

LOCATION, NON-AGRICULTURAL EMPLOYMENT, AND VULNERABILITY TO POVERTY IN RURAL THAILAND

CARSTEN LOHMANN and INGO LIEFNER

With 2 figures and 9 tables

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Summary: The location of a household affects its vulnerability to poverty. For example, the opportunity to secure regional non-agricultural wage-employment (RNAwE) as a means of reducing vulnerability is distributed unevenly between peri-urban and rural-remote regions. Data from a recently completed survey of 2,200 rural households in northeastern Thailand, sponsored by the German Research Foundation (DFG), underline the importance of location as a factor in levels of poverty that are experienced: there are significant differences between peri-urban and rural-remote households regarding transport costs, travel times, participation in RNAwE, and total household income.

Zusammenfassung: Die Vulnerabilität eines ländlichen Haushaltes wird nicht zuletzt von seiner Lage in Bezug auf außerlandwirtschaftliche Beschäftigungszentren bestimmt. Dieser Artikel untersucht, wie sich die Möglichkeit der außerlandwirtschaftlichen Einkommenserzielung, als Mittel der Vulnerabilitätsreduktion, zwischen stadtnahen und stadtfernen ländlichen Regionen unterscheidet. Die empirische Analyse basiert auf einer repräsentativen Befragung von 2.200 ländlichen Haushalten in Nordostthailand. Die Ergebnisse zeigen signifikante Unterschiede zwischen stadtnahen und stadtfernen Haushalten bezogen auf Transportkosten, Transportzeiten, Partizipation in regionaler, außerlandwirtschaftlicher abhängiger Beschäftigung und dem gesamten Haushaltseinkommen.

Keywords: Location opportunity, rural non-agricultural employment, vulnerability, rural households, Thailand

1 Introduction

Much of the empirical research in the fields of developmental and poverty studies utilizes the concept of vulnerability to poverty (henceforth, vulnerability). This has especially been the case since the publication of the “*World Development Report 2000/2001 – Attacking Poverty*”. Vulnerability is a dynamic concept that can be used to establish not only whether a person is poor today, but also the probability that they will be poor tomorrow (WORLD BANK 2000, 135). Most research on vulnerability, e.g., that which adopts the livelihood approach, pays attention to the complexity of socio-economic processes in rural areas of developing countries (BOHLE 2001; CHAMBERS and CONWAY 1991; CHAUDHURI et al. 2002; HEITZMANN et al. 2002; HODDINOTT and QUISUMBING 2003; KIJIMA et al. 2006; KUROSAKI 2006; SEN 2003). A related area of research throughout the past decade has been the exploration of the rural nonfarm economy and the investigation of the

attempt of rural households to secure nonfarm income in addition to farm income as a means of overcoming poverty and reducing their vulnerability to it (ELLIS 2000; HAGGBLADE et al. 2007a; ISLAM 2006; LANJOUW and LANJOUW 2001; OTSUKA and YAMANO 2006; REARDON et al. 2001; RIGG 2006; ROSEGRANT and HAZELL 2000; ZHU and LUO 2006). Yet another thread of research focuses on the spatial dimension of poverty-related socio-economic processes (BARRETT et al. 2001; DE JANVRY and SADOULET 2001; JONASSON and HELFAND 2008). The importance of location, spatial interactions, regional development processes, as well as the impact of spatial disparities in production, distribution, and the wellbeing of people, are highlighted in the recently published “*World Development Report 2009 – Reshaping Economic Geography*” (DICKEN 2007; WORLD BANK 2009).

From the point of view of economic geography, it would seem promising to bring these three lines of research together. The exploration of the spatial dimension of rural non-agricultural employment, especially in

connection with vulnerability, has been identified as a priority for future research (HAGGBLADE et al. 2007b, 393), due to the fact that “there have been relatively few studies that disaggregate rural nonfarm activities and analyze them in terms of spatiality using household data” (REARDON et al. 2007, 135). This paper hypothesizes that vulnerability to poverty can be significantly reduced by non-agricultural income, which is viewed as an important determinant of the level and the volatility of rural household income. A household’s capacity to generate non-agricultural income, however, depends to a large extent on spatial factors (e.g. the local availability of non-agricultural jobs and transport infrastructure). These relations are likely to emerge in lower-middle income countries whose economies already offer non-agricultural employment opportunities to rural residents (OTSUKA and YAMANO 2006, 396; ROSEGRANT and HAZELL 2000, 97).

This paper provides empirical evidence for the hypotheses stated above using cross-sectional survey data from Thailand as an example of an emerging Asian country. First, it aims to establish a theoretical connection between vulnerability, non-agricultural employment, and location. Second, it uses recent survey data to depict relations between job locations, transport costs, types of regional wage jobs, participation in jobs, and income derived from jobs. Third, policy issues are not on the forefront of this paper but some general implications for policy do emerge from the analyses and are summarized in the last section. The paper focuses on the following two research questions: How does location affect access to regional non-agricultural wage-employment (RNAwE)? What is the role of location and non-agricultural employment in reducing poverty and vulnerability to it? In the empirical section the concept of vulnerability serves merely as a background concept because we are not able to measure vulnerability directly with cross-sectional data.

2 Vulnerability, non-agricultural income diversification, and location opportunity

There is a large body of literature on poverty that deals with the issues of vulnerability, non-agricultural income, and the relationship between location and poverty. However, the vast majority of these studies investigate the factors in isolation. In order to integrate these three issues conceptually, this section provides an overview of the pertinent definitions and relevant conceptual arguments. It also reviews empirical findings regarding the connection between location and non-agricultural income.

2.1 Vulnerability to poverty

Vulnerability to poverty can be defined in different ways. According to a recent review conducted by GUIMARAES (2007, 236–239), most definitions of vulnerability include the following notions: (i) uncertain events (shocks) may affect individuals and households differently, and (ii) the probability that individuals and households will fall into poverty after a shock has occurred depends on the varying degrees to which they are exposed to risk and their preparedness to react to risk. For example, HEITZMANN et al. (2002, 6) define vulnerability to poverty as “the forward-looking state of expected outcomes, which are in themselves determined by the correlation, frequency and timing of realized risks and the risk responses. Households are vulnerable if a shock is likely to push them below (or deeper below) a predefined welfare threshold (e.g., poverty)”. While including both of the above notions, definitions of vulnerability to poverty fall into two types: the first relates to a potential loss of welfare in the future, i.e., *vulnerability as uncertain welfare*, while the second views vulnerability as the inability to respond to shocks due a lack of individual, social, institutional, or locational assets, i.e., *vulnerability as lack of entitlements* (GUIMARAES 2007, 240–247). Both types of definition stress different aspects of vulnerability to poverty that are nevertheless strongly related to each other. The first focuses on the effects of a shock on the future level of income. More precisely, it looks at the probability that income and consumption will fall below a certain threshold. With its emphasis on income and consumption, it stresses the monetary outcome of shocks. The second focuses on individual characteristics and household assets (e.g., education, health, land ownership, social status) that enable individuals or households to prepare for a shock or to respond effectively to shocks. Thus, it looks at factors that determine the capability to deal with shocks.

In the study reported herein, the *vulnerability as uncertain welfare* approach was used because it is relatively easy to translate it into empirical variables and to link it with locational factors. However, research into the effects of the spatial variation of entitlements on reducing vulnerability would be equally promising.

Important terms in the context of vulnerability are risk, shock, and strategy for risk management. Risk is to be understood as a probability distribution of uncertain and potentially harmful events. If such an event occurs and pushes a household below the poverty line it is called a shock. It is useful to distinguish between idiosyncratic risks/shocks (e.g., illness, death, divorce), which only concern single in-

dividuals and households, and covariate risks/shocks (e.g., floods, droughts, earthquakes, economic crises), which affect a large number of people in villages, regions, nations, or even larger units.

Households can use the following broad strategies for risk management: risk reduction, risk mitigation, and coping with shocks. First, “Risk reduction aims at reducing the probability of a shock” (WORLD BANK 2000, 141). Examples are preventive health practices, digging wells, or building dams to prevent flooding. However, individual households have only a limited capability to reduce covariate risks effectively. Second, “Risk mitigation aims at reducing the impact of shocks” (WORLD BANK 2000, 141). Common strategies of mitigation are diversification of income sources and assets, and informal and formal insurance. The main feature of these actions is that they have to be in place *ex ante* in order to reduce the impact of a shock *ex post*. Most of these measures can be taken by the households themselves. Third, “Coping strategies aim to relieve the impact of a shock after it occurs” (WORLD BANK 2000, 142). *Ex post* coping strategies include the sale of assets, using child labour, seasonal or temporary migration, taking up low-paid off-farm employment, borrowing from friends and banks, or reducing food consumption. These types of coping activity bring short-term benefits. In the long run, they are often associated with negative effects, such as children failing to complete school or indebtedness.

In contrast, the diversification of sources of household income is a mitigation strategy without long-term negative consequences that can help to reduce vulnerability to poverty. For example, in the event of a flood, one agricultural household, which depends solely on its agricultural activities for income, may lose 100% of its total income for the year, while another household, which gains 50% of its income from non-agricultural sources, will lose only 50% of its total income for the year.

2.2 Non-agricultural income diversification

The reduction of vulnerability of rural households is closely related to a diversification of their income sources beyond farm income. Income-generating activities of rural households can be classified according to sector, area of employment, and type of employment. The classification according to sector is derived from standard national accounting classifications, in which non-agricultural work is simply defined as “activity outside agriculture (own farming plus wage-employment in farming), hence manufactures and services” (REARDON et al. 2001, 396). The classification according to area of employment differentiates between regional (at home, in the home village, regional rural, regional urban) and non-regional (national rural, national urban, international) employment. The classification according to type of employment differentiates between self-employment and wage-employment (BARRETT et al. 2001) (Tab. 1). The empirical analyses in section 4 mainly concentrate on regional non-agricultural wage-employment (RNAwE).

In general, non-agricultural work supplements and diversifies a household’s income base, and has the potential to reduce the risks involved in farming activities (SHI et al. 2007, 439; ELLIS 1998, 1). Such work is unlikely to be subject to the same covariate risks that affect agriculture, e.g., drought or flooding. Thus, it should play a crucial role in reducing vulnerability to poverty.

Diversification towards non-agricultural income is seen both as an *ex ante* risk mitigation strategy and as an *ex post* coping strategy (HEITZMANN et al. 2002, 15; WORLD BANK 2000, 141). Income diversification for risk mitigation can be achieved by securing employment in highly productive and well-paid sub-sectors of the non-agricultural economy. This type of non-agricultural employment is often referred to as demand-pull employment. In contrast, agricultural

Table 1: Three-way Classification of Household Income Generating Activities by Sector, Space, and Type of Employment

| | AGRICULTURE | | NON-AGRICULTURE | |
|---------------------|-------------------------------|----------------------------|--|-----------------------------|
| | <i>Primary sectors</i> | | <i>Secondary sectors & Tertiary sectors</i> | |
| | Agriculture, fishing, hunting | | Mining, construction, manufacturing Public and private services | |
| Regional | Wage-employment (RAwE) | Self-employment (RAsE) | Wage-employment (RNAwE) | Self-employment (RNAsE) |
| Non-regional | Wage-employment (NRAwE) | Self-employment (NRAsE) | Wage-employment (NRNAwE) | Self-employment (NRNAsE) |

Source: Adapted from BARRETT et al. (2001, 319)

wage-employment is an *ex post* coping strategy when households are forced to look for income sources after a shock has reduced their own farm income. Related employment in subsectors of the economy, which is easy to secure but usually less productive and remunerative, is labelled distress-push employment (BUCHENRIEDER and MÖLLERS 2005, 24).

The aim of risk mitigation through *ex ante* income diversification is to achieve an income portfolio with a “low covariate risk between its components” (ELLIS 2000, 60). It is often stated that distress-push diversification into low-return activities leads to safer but lower total household income (DERCON 2002, 151–152; ELBERS et al. 2003). In the case of demand-pull diversification into high-return activities, the objectives of safer and higher household income can be reached simultaneously (ELLIS 1998, 1). However, access to high-return jobs depends to a large degree on such household assets as education and skills. Thus, income diversification has to be viewed as a part of “the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and improve their standard of living” (ELLIS 2000, 15). The connection between household assets and non-agricultural income has been analyzed by many researchers (e.g., CARTER and BARRETT 2006; CHERDCHUCHAI and OTSUKA 2006; DE BRAUW and ROZELLE 2008; PERZ 2005; REARDON et al. 2007; YUNEZ-NAUDE and TAYLOR 2001); hence, it will not be further discussed here.

The opportunity of generating income from non-agricultural employment also depends on regional factors, such as the level of economic and infrastructural development. For example, a well-developed regional economy offers non-agricultural wage jobs to local people in sectors such as food processing, construction, or garment fabrication. This enables households within this particular region to take up remunerative non-agricultural employment. Regions with a less-diversified regional economy offer much fewer opportunities for obtaining non-agricultural income locally. Thus, the opportunity for a household to obtain RNAwE is closely related to its location within a country or region.

2.3 Location opportunity

The importance of location and distance in facilitating access to RNAwE has been acknowledged by a number of authors. For example, BARRETT et al. (2001, 326) stress the point that transport infrastructure, among other factors, opens up “new op-

portunities previously inaccessible to rural populations.” The conceptual bases of most of the studies mentioned later in this section are to be found in different, well-established theories, such as sector and modernization theories or polarization theory. It is argued that economic restructuring, e.g., the shift from agriculture to manufacturing and services or from labour-intensive to capital- and knowledge-intensive industries, trickles down the spatial hierarchy from the urban centres to the rural periphery. This process leads to an integration of the spatial economy after a period of sustained economic growth (FAFCHAMPS and SHILPI 2003; FRIEDMANN 1970, 30–32, 38). Thus, with economic restructuring, opportunities for non-agricultural employment become available, not only to the residents of cities, but also to people in peri-urban hinterlands and to residents along the axes between cities (FRIEDMANN 1970, 31; ROSEGRANT and HAZELL 2000, 111). A similar argument is advanced by MOHAPATRA et al. (2006) in their work on spatial economic development in rural China. They explain rural economic restructuring in terms of changes in the locally dominant types of businesses and the proximity to urban centres: rural restructuring is characterized by a sequence of four developmental stages, beginning with (1) subsistence agriculture, followed by (2) labour out-migration and (3) small-scale self-employment, which finally evolves into (4) an economy dominated by medium- and large-scale companies (MOHAPATRA et al. 2006, 1026–1028). It is assumed that this developmental process is facilitated by proximity to urban centres where rural residents have the opportunity to profit from the same urbanization advantages as the urban population. Urbanization advantages include lower transaction costs, better market access, and larger market size for inputs and outputs, denser communication networks, access to higher-quality technology, and a well-developed technical and social infrastructure (MOHAPATRA et al. 2006, 1026; SCHÄTZL 2001, 34–36). It is important to note that these concepts are used primarily to explain and describe the regional development process in the national periphery by focusing on the emergence of the regional, often termed *rural*, non-agricultural economy (Tab. 1 upper row, right column). Thus, to comprehend fully the rural non-agricultural sector “small rural towns, growth centers and their industries” (START 2001, 492) should be included in the analysis (ROSEGRANT and HAZELL 2000, 111–113).

The concepts of regional economic restructuring can be combined with the concept of vulnerability to gain new insights into the phenomenon of “location

opportunities' in rural areas. Rural households can only benefit from opportunities for non-agricultural employment under certain circumstances. First, cities in rural areas have to provide enough well-paid non-agricultural jobs for their hinterland populations. Second, households have to be located in the hinterland of one city or at an axis between two cities (relative location). Third, the transport infrastructure (e.g., road network and connectivity (DOUGLASS 2006)) must allow daily travel from villages to towns. Fourth, transport costs have to be lower than earnings from town-based activities. Together, these circumstances determine the location opportunities of a household to earn regional non-agricultural income. Where these conditions do not exist and thus there is a lack of location opportunities, only migration can enable households to benefit from *non-regional* non-agricultural employment and income.

It is important to note that location opportunities influence both the physical access to non-agricultural employment and the access to assets such as education or credit, which reinforce wage- and self-employment. As previously stated, the empirical analysis focuses on employment acquisition, not on asset accumulation.

From the above theoretical discussion, the following empirical hypotheses can be drawn:

- H₁: Households in peri-urban areas have a higher participation rate in RNAwE than rural-remote households because of location opportunity;
- H₂: Access to remunerative RNAwE depends on location and transport infrastructure because these factors determine travel times, transport costs, and connectivity;
- H₃: RNAwE provides higher income than RAWe in an emerging market economy, such as Thailand;
- H₄: RNAwE and location reduce the rural population's vulnerability to poverty.

These hypotheses will be tested in Section 4 by using a quantitative dataset of rural households in northeast Thailand, rather than case studies. As a result, it is possible to derive both general and representative conclusions about the interplay of location/type of region, employment and poverty/vulnerability in rural areas of lower-middle income countries.

Before describing the data, sampling methodology, and definitions used, a brief overview is provided of some of the growing number of published empirical studies on the importance of location and spatial differentiation in rural areas of developing countries. The following examples highlight some of their key findings:

- In a recent paper on the effect of location on non-agricultural income of rural households in Brazil, JONASSON and HELFAND (2008) provide evidence for a pronounced impact of spatial factors. Using demographic census data as a basis, they show that distance from urban centres correlates negatively with regional non-agricultural employment. Opportunities for non-agricultural employment are lowest in locations that have a high incidence of poverty (2008, 22).
- Using survey data taken in northern Tanzania in 1997, ELLIS (2000, 200) published similar findings based on an analysis of the effect of distance to rural towns on the per capita income of rural villages. He found that remote villages have significantly less total income than less remote villages. The shares of non-agricultural income vary accordingly. Remoteness was measured as distance in kilometres.
- A 1998 survey of 50 villages located in the peri-urban areas of Tanzania's six largest cities gives similar results. By dividing the sample into four groups, 0–5, 5–10, 10–15, and 15–20 km from the city perimeter, LANJOUW et al. (2001, 395) found that the most distant group had only half the per capita income of the nearest group. On the other hand, the share of non-agricultural income was surprisingly low, only around 16 % for both the nearest and most distant groups, whereas the shares were 24% and 36% for the two middle-distant groups. The authors argue that households located closest to the city in the 0–5-km group grow perishable but profitable agricultural goods such as fruit, which cannot easily be transported over large distances, to serve the urban food market and thus a greater proportion of their income is still agricultural. Overall, however, earnings from wage-employment suggest that remunerative non-agricultural employment is to be found close to urban areas (LANJOUW et al. 2001, 401).
- Another measure for distinguishing between rural and peri-urban areas is to define thresholds for the total population size per settlement. By using census data from rural Mexico, VERNER (2005, 1) defines rural as a locality with fewer than 2,500 inhabitants and peri-urban as a locality with at least 2,500 and fewer than 15,000 inhabitants. She found that earnings from regional non-agricultural wage-employment are 12% higher for the median worker in peri-urban areas. Participation in the high-return subsector of the rural nonfarm economy is more likely for peri-urban residents; rural-remote dwellers tend to work in the low-return subsector (VERNER 2005, 23–26).

- ISGUT (2004, 63) provides evidence that both household assets and employment opportunities are influenced by spatial factors. His results from a 1998 household survey in Honduras show that regional non-agricultural wage-employment is only open to workers with twice as many years of education as the typical agricultural worker and that such employment is geographically concentrated close to urban centres: “Households located in these areas can commute to work in nearby towns or cities and perhaps have access to good schools which provide the necessary skills for that type of employment” (ISGUT 2004, 70). This finding is supported by WIGGINS and PROCTOR (2001, 435), who argue that only areas within a daily commuting range around a town or city should be termed peri-urban.
- In contrast to these findings, studies such as SEN’S (2003) panel study of 379 households in 21 villages in rural Bangladesh in 1987–88 and 2000 provide only weak support for the importance of location. SEN found that households that escape from poverty had higher non-agricultural income shares from local and migratory sources, better schooling, and both higher financial and non-agricultural productive assets. But such households were not concentrated in a specific region as measured by agro-ecological conditions and endowments of community and public assets at the village and district level (SEN 2003, 519–522).

To summarize the above, it can be stated that under certain circumstances, location is a factor in gaining access to RNAwE. However, empirical evidence from these studies, which were conducted in different countries, is far from conclusive. The literature still lacks comprehensive, methodologically consistent investigations of the relationship between (a) opportunities of securing RNAwE and (b) poverty or vulnerability when comparing different types of region and segments of the labour market. So far, most investigations have provided evidence regarding household income but have been unable to offer precise insights into the interplay between participation in the non-agricultural labour market, wages, professions, and locations.

The empirical section of this paper addresses two of the main shortcomings of the publications discussed above. First, methodologically, the findings presented here are based on a large and comprehensive survey that includes very detailed information on all sources of household income, including non-agricultural income. In addition, distance is measured by travel time and transport costs, rather

than in kilometres. Second, the empirical analysis identifies more than just a link between location and RNAwE; it provides a starting point for establishing an empirical link between location and vulnerability.

3 Data

While there are already many case studies in the field of vulnerability research (cp. BOHLE 2001; VAN DILLEN 2002), it was important that the hypotheses posited in section 2.3 of this study were tested quantitatively using a representative dataset. This dataset was acquired from a multidisciplinary research project on vulnerability to poverty in rural areas in Thailand and Vietnam that was sponsored by the German Research Foundation (DFG). This study uses only that part of the survey that was conducted in 222 villages in three provinces of northeast Thailand, covering a representative dataset of 2,186 households that were selected through a multi-stage process of cluster random sampling (HARDEWEG et al. 2007). Corresponding data from Vietnam has not been included.

3.1 Sampling and setting

Thailand was chosen because it is an example of an emerging market economy. Based on 1988 constant prices, it had an average real annual GDP growth rate of 4.9% from 1986 to 2005. This growth has been mainly fuelled by the expanding Bangkok Metropolitan Region- (BMR) and Eastern Seaboard Region- (ESBR) based manufacturing sector, which grew at an average real annual GDP growth rate of 8.9% and expanded its share of the GDP from 23% in 1986 to 39% in 2005. Real GDP per capita grew from 23,944 Thai Baht (THB) in 1986 to THB 59,527 in 2005 (NESDB several years). This number equates in nominal terms to USD 2,750 in 2005 (WORLD BANK 2006, 289).

Within Thailand, the northeast region was chosen because it is lagging behind the rest of the country economically, with an average real annual GDP growth rate of 3.2% from 1986 to 2005. Moreover, this region’s incidence of poverty (headcount) of 16.8% is the highest in Thailand against a country average of 9.6% in 2006 (NESDB 2007). Within the northeast, three provinces (Buriram, Ubon Ratchathani, and Nakhon Phanom), were selected as survey sites because of their peripheral location along a border and

a certain degree of variation in agro-ecological conditions (HARDEWEG et al. 2007). Table 2 below gives basic information on these three provinces.

From these provinces, a cluster of 110 rural sub districts (*tambons*) was selected with probability proportional to size by a systematic random sample taken from a list that was ordered by population density. This resulted in the selection of 41 sub districts in Buriram, 49 in Ubon Ratchathani, and 20 in Nakhon Phanom. The term 'rural' is defined by the population in a sub district (*tambon*) being fewer than 5,000 (NSO 1990, 25). Within each of the selected sub districts, two villages were selected with probability proportional to size. In the final step, a fixed-size sample of households was selected systematically from a list of households that was ordered by household size. As a result, 819 households in Buriram, 970 in Ubon Ratchathani, and 397 in Nakhon Phanom were interviewed.

The households were selected at random and were located in all the types of region of each province, including the peri-urban and rural-remote. The large sample size provided the opportunity to derive statistically representative and significant results.

The data collection process used two questionnaires (see www.vulnerability-asia.uni-hannover.de/390.html). The first, a two-page questionnaire for the village headman, covered information about location, infrastructure, main village occupations, main problems, and practices for the use of natural resources in the village. The second, a 29-page questionnaire for the household survey, asked about household demographics, health, education, employment and income (agricultural and non-agricultural), migration, shocks and risks, borrowing and lending, and expenditures and household assets.

3.2 Definitions used

1. This study analyzes spatial disparities in access to RNAwE by households in two different types of rural region. One type of region, called peri-urban, is equipped with sufficient infrastructure and is close to centres of RNAwE. The other type, called rural-remote, is characterized by an insufficient infrastructure and a large distance from centres (LANJOUW et al. 2001, 386). The type of region labelled peri-urban is

Table 2: Basic Information about the Three Sample Provinces (2005)

| | Ubon Ratchathani | Buriram | Nakhon Phanom | <i>Thailand</i> |
|--|----------------------|------------------|-------------------|-------------------|
| Population in million of persons | 1.783 | 1.536 | 0.693 | 64.763 |
| Level of Urbanization in % | 14.6 % | 13.9 % | 12.7 % | 29.1 % |
| Population of provincial capital in persons | 122,782 ^a | 28,319 | 27,710 | - |
| Real GDP per capita in THB ^b and relative levels compared with Thailand | 16,905 (28 %) | 15,381 (26 %) | 13,519 (23 %) | 59,527 (100 %) |
| Avg. real GDP growth rate 1986-2005 in % | 3.5 % | 3.3 % | 2.5 % | 4.9 % |
| Share of non-agricultural sector in % of GDP | 82 % | 75 % | 76 % | 91 % |
| Share of non-agricultural employment in % (Quarter 4) ^c | 38 % (2006) | 32 % (2006) | 36 % | 58 % |
| Distance and road travel time to Bangkok in km and hours | 600 km 9 hrs. | 400 km 6 hrs. | 700 km 10 hrs. | - |

Note: a The cities of Ubon Ratchathani (92,261) and Warin Chamrap (30,521) can be characterized as a twin city and are counted together.

b At 1988 constant prices.

c In rural areas employment figures are heavily dependent on seasonal fluctuations: generally Quarter 1 and Quarter 2 have high non-agricultural shares while Quarter 3 and Quarter 4 have low non-agricultural shares.

Source: Provincial Statistical Yearbooks of Ubon Ratchathani, Buriram and Nakhon Phanom (2006); NSO (2006)

defined here as being within a perimeter of 70 minutes travel time from a rural town. The term 'rural town' refers in 67% of all cases to the provincial capital and in 33% of all cases to a different town mentioned by the village headman as the next town from the village. Regions outside this 70-minute perimeter are called rural-remote. This definition is based on the survey results, but does not deviate from the relevant literature. For example, DOUGLASS (2006, 141) defines peri-urban areas in Indonesia as being within 60 km from a town; WIGGINS and PROCTOR (2001, 432) give a general statement that a rural residence and an urban workplace "can be seen for any rural area within one to two hours travel of a substantial city [above 250,000 inhabitants]"; and JANVRY and SADOULET (2001, 475) propose a one-hour travel time to urban centres as a measure for the effect of location on participation in non-agricultural employment. The 70-minute threshold used in this study is within the range used in the studies mentioned above. Moreover, the results do not change if another threshold, for example 60 minutes, is used. Furthermore, proximity to a rural town is better measured by travel time in minutes (isochrones) and not travel distance in kilometres, because road conditions can differ significantly in developing countries (FAFCHAMPS and SHILPI 2003, 36). It should be made clear that the peri-urban type of region is part of the overall rural region and should not be confused with the suburban type of region that is found directly adjacent to city boundaries. The rural characteristic of our sample can be seen in the high participation rates of households in activities that are related to agriculture: 97% of all households possess land for agriculture or gardening, 83% are engaged in crop production, 75% possess livestock, and 71% are engaged in fishing, hunting, collecting, or logging.

2. 'Regional' is defined as within the home province, and 'non-regional' is defined as outside the home province.

3. 'Agricultural wage-employment' means work in the agricultural sector. Employment in all other sectors means working in the non-agricultural sector.

4. The differentiation between the high-return demand-pull and low-return distress-push subsectors is derived from wage and income levels. If the average wage or income in one occupation is above the average wage or income of all occupations, the subsector is designated as high-return or demand-pull. If the average wage or income in one occupation is below the average wage or income of all occupations, the subsector is designated as low-return or distress-push (VERNER 2005, 24).

5. Our definition of a shock is based on the subjective assessment of the household members. According to the questionnaire a shock has to be interpreted as *any event that causes a big problem for the household*. It would not have been practicable to use a more precise definition of a shock, such as losing 50% of income or falling into poverty, during the interview situation because the interviewees would have found it difficult to answer.

6. We use two definitions for the household in our analysis: the *expanded* household and the *nucleus* household. The *nucleus* household constitutes all household members who share the "the same abode or hearth" (ELLIS 1993, 13) for more than 180 days per year. The *expanded* household constitutes, in addition, all household members who share the same abode or hearth for fewer than 180 days per year and yet maintain an economic relationship with the nucleus household by income sharing (e.g., remittance transfers) throughout the year. All analyses on the household and the job level in Sections 4.1 and 4.2 use the expanded household definition. Only Section 4.3 uses the nucleus household definition, for calculating the per capita household income. The average household sizes were 4.86 persons for the *expanded* household and 3.98 persons for the *nucleus* household. For the household income analysis, the annual nucleus household income was calculated as follows: cash income plus in-kind income plus home consumption of all income sources between May 2006 and April 2007. Thus, household income comprises remittances from non-nucleus household members (i.e., permanent migrants) and friends; crop, livestock and hunting/lodging/fishing income; non-agricultural wage and business income; public transfers; imputed income from house and homestead; and other sources (TUNG et al. 2008a). Missing values, mainly in the hunting/lodging/fishing income category, were estimated by applying the following general replacement principles: first, in most cases, the mean of a corresponding group within the sample with a minimum of five cases was used. Second, external statistics and other information were used. Third, judgments of local experts were used (TUNG et al. 2008b). The use of imputations and estimations for missing data is common in household surveys (cp. WOOLARD and KLASSEN 2005, 871–872). Negative income elements were also taken into account, e.g., in some cases input costs were higher than sales values in crop production, livestock raising, or non-agricultural business operations. In addition, the total annual

household income was divided by the full number of nucleus household members, i.e., children were counted as full members because it is likely that lower food expenditures would be offset by higher health and education expenditures.

4 Empirical findings

4.1 Participation in regional and non-regional wage-employment

The share of households engaged in non-agricultural employment is 68% for wage-employment and 31% for self-employment. As stated earlier, only participation in regional non-agricultural wage-employment (RNAwE) will be analyzed in detail.

Figure 1 illustrates the effect of location on participation in RNAwE by showing that districts with high rates of participation in RNAwE tend to be concentrated around rural towns, especially around the provincial capitals of Ubon Ratchathani and Buriram.

For further analysis, the sample is divided into two spatial groups, according to definition 1) above. This results in 80% (n=1,737) of the households being located in peri-urban and 20% (n=439) in rural-remote areas. While the focus of the analyses is on non-agricultural wage-employment, agricultural wage-employment is used as a control group. Information is given on the household as well as on the job level.

The data in tables 3 and 4 are used to analyze Hypothesis 1: “Households in peri-urban areas have a higher participation rate in RNAwE than rural-remote households because of location opportunity”. In general, non-regional NAWe is more common than regional NAWe. The overall difference between non-regional and regional NAWe is 14.5 percentage-points (47% to 32.5%) for all households, with a difference of 11.1 percentage points (46.6% to 35.5%) for peri-urban and a difference of 27.3 percentage-points (48.3% to 21%) for rural-remote households (Tab. 3, columns c, a, b; rows 1, 5), respectively. These findings show that opportunities for non-agricultural employment are more readily available outside the sample rural provinces; Bangkok is the destination for the majority of migrants (55.7%). While the level of out-migration, i.e., non-regional NAWe, is almost the same for both peri-urban and rural-remote regions, the engagement in regional

NAwE shows a significant spatial difference of 14.5 percentage-points (35.5% to 21%; Tab. 3, column d; row 1). This result provides confirmation for Hypothesis 1: location matters for gaining access to RNAwE.

It should be noted that people in the peri-urban region do not have better education opportunities than those in the rural-remote regions. In the age group 20–65, the former have average years of schooling of 6.86 years and the latter 6.68 years. The difference of 0.18 years is marginal, statistically not significant, and does not influence the rates of participation in RNAwE of the two types of region.

The gap with respect to participation of 14.5 percentage points narrows to 9.4 percentage points when regional agricultural wage-employment is included. The gap narrows further to 5.6 percentage points when regional and non-regional wage-employment are both included (columns 2, 4). When only non-regional wage-employment is taken into account, rural-remote households even show slightly higher rates of participation (Tab. 3, column d, rows 5, 6). Hence, agricultural wage-employment and migration have a balancing effect on overall participation in the labour market.

Table 4 provides figures that confirm Hypothesis 2: “Access to remunerative regional RNAwE depends on location and transport infrastructure because these factors determine travel times, transportation costs, and connectivity”. Location-specific factors affect the chances of gaining access to RNAwE: peri-urban households benefit from 65% lower travel times, 21% lower transport costs, and a 62% higher connectivity based on the frequency with which buses run to towns, compared to their rural-remote counterparts.

Simple statistical analyses show a weak correlation coefficient of -0.366 between the mean rate of participation of households in RNAwE per subdistrict and the mean travel distance in minutes from the subdistrict to the next rural town. On the level of single provinces, this relationship is most pronounced for Ubon Ratchathani, with a correlation coefficient of -0.597. By redefining the ‘next rural town’ as the provincial capital and no other town mentioned by the village headman, the correlation coefficient rises further to -0.746. Both figures are significant at the 1% level. The reason for this result is that Ubon Ratchathani has a larger provincial capital than the two other provinces (Tab. 2).

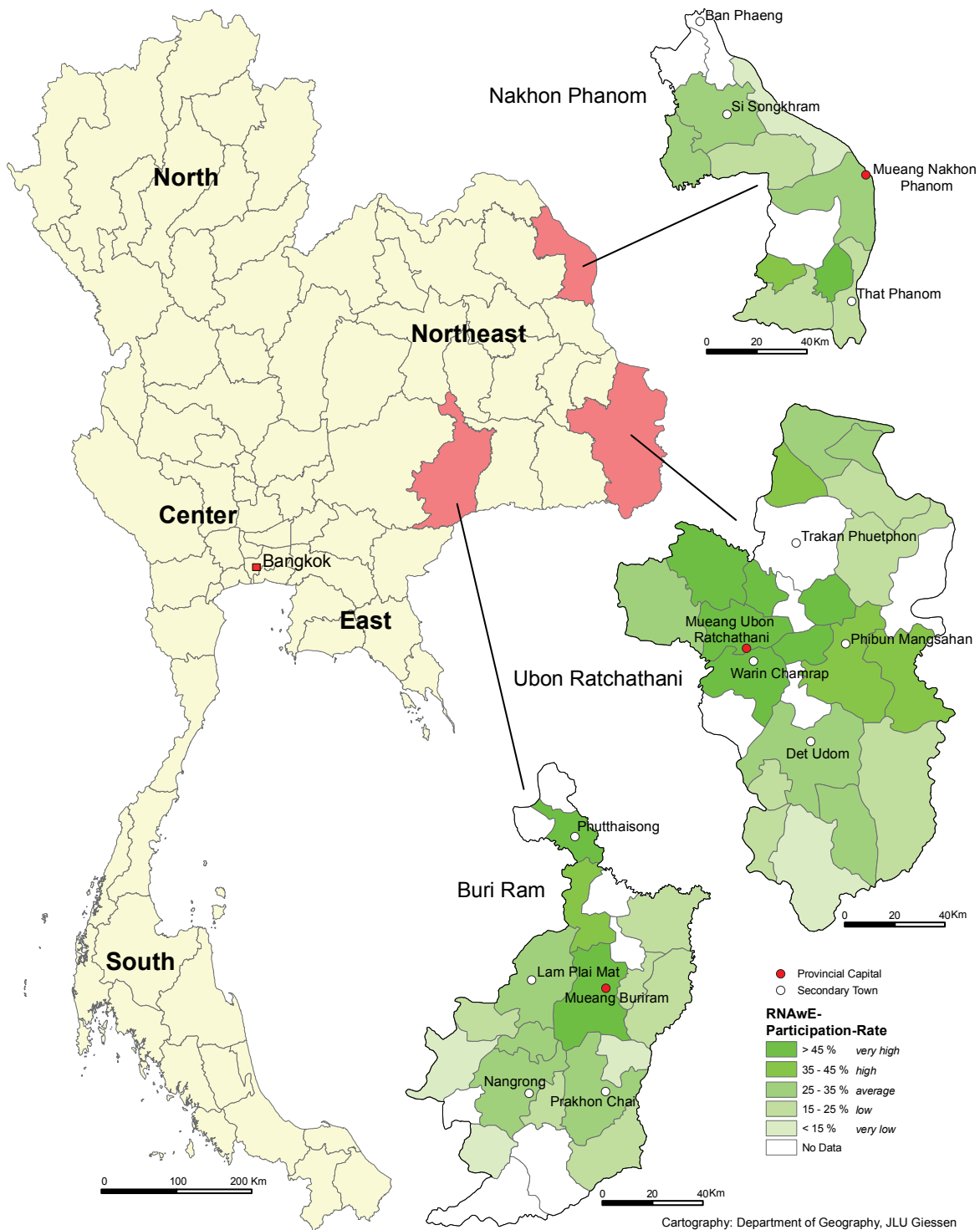


Figure 1: Household-level: RNAwE-Participation-rate in % by District
 Note: In white colored districts no households were interviewed due to cluster sampling procedure.
 Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

Table 3: Household-level: Differences Between Wage Labor Market Participation Rates of Households by Type of Region (70-minute threshold; ordered by Column d); (n=2,176)

| | Part of labor market ^a | | | | (a) Peri-urban ^b | | (b) Rural-remote | | (c) Total | | (d) Diff. between (a) & (b) | | <i>Chi²-Test</i> | |
|-----------------|-----------------------------------|--------------|-------------|-----------------|-----------------------------|------|------------------|-----|-----------|------|-----------------------------|--------------|-----------------------------|--|
| | spatial | | sectoral | | % | n | % | n | % | n | % -points | sig | Cramér's V | |
| | regional | non-regional | agriculture | non-agriculture | | | | | | | | | | |
| 1 HH engaged in | X | | | X | 35.5% | 616 | 21.0% | 92 | 32.5% | 708 | 14.5 | 0.000 | 0.124 | |
| 2 HH engaged in | X | | X | X | 46.5% | 807 | 37.1% | 163 | 44.6% | 970 | 9.4 | 0.000 | 0.075 | |
| 3 HH engaged in | X | X | | X | 69.1% | 1201 | 61.3% | 269 | 67.6% | 1470 | 7.8 | 0.002 | 0.067 | |
| 4 HH engaged in | X | X | X | X | 77.8% | 1345 | 72.2% | 317 | 76.7% | 1662 | 5.6 | 0.014 | 0.053 | |
| 5 HH engaged in | | X | | X | 46.6% | 810 | 48.3% | 212 | 47.0% | 1022 | -1.7 | 0.534 | 0.013 | |
| 6 HH engaged in | | X | X | X | 48.6% | 844 | 50.6% | 222 | 49.0% | 1066 | -2.0 | 0.458 | 0.016 | |

Note: a Part of labor market: Regional = within home province, Non-Regional = outside home province.

b Type of Region: peri-urban = within 70 minutes travel time to rural town, rural-remote = more than 70 minutes travel time. The sum of (1)+(5) exceeds the value of (3) because HH engaged in both regional & non-regional non-agricultural wage employment were assigned to both categories; The sum of (2)+(6) exceeds the value of (4) because HH engaged in both regional & non-regional off-farm wage employment were assigned to both categories.

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

Table 4: Household-level: Travel Times, Transportation Cost and Connectivity of Households by Type of Region (n=2,186)

| Variable | Unit | Peri-urban | | Rural-remote | | Diff. of mean | | <i>t-Test</i> | |
|--|------------------|------------|------|--------------|-----|---------------|-----|---------------|--------------|
| | | mean | n | mean | n | abs. | % | t | sig |
| Travel time to next town | Minute | 34.5 | 1737 | 98.6 | 439 | -64.1 | -65 | -65.589 | 0.000 |
| Minimum cost of a one-way trip to the next town | THB ^a | 20.2 | 1241 | 25.5 | 349 | -5.3 | -21 | -8.190 | 0.000 |
| Frequency of bus trips per day to next town ^b | Number | 9.4 | 1195 | 5.8 | 329 | 3.6 | 62 | 3.936 | 0.000 |

Note: a Current exchange rates are 1 US\$ = 32 THB; or 1 € = 46 THB.

b Three peri-urban villages with extreme outlier indications of 216, 198 and 168 "bus trips per day" were excluded due to plausibility considerations and „4-sigma-rule“ (Sachs and Hedderich 2006, 344).

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

4.2 Job characteristics and earnings from RNAwE

The lack of jobs in the industry and services sectors for households in rural-remote areas is evident from table 5. The percentage shares are based on the

1,475 regional jobs of the 970 households that are engaged in regional wage-employment. For rural-remote households, only 45% of all jobs are in the non-agricultural sector, compared to 71% for peri-urban households. The non-agricultural sector is characterized mainly by service industries and construction,

whereas production accounts for a lower proportion of employment (Tab. 5). The overall pattern of regional wage jobs differs significantly between peri-urban and rural-remote regions. This is due mainly to differences in agriculture, private services, and production (Tab. 5).

A closer examination of the characteristics for particular salaries, job durations, and annual incomes is necessary in order to assess the importance of RNAwE in relation to agricultural wage-employment. Moreover, the following analysis provides some insights into the functions of wage jobs, distress-push or demand-pull, and provides figures to test Hypothesis 3: "RNAwE provides higher income than RAwE in an emerging market economy, such as Thailand".

Table 5 shows that average daily wages in the non-agricultural sector are more than 60% higher than in the agricultural sector, THB 231 and THB 143, respectively. When multiplied by the double duration of annually available working months, the average non-agricultural job provides a 277% higher annual income than the average agricultural job, approximately THB 56,000 compared to THB 15,000

for the latter. The shares of high-salary jobs and high-income jobs, expressed as the share above the mean wage of THB 201 per day and mean income of THB 42,315 per year of all jobs, are 4% and 7% for the agricultural and 29% and 46% for the non-agricultural sector, respectively. These differences between agricultural and non-agricultural jobs are also significant for every RNAwE subsector (Tab. 5). Hence, RNAwE can be regarded as a high-return activity compared to RAwE, and can therefore be seen as a demand-pull activity.

Within the RNAwE sector, there is a high heterogeneity between and within the four subsectors. Construction is the most economically unfavourable RNAwE sector. While construction offers a noticeably higher daily wage than production, the low work duration of 5.4 months per year leads to the lowest annual income of approximately THB 27,000 for those employed in this subsector. The production sector has a longer work duration of 8.6 months, which leads to an income of approximately THB 39,000. However, private and public service jobs are the most economically favourable. They have the

Table 5: Job-level: Sectoral Structure of Regional Wage Employment by Type of Region, as well as Daily Salary, Annual Working Duration and Annual Income by Sector (n=1,475)

| Sector | Sectoral Structure by Type of Region | | | Daily Salary ^b THB | Share high- salary ^c % | Annual Working Duration Months | Annual Income THB | Share high- income ^d % |
|------------------------|---|-----------------------------------|--------------------------------|-------------------------------------|--|---|-------------------------|--|
| | Peri- Urban <i>n</i> =1,225 | Rural- remote <i>n</i> =250 | Diff. %-points ^a | | | | | |
| Agriculture | 29 | 55 | -26 | 143 | 4 | 4.0 | 14,912 | 7 |
| Non-Agriculture | 71 | 45 | 26 | 231** | 29 ⁺⁺ | 8.5** | 56,272** | 46 ⁺⁺ |
| Sub-sectors | | | | | | | | |
| Construction | 20 | 16 | 4 | 186** | 14 ⁺⁺ | 5.4** | 26,647** | 17 ⁺⁺ |
| Production | 12 | 5 | 7 | 165* | 20 ⁺⁺ | 8.6** | 39,073** | 42 ⁺⁺ |
| Private service | 23 | 13 | 10 | 198** | 27 ⁺⁺ | 9.5** | 51,563** | 52 ⁺⁺ |
| Public service | 16 | 11 | 5 | 385** | 58 ⁺⁺ | 11.2** | 114,285** | 80 ⁺⁺ |
| Total | 100 | 100 | | 201 | 21 | 7.0 | 42,315 | 33 |

Note: a Chi²-test is significant at 1 %-level.

b Unweighted mean, i.e. not weighted by different annual working durations per job.

c Above avg. salary per day of all sectors (201 THB).

d Above avg. income per year of all sectors (42,315 THB).

** Mean of respective sector is different from agriculture, t-test significant at 1 %-level.

* Mean of respective sector is different from agriculture, t-test significant at 5 %-level.

++ Share of respective sector is different from agriculture, chi²-test significant at 1 %-level.

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

highest salaries and the longest job durations, which lead to the highest annual incomes of approximately THB 52,000 and THB 114,000, respectively. Public sector jobs can be regarded as the number one choice for rural people to aim for because they offer a 666% higher annual income compared to agricultural jobs. Within the three private subsectors, production and service jobs have quite comparable high-income shares of 42% and 52%, respectively. Both serve as a stable source of income for rural people, thereby helping them to reduce their vulnerability to poverty. The construction sector has a high-income share of only 17% because, like the agricultural sector, it is affected by seasonal cycles.

Differences between peri-urban and rural-remote areas regarding daily salaries from RNAwE differ only slightly (Tab. 6). The duration of annual working months is significantly longer (20% or 1.4 months) for peri-urban households. Annual incomes from RNAwE jobs of peri-urban households are, thus, 16% higher than jobs done by members of rural-remote households.

Apparently, wages are similar across the different regions of Thailand's rural northeast. The information from the survey does not provide an explanation for this finding. Reasons for regionally invariant salaries may include the guiding function of fixed wages in the public sector, the dominant effect of single companies in construction or manufacturing on the salary structure, or the fact that most, if not all, wage-employment is located in a few towns or peri-urban areas. This last point indicates that rural dwellers, independent of their home village location, are engaged in the same companies at the same locations. However, these possible explanations do not

contradict the concept of location opportunity that was outlined in Section 2.3, because local opportunity does not assume that gross wages have to differ spatially. Rather, the concept assumes that net wages (= gross wage minus transport cost) differ spatially due to the fact that transport costs rise with distance, reducing the net wage for workers who are located further away.

4.3 Location, RNAwE, and vulnerability

Location affects rates of participation in RNAwE. This was shown in Section 4.1: peri-urban households had the highest participation in RNAwE with 35.5% compared to 21.0% for rural-remote households (Tab. 3). Given this difference and the high earnings from average RNAwE jobs discussed in Section 4.2, the total income from RNAwE should be affected significantly by the location of households. However, household income and its variability are the crucial factors that determine vulnerability.

Theoretically, RNAwE should reduce vulnerability because it is not subject to the same types of shock that affect agriculture. Indeed, 55% of all reported shocks during the past five years (2002–2006) can be assigned directly to agriculture (e.g., drought, flooding, crop pestilence, strong increases of input prices, strong decreases of output prices) (Tab. 7). The figure for non-agricultural shocks (e.g., job loss, migration, collapse of business) is 11 times lower and stands at 5%. The other 41% of shocks are idiosyncratic, e.g., illness or death of a household member, and cannot be assigned directly to one of the two broad income categories. The income loss

Table 6: Job-level: Mean Salary, Annual Working Months and Annual Incomes of RNAwE by Type of Region^a (n=973)

| Variable | Unit | Peri-urban | | Rural-remote | | Diff. of mean | | <i>t-test</i> sig | <i>U-test</i> ^d sig |
|---------------------------------------|-------|------------|-----|--------------|-----|---------------|----|----------------------|-----------------------------------|
| | | mean | n | mean | n | abs. | % | | |
| Approx. salary per hour ^b | THB | 30.2 | 821 | 28.1 | 107 | 2.1 | 8 | 0.463 | 0.305 |
| Approx. salary per day ^{b,c} | THB | 230 | 849 | 225 | 109 | 5 | 2 | 0.817 | 0.882 |
| Annual working duration | Month | 8.6 | 861 | 7.2 | 112 | 1.4 | 20 | 0.001 | 0.001 |
| Annual income | THB | 56520 | 844 | 48666 | 109 | 7854 | 16 | 0.257 | 0.021 |

Note: a Data differs slightly from table 5 due to the fact that 13 RNAwE-jobs could not be assigned to a specific type of region.

b Difference to salary per hour due to different average working hours per day.

c Unweighted mean, i.e. not weighted by different annual working durations per job.

d The Mann-Whitney-U test is used due to the right-skewed distribution of income data.

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

Table 7: Shocks during past 5 years (2002-2006) by sector (n=1,876)

| Type of shock by sector | % | # | Mean income loss THB | Mean recover time years | Share high impact % |
|--|--------------|--------------|----------------------|-------------------------|---------------------|
| Agricultural sector related | | | | | |
| Drought | 31.3 | 587 | 18,486 | 1.2 | 60 |
| Flooding | 14.5 | 272 | 15,764 | 1.0 | 63 |
| Crop pests | 3.4 | 63 | 8,139 | 1.4 | 40 |
| Strong increase of prices for Input | 2.2 | 42 | 10,260 | 1.7 | 41 |
| Strong decrease of prices for Output | 1.4 | 26 | 22,865 | 1.6 | 65 |
| ... | ... | ... | ... | ... | ... |
| Total: | 54.5 | 1,023 | 16,611 | 1.2 | 59 |
| Non-agricultural sector related | | | | | |
| Job Loss | 1.9 | 36 | 38,058 | 1.4 | 56 |
| Household member left household | 1.2 | 22 | 33,924 | 1.5 | 59 |
| Collapse of business | 1.0 | 18 | 79,111 | 1.9 | 67 |
| ... | ... | ... | ... | ... | ... |
| Total: | 4.6 | 86 | 42,418 | 1.5 | 58 |
| Sector unspecific | | | | | |
| Illness of household member | 15.5 | 290 | 12,316 | 1.3 | 72 |
| Death of household member | 8.7 | 163 | 20,913 | 1.1 | 80 |
| Unable to pay back loan | 5.5 | 104 | 23,588 | 2.4 | 79 |
| Money spent for ceremony | 2.1 | 39 | 4,103 | 1.7 | 48 |
| Household Damage | 1.9 | 36 | 404 | 0.7 | 64 |
| Theft | 1.5 | 28 | 1,429 | 1.2 | 61 |
| ... | ... | ... | ... | ... | ... |
| Total: | 40.9 | 767 | 16,107 | 1.5 | 73 |
| Total: | 100.0 | 1,876 | 17,577 | 1.3 | 65 |

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

of approximately THB 16–19,000 as a result of typical agricultural shocks, such as drought and flooding, is quite low compared to the income loss of approximately THB 34–38,000 as a consequence of typical non-agricultural shocks, such as job loss or unsuccessful migration. However, the households' own perceptions of the impact of shocks do not vary between the two categories. In both categories, roughly 60% of all shocks are viewed as having a high impact on household wellbeing. Taking all the figures together, this provides strong support for the argument that diversification of sources of income to include non-agricultural sources is required if agricultural risks are to be mitigated and total household income is to be stabilized.

The *nuclens* per capita incomes per month for the sample provinces are THB 2,673 (2,676), THB 3,447 (3,201), and THB 2,213 (2,900) for Buriram, Ubon Ratchathani and Nakhon Phanom, respectively. (The figures in parentheses are the official household

income figures from the Household Socioeconomic Survey (NSO 2006)). Using the official 2006 consumption poverty line for the rural northeast of THB 1,215 per capita per month, the incidences of poverty are 38 (31)%, 31 (25)% and 36 (26)% for Buriram, Ubon Ratchathani, and Nakhon Phanom, respectively. (The percentages in parentheses are the official estimates for the incidence of poverty for the whole provinces, including urban areas (NESDB 2007)). The official poverty estimates are lower than our figures because they refer to whole provinces, including urban areas, as well as taking different minimum food requirements of different household members into account (SOMCHAI et al. 2004). However, overall, our figures do not deviate much from the official data and can be taken as a reliable basis for the following analysis.

Tables 8 and 9, and figure 2 illustrate the single and combined effect of RNAwE and location on per capita household income. Before examining the data

in more detail, it should be noted that the distribution of income shows a high variation with a coefficient of variation of 170% and a right-skewed distribution with some high-income households at the upper end. Consequently, median values are more reliable than mean values. Accordingly, the results of mean differences and parametric tests should be interpreted with caution. Non-parametric tests deliver more reliable results.

Both tables 8 and 9 show that households with RNAwE income have a 38% higher median income and an incidence of poverty that is 13 percentage points lower than households without RNAwE income. The effect of location opportunity is equally visible. The rate of participation in RNAwE of peri-urban households, which is 14.5 percentage points higher than that of rural-remote households (Tab. 3, row 2) results in a 17% higher median income and an incidence of poverty that is 9 percentage points lower than that of rural-remote households.

These findings indicate that both RNAwE and proximity to rural towns is correlated positively with an increase in total household income. The combined effect of RNAwE and location can be il-

lustrated by comparing the most advantaged group of ‘peri-urban, RNAwE’ households with the most disadvantaged group of ‘rural-remote, non-RNAwE’ households. The former has a significantly higher median income of 53% and an incidence of poverty that is 19 percentage points lower than the ‘rural-remote, non-RNAwE’ households (Tab. 8 and 9, row 5). The income gap between these two groups is the largest when different combinations of RNAwE and location are used as criteria for differentiating household types. The lowest median difference in income of nearly 7% is seen between ‘rural-remote, RNAwE’ and ‘peri-urban, non-RNAwE’ households. In this case, the disadvantaged location of the rural-remote households is compensated by RNAwE income, while the peri-urban households compensate for their lack of RNAwE income by drawing on other advantages associated with this type of region (see Section 2.3).

Figure 2 shows the percentage frequency density distribution (BAHRENBURG et al. 1990, 36) of per capita income per month, comparing the most advantaged ‘peri-urban, RNAwE’ households with the most disadvantaged ‘rural-remote, non-RNAwE’

Table 8: Household-level: Per capita Income per Month in THB^a by Type of Household, composed by Type of Region and RNAwE^b

| Type of HH | | | | Type of HH | | | | Diff. of mean | | <i>t-Test</i> | Diff. of median | | <i>U-Test</i> ^c |
|--------------------------|-------|--------|----------|----------------------------|-------|--------|----------|---------------|----|---------------|-----------------|----|----------------------------|
| | mean | median | <i>n</i> | | mean | median | <i>n</i> | abs. | % | | abs. | % | |
| Peri-urban RNAwE | 2,972 | 1,754 | 1,705 | Rural-remote non-RNAwE | 2,655 | 1,493 | 430 | 318 | 12 | 0.238 | 261 | 17 | 0.001 |
| Peri-urban, non-RNAwE | 2,709 | 1,597 | 1,098 | Rural-remote, non-RNAwE | 2,533 | 1,418 | 339 | 176 | 7 | 0.543 | 179 | 13 | 0.021 |
| Peri-urban, RNAwE | 3,448 | 2,172 | 607 | Rural-remote, non-RNAwE | 2,533 | 1,418 | 339 | 915 | 36 | 0.012 | 754 | 53 | 0.000 |
| Rural-remote, RNAwE | 3,109 | 1,712 | 91 | Peri-urban, non-RNAwE | 2,709 | 1,597 | 1,098 | 400 | 15 | 0.433 | 115 | 7 | 0.209 |

Note: a Nucleus household definition.

b Expanded household definition. 90% of RNAwE-jobs are done by nucleus members; 10% are done by non-nucleus members. Their income partly enters the nucleus household income via remittance.

c The Mann-Whitney-U test is used due to the right-skewed distribution of income data.

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

Table 9: Household-level: Poverty Incidence^a in % by Type of Household, composed by Type of Region and RNAwE^b

| Type of HH | Poverty-incidence % | Type of HH | Poverty-incidence % | Diff. %-points | <i>Chi²-Test</i> | |
|-----------------------|---------------------|-------------------------|---------------------|----------------|-----------------------------|------------|
| | | | | | sig | Cramér's V |
| Peri-urban | 33 | Rural-remote | 42 | -9 | 0.001 | 0.074 |
| RNAwE | 26 | Non-RNAwE | 39 | -13 | 0.000 | 0.124 |
| Peri-urban, RNAwE | 25 | Rural-remote, RNAwE | 34 | -9 | 0.074 | 0.680 |
| Peri-urban, non-RNAwE | 37 | Rural-remote, non-RNAwE | 44 | -7 | 0.032 | 0.057 |
| Peri-urban, RNAwE | 25 | Rural-remote, non-RNAwE | 44 | -19 | 0.000 | 0.190 |
| Rural-remote, RNAwE | 34 | Peri-urban, non-RNAwE | 37 | -3 | 0.557 | 0.017 |

Note: a Nucleus household definition.

b Expanded household definition. 90% of RNAwE-jobs are done by nucleus members; 10% are done by non-nucleus members. Their income partly enters the nucleus household income via remittance.

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

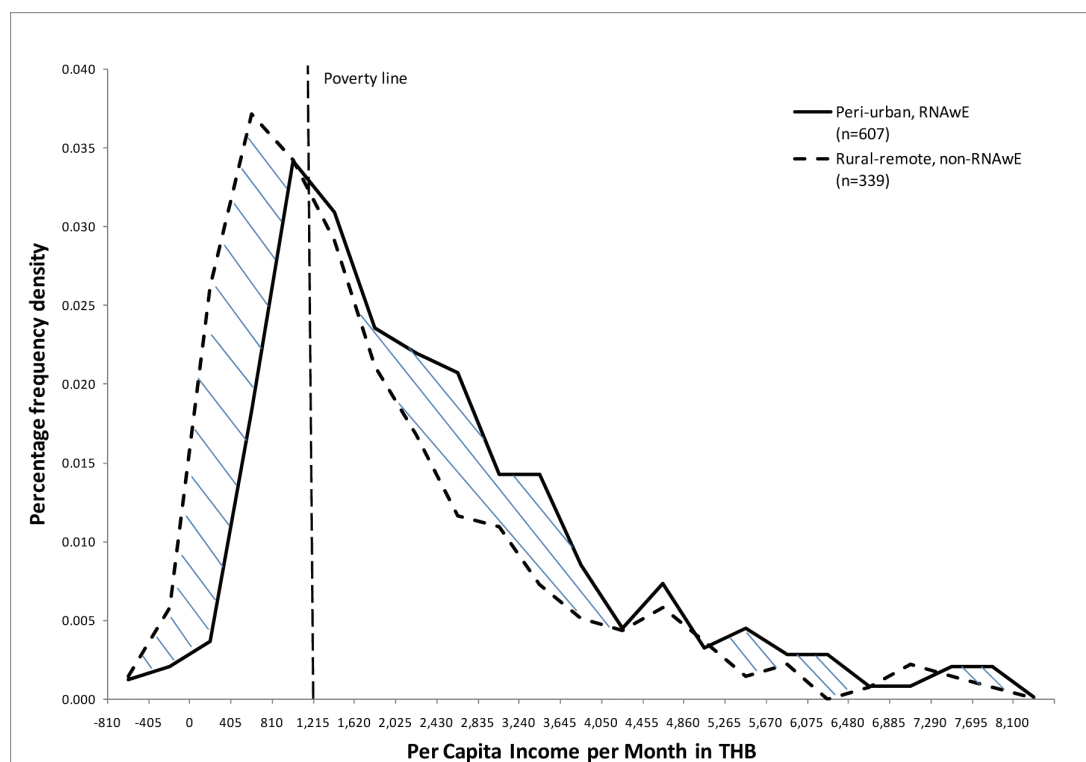


Figure 2: Household-level: Percentage Frequency Density Distribution of 'Peri-urban, RNAwE^b' and 'Rural-remote, non-RNAwE^b' Households Per Capita Income^a

Note: a Nucleus household definition.

b Expanded household definition. 90% of RNAwE-jobs are done by nucleus members; 10% are done by non-nucleus members. Their income partly enters the nucleus household income via remittance.

Source: Own calculation based on DFG-FOR 756, Household Survey 1st wave 2007, Thailand

households. Both distributions are right-skewed, due to the positive outliers mentioned above. The 'peri-urban, RNAwE' income distribution is shifted further to the right than that of the 'rural-remote, non-RNAwE' households, which results in a lower incidence of poverty of 25% to 44%, respectively (Tab. 9, row 5).

In order to determine whether there is a link between location, RNAwE, and vulnerability, one can interpret these empirically-based frequency density distributions as approximations for probability density estimates (FOTHERINGHAM et al. 2000, 71–73). By doing this, it can be stated that even from a cross-sectional perspective, 'rural-remote, non-RNAwE' households have a higher probability of being poor in the future than 'peri-urban, RNAwE' households. Hence, these results confirm that RNAwE and location clearly affect vulnerability, as stated in Hypothesis 4: "RNAwE and location reduce the rural population's vulnerability to poverty". Moreover, households in peri-urban regions have better opportunities to reduce their vulnerability, which confirms the basic argument of this study.

5 Summary and Conclusions

Before suggesting directions for further research, we summarize and place in a broader context the principal findings of the study regarding the different opportunities in peri-urban and rural-remote regions for rural households to gain income from RNAwE.

Households in peri-urban areas have a higher rate of participation in RNAwE than rural-remote households, 35.5% and 21%, respectively (H_1), and households in rural-remote areas depend more on migration for gaining non-agricultural income. Peri-urban households benefit from 65% lower travel times and 21% lower transportation costs, as well as a 62% higher connectivity based on the frequency with which buses run to rural towns (H_2). RNAwE offers more than 60% higher daily wages and twice the duration of annual working months, which leads to annual incomes that are 277% higher than those for jobs in agriculture (H_3). There are also spatial differences in working duration and incomes between regional non-agricultural jobs done by peri-urban and rural-remote household members, with peri-urban households having annual incomes that are 16% higher than those of rural-remote households. In contrast, wages do not differ

spatially. Differences between locations are driven mainly by rates of participation, travel times, transport costs, and connectivity. Location also affects total household income: peri-urban households have median incomes that are 17% higher, and incidences of poverty that are 9 percentage points lower, than rural-remote households. The most advantaged group, 'peri-urban, RNAwE' households, has a median income that is 53% higher and an incidence of poverty that is 19 percentage points lower than the most disadvantaged group, 'rural-remote, non-RNAwE' households. The corresponding income distribution leads us to draw the conclusion that, all other things being equal, the probability of being poor in the future is higher for a household in the latter group because they lack RNAwE and are located farther away from towns (H_4).

It should be noted that the provinces sampled for these analyses do not possess 'regional growth centres' as do the two leading northeastern provinces of Khon Kaen and Nakhon Ratchasima. Taking into account the fact that our study provinces are still at a very low level of development, peripherally located, and characterized as rural when compared to other parts of Thailand, it is therefore perhaps surprising to find that the effects of location on rates of participation in RNAwE, RNAwE incomes, and total household incomes were measurable at all.

Nevertheless, from the analyses, it can be stated that location matters for gaining income; RNAwE in particular is an important factor in mitigating risks and reducing household vulnerability to poverty. Thus, these findings provide a starting point for an extension of the vulnerability concept to cover spatial factors such as local availability of jobs, location of households and jobs and transport costs. A concept of vulnerability that includes a reference to spatial factors should focus not only on the spatial variation of shocks, but also on the spatial variation of opportunities. The availability of RNAwE reduces household vulnerability, irrespective of a location's susceptibility to covariate shocks in agriculture. On the other hand, the location can increase vulnerability if the opportunity to gain RNAwE is low.

The results of this study can be generalized to a certain extent. Studies on lower-middle income countries that have an institutional and economic system comparable to Thailand's should find similar relations between location, non-agricultural income, and vulnerability. The basic effect of location on RNAwE and vulnerability will be even

more pronounced in rural regions where, on the one hand, the emergence of a modern non-agricultural sector is concentrated in a single city while, on the other hand, the transport infrastructure is still insufficient and institutional barriers to social and spatial mobility exist.

Three general recommendations for policy can be derived from the limited knowledge that has been gained from the analyses presented here. First, it would appear to be worthwhile to support the economic restructuring of small and medium-sized cities in the rural areas of developing countries, so that they can serve as hubs for RNAwE. Second, it may be equally promising to invest in infrastructure and transport in rural areas, thus facilitating access to RNAwE within commuting distance. Third, institutional barriers, e.g., restrictions on temporary migration, should be removed, thereby providing opportunities for rural-remote households to participate in *non-regional* non-agricultural employment.

The following avenues for further research seem to be promising:

- This study has used the concept of *vulnerability as uncertain welfare*. However, using the concept of vulnerability as a lack of entitlements might lead to slightly different results: RNAwE and location would not necessarily be the means to reduce vulnerability; instead, location and its effect on accumulating assets, e.g., education, might stand out.
- The spatial extension of the vulnerability concept needs to receive further empirical validation. In particular, analyses of the long-term interplay of opportunities and shocks, using (a) panel data, and (b) a combination of quantitative and qualitative research methods using case studies may prove to be rewarding.
- Making cross-country comparisons will extend the analyses and potentially the validity of the findings to countries that have different socio-economic and institutional systems, e.g., post-socialist countries or low-income countries.
- Lastly, it is surprising that wages and incomes differ only slightly between the two types of region examined in this study. It would be worthwhile to analyze the reasons for this phenomenon by, for example, looking more deeply into the details of the structure of the rural-urban labour market.

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Authors

Dr. Carsten Lohmann
Justus-Liebig-University Giessen
Department of Economic Geography
Senckenbergstr. 1
35390, Giessen, Germany
carsten.lohmann1@geogr.uni-giessen.de

Prof. Dr. Ingo Liefner
Justus-Liebig-University Giessen
Department of Economic Geography
Senckenbergstr. 1
35390, Giessen, Germany
ingo.liefner@geogr.uni-giessen.de