in general have experienced flood events infrequently (Tian and Lemos in review).

Flood impacts on agriculture also vary across locations. Agriculture in the PLR appears to be sensitive to flooding. Severe floods, which usually occur between July and September, can affect early rice harvesting, late rice planting, and one-season rice and cotton growing. Rice production in particular can suffer heavy damage when severe floods occur in July. The early rice harvest can be reduced or wiped out, and the late rice planting season missed if floodwaters remain for lengthy periods. However, the villages with rich, productive farmland, again, are the major rice production centers protected by well-built levees. Consequently, the sensitivity of their agricultural production to flooding is low. Villages with poor farmland are usually protected by low-quality levees and show a high sensitivity. More generally, agriculture in the high flood hazard zone is sensitive to flooding; according to the assessment in Chap. 3, 21.6% of farmland in the region lies in the high flood hazard zone.

## 4.6 Reflections on Policy

### 4.6.1 *Urbanization and Rural Development*

This analysis has demonstrated that the broader development context can significantly affect rural livelihoods. Development policy in general needs to look at rural development as an integrative, endogenous part of overall development, and guide urbanization to benefit rural households. Rural households make livelihood decisions also according to their own characteristics and local contexts. There are multiple paths to successful livelihoods, and we can expect that they will continue to develop their livelihoods along various paths. While some households may eventually exit or specialize in agriculture, others are likely to maintain rural and urban mixed livelihoods.

The stage of urbanization can be measured by the proportions of rural households performing urban work, agricultural work, and combined farm/nonfarm work, and how their respective incomes show improvement (Fig. 4.6). As urbanization increases, so too will the proportion of households that perform urban work. We may consider urbanization successful if at the end of this process, the income for all types of households is comparable to urban household income. Using such a systems perspective, we can assess our progress at any given time and learn useful insights for steering urbanization toward this desired final state.

Given the limited farmland resources and large rural populations, it is not difficult to understand, and most scholars agree, that increasing rural income will be dependent on nonfarm employment, and that the industrial sector is the engine driv-

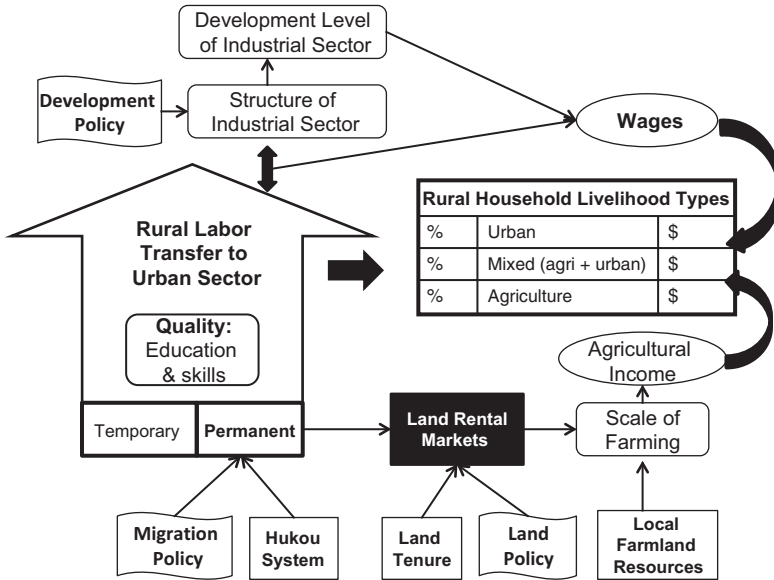


Fig. 4.6 Policy, institutions, and rural-urban development dynamics (Tian et al. 2016)

ing overall economic growth (Huang and Peng 2007). But the amount of rural labor transferring to the urban sector must be appropriate for that sector’s development level, and policies that strive to promote industrial development should consider the quality and quantity of rural labor to facilitate rural labor transfer (Fig. 4.6). This would likely promote a linked, balanced growth of both sectors, which is essential for all rural households to increase incomes regardless of their livelihood types (see also Nurkse 1961; Johnston and Mellor 1961)—as the industrial sector grows and employs more rural migrants who make permanent homes in the city, households that stay in the countryside will be able to enlarge their farming operations, improving both agricultural production and income (Fig. 4.6).

Development, migration, and land policies can work synergistically to foster such healthy urban-rural development dynamics to lift macro-level constraints and facilitate rural households developing robust livelihoods through different paths. *Hukou* and land reform, farmland consolidation, and urban planning all play a part and must be considered together from this system’s perspective.

The government’s new migration policy that moves away from the *hukou* system toward a residency registration system is timely. This addresses the social unfairness inherent in *hukou*, especially for younger generations from rural areas because it will give them the same opportunities as they get a college education and compete for employment in the cities. Meanwhile, the government can use the point-awarding system to guide migration so as to avoid some of the potential undesirable outcomes of migration.

While *hukou* is associated with several issues in rural development, as discussed earlier, there is one major concern about the elimination of *hukou*—it could lead to an overflow of migrant workers to large cities, where labor absorption capabilities are limited. This would disturb the overall development dynamics (Fig. 4.6), and could lead to the rural poor becoming urban poor, a phenomenon that has been observed in some other developing countries (Dandekar 1997; Jellinek 1997; Anjaria 2006; Davis 2006).

The new residency registration system is an effective, flexible way to influence migration and urban growth. Because of the tough point requirements in larger cities, many migrant workers are more likely to settle in smaller cities; this can potentially encourage economic growth and increase urbanization in these cities. Farmers may also find it relatively easy to adapt to urban life if they settle in smaller cities near their villages.

The growth in smaller cities can also create near-home, nonfarm work opportunities and expand high-return livelihood options to more farmer households, which would improve their overall livelihoods. The industrial development in smaller cities may focus on activities that suit the natural environment and integrate agriculture and local culture.

Closely related to the new migration policy is China's initiative on the development of urban clusters to drive economic growth through urbanization, and to influence the pattern of migration. Urban clusters usually include one or two nucleus cities and networks of cities with well-connected transportation systems across provincial boundaries. The Pearl River Delta (around Guangzhou and Shenzhen) and Beijing-Tianjin-Hebei (around Beijing and Tianjin) are among those early city clusters. Currently 11 city clusters exist mostly in the eastern regions,

China plans to increase this number to 19 by 2020, according to the country's 11th 5-year plan (2014–2020). The new clusters under development are also intended to promote economic growth in central China. The middle reaches of the Yangtze River is among those new clusters under development. It includes Hubei Province, Hunan Province, and Jiangxi Province, covering a total of 3,170,000 km<sup>2</sup>. This will affect rural development and migration patterns in the zone that includes the PLR.

From the systems perspective, the development of urban clusters and the new migration policy can, and I expect them to, synergistically contribute to healthy urban-rural development dynamics. However, the scale of Chinese urban clusters is unprecedented and will likely create challenges for infrastructure and governance. How smaller cities are integrated with these urban clusters is not clear. The spatial configuration of urban centers at different scales can have important implications for both rural and urban development in the long run. The effects of these urban development and migration policies remain to be seen.

In the agricultural sector, the government should continue its efforts in farmland consolidation. The government's policy guidelines for farmland consolidation through exchanges in land rental markets are sound in principle. Providing special support to large farms can increase scales of farming operations, and this, together with the *hukou* reform and urban development plans, will likely lead to linked

growth of the agricultural and industrial sectors. But the government needs also to ensure that the degree of farmland concentration is in accord with the amount of labor employed in the industrial sector.

Another approach to farmland consolidation could be to subsidize households that subcontract their farmland under long-term formal contracts. Coupled with the new migration policy that relaxes and eliminates *hukou*, this approach could encourage households that do well in cities to exit agriculture. In the next chapter, I use an agent-based computer model to explore the potential effects of such a policy in comparison to existing subsidies for rice growers and large farms.

Besides economic development, further improvements in social and cultural development are desirable in rural areas. The “building a new countryside” initiative has already produced observable effects on improving physical infrastructure and cultural life in some of the villages we visited. As the macro economy grows, the government may broaden the benefits of current health care and social welfare systems in the countryside. This is also an effective way to share the fruits of economic reforms with rural populations, whose interests have previously been compromised for urban development.

Land tenure has been a subject of debate among Chinese scholars (Li and Li 1989; Wei 1989; Chi 2000; Dong 2008); some argue that privatization is necessary to secure land rights for rural households and solve the Three Rural Issues, namely agriculture, farmers, and rural areas (see Palomar 2002; Zhang 2002; Liu and Han 2006). However, privatization of land could introduce a sudden change to the overall development dynamics and may not necessarily benefit farmer households (Fig. 4.6).

Under a private-property regime, households that do well in cities could instead hire labor to manage their farmland and may not release farmland to other households. Poor households that lack other viable livelihoods may be forced to sell their land for short-term gain, ending up becoming urban poor or agricultural laborers. Thus there would likely be a rise in inequality. Furthermore, it may not be a viable option for most households to use farmland as collateral to obtain bank loans for higher-return livelihoods—very few of them can take such risks and their holdings are too small.

Empirical evidence from the developing world shows that property rights titling is not always beneficial for development, and has in fact failed to deliver the benefits claimed by its proponents (e.g., De Soto 2000). It has sometimes even harmed the poor (Gilbert 2002; Cousins et al. 2005; Payne et al. 2009; Sjaastad and Cousins 2009; Domeher and Abdulai 2012). For example, in Latin American countries where more complete neoliberal policies have been implemented, economic growth has not led to significant poverty reduction; many smallholder farmers remain poor, and deep inequality persists (Berdegué and Fuentealba 2011).

A major problem associated with the current land tenure in China is land requisition by local governments (often for such purposes as industrial development). This can cause rural households to lose their land-based livelihoods, and in some cases, rural households are not compensated appropriately (Liu et al. 2014). Laws that specify and protect rural households’ land rights are in place. The government must strengthen the enforcement of these laws. Issuance of land certificates to farmer

households and extensions of their land contract periods will help strengthen farmer households' land rights; the insecurity of rental land could be remedied by long-term formal contracts.

#### ***4.6.2 Flood Impacts and Equitable, Sustainable Development***

Development programs and policies may simultaneously promote human development and mitigate flood impacts in the Poyang Lake area in several ways. As noted, facilitating urbanization to benefit rural households could continue to improve rural income and reduce the dependence of rural livelihoods on agriculture, especially for households with high exposure to flooding. Encouraging larger-scale farming operations could also help make more feasible the land-use practices developed by agricultural scientists that utilize spatial planning to increase land profitability and reduce flood damage.

Poverty reduction programs may focus on enhancing the capabilities of poor households through education and training to help them develop diversified livelihoods. This would not only improve their livelihoods but also reduce their dependence on crop cultivation. Providing better welfare to rural populations in general, and the elderly in particular, could enhance their resources to cope with flood impacts as well.

Villages with poor farmland resources face greater challenges for development than other villages. Their poor farmland limits agricultural output. Furthermore, their agricultural production is highly sensitive to flooding because of poor levee protection. Many village households would probably be better off seeking urban-based livelihoods. The Jiangxi provincial and local governments could provide assistance to these households in establishing secure urban livelihoods. This could also address the issue of inequality in natural resources that is increased by the government's interventions on levee construction.

### **4.7 Conclusions**

This analysis of rural livelihoods shows that the level of income and well-being of a household is largely determined by its livelihood strategy and how successfully the household executes that strategy. Four major livelihood profiles are identified using the survey data: (I) diversified near-home; (II) business-oriented; (III) farming-based; and (IV) combined migratory work and farming. Each of these can lead to high income if a household possesses certain characteristics, and some of these strategies are facilitated by local farmland resources or location near urban centers.

The majority of rural households have limited feasible options and rely on income from migratory work and farming. Low education, and lack of village social capital and collective action, are major constraints for most households.



Rural-urban development dynamics and institutional arrangements can also constrain rural livelihoods. In addition to the direct consequence of low agricultural income, the small farm size discourages farmer households from investing in agriculture. Nor can they easily alter traditional rice cultivation for higher-value crops because of the small production scale. The *hukou* system affected or affects not only the well-being of migrant workers in cities; coupled with the insecure rights for rental farmland inherent in informal short-term rental contracts, it discouraged or discourages land exchanges, further limiting the potential for rural households to raise their incomes through larger farming operations.

Rural livelihoods in the Poyang Lake area are not greatly affected by flooding due to large proportions of nonfarm income. Farmer household incomes are not associated with their flood risk. But the poor households whose livelihoods are highly dependent on crop cultivation are most affected. Although current agricultural practices appear sensitive to flooding, the degree to which the agricultural system is affected by flood hazards varies from village to village. Those villages with poor farmland face greater challenges for development. Their poor farmland limits agricultural output, and their agricultural production is also highly sensitive to flooding. Urbanization, in general, has a positive effect on improving rural livelihoods and reducing flood impacts, especially for households with poor farmland and high flood risks.

To ensure that rural households benefit from urbanization, national policy needs to foster healthy rural-urban development dynamics, and it is vitally important to promote the simultaneous growth of the agricultural and industrial sectors. The slow growth of rural income and rural-urban gaps are more likely resolved gradually and steadily through the linked growth of both sectors: As the industrial sector grows, more rural labor will be employed in that sector and earn higher wages; households in the countryside can accordingly enlarge their farming operations, improving agricultural income. The growth in nonfarm income and upscaling of farming operations in general will mitigate flood impacts on rural livelihoods in the PLR.

China's recent policy developments, i.e., *hukou* reform that shifts toward residency registration systems in cities, the focus on developing urban clusters rather than large monocentric cities, the issuance of land-use rights certificates to farmer households and extensions of their land contract periods, and special supports for large farms, seem to be appropriate. These will likely contribute synergistically to healthy rural-urban development dynamics and shape urbanization and rural development to produce positive outcomes.

Poverty reduction programs should aim at enhancing households' capabilities and assisting them in developing diversified livelihoods. This would also reduce flood impacts on the livelihoods of poor households in the PLR. The Jiangxi government may provide additional assistance to households in villages with poor farmland resources and high flood risks in establishing secure urban livelihoods. In the high flood hazard zone more generally, the Jiangxi government may increase its efforts in researching and promoting alternative land uses and livelihoods that suit specific biophysical environments.

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