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КАРТИРОВАНИЕ ПРОДОВОЛЬСТВЕННОЙ БЕЗОПАСНОСТИ И СТАТИСТИКИ УЯЗВИМОСТИ ДЛЯ ИНФОРМИРОВАНИЯ ПРИ ФОРМИРОВАНИИ ПОЛИТИКИ: ПРИМЕНЕНИЕ ИНТЕГРИРОВАННОГО КОНТЕКСТНОГО АНАЛИЗА В КЫРГЫЗСКОЙ РЕСПУБЛИКЕ

MAPPING FOOD SECURITY AND VULNERABILITY STATISTICS TO INFORM POLICYMAKING: USE OF THE INTEGRATED CONTEXT ANALYSIS IN THE KYRGYZ REPUBLIC

Бул макалада Комплекстүү Жагдайлык Талдоо (КЖТ) аркылуу райондук деңгээлде Кыргыз Республикасынын азык-түлүк коопсуздугунун мүнөздөмөсү жана өзгөчөлүктөрү жөнүндө кыскача маалыматтар көрсөтүлгөн. Жыйынтыгында КЖТ талдоо көрсөткөн визуалдуу натыйжалар, ар бир район боюнча маанилүү маселелерди чечүү үчүн, тиешелүү чараларды көрүү негизинде чечим кабыл алуучуларга жана өнүктүрүү тармагындагы практиканттарга жардам берет.

Ачкыч сөздөр: азык-түлүк коопсуздугу, комплекстүү жагдайлык талдоо, ГИС, жакырчылык деңгээли, табигый таасирлер.

Эта статья представляет собой краткое изложение характеристик продовольственной безопасности в Кыргызской Республике на районном уровне с помощью Интегрированного Контекстного Анализа (ИКА). Результат показал, что визуализированные результаты ИКА анализа помогают лицам, принимающим решения и практикующим в области развития, чтобы предпринять соответствующие шаги для решения важнейших вопросов в каждом районе.

Ключевые слова: продовольственная безопасность, интегрированный контекстный анализ, ГИС, уровень бедности, природные потрясения.

This paper is a summary of the food security characteristics in the Kyrgyz Republic at district level using the Integrated Context Analysis (ICA). The result showed that the visualized results of the ICA analysis help decision makers and development practitioners to take appropriate steps to address the critical issues in each district.

Keywords: food security, integrated context analysis, GIS, poverty level, natural shocks.

1. Introduction

During the last decade, the world has seen many new challenges in achieving food security. The global food and fuel price crisis in 2007 followed by the financial crisis in 2008 have increased the number of food insecure throughout the world. Drought in 2010 and 2012 affected global crop production and market prices in many parts of the world, especially Central Asia. Recent global economic instability has also led to fluctuating currency exchange rates across the world, affecting the purchasing power of market-reliant poor families. In the Kyrgyz Republic, these challenges could also set back the substantial progress made in reducing extreme poverty and food insecurity since independence in 1991. Food prices have sharply risen since 2007, with an average low-income household spending more than 60 percent of their monthly budget on food. Crop production has been repeatedly affected by dry weather in 2010, 2012 and 2014. This has contributed to a slowdown in the reduction of poverty since 2010 /1,2,3,4/.

Achieving food security and nutrition for all requires a long-term cross sectoral effort. In designing food security and nutrition programs, stronger efforts must be made to better target available resources. Geographical areas should be prioritized according to the severity and type of food security and nutrition problems. Such geographical targeting is highly relevant and useful in policy discussions and program design in the Kyrgyz Republic where people's socioeconomic situations vary significantly according to Agra-ecological conditions. Mapping food security and vulnerability statistics supports evidence-based geographical targeting and for monitoring and evaluating food security and nutrition programs for all stakeholders both at national and sub-national levels.

Since the food security status of any household or individual is typically determined by the interaction of a broad range of agro-environmental, socioeconomic and biological factors, there is no single, direct measure of food security. However, it is essential to present food security and vulnerability statistics and its geographical characteristics in a manner that is accessible and informative for policy makers. By analysing and overlaying the findings of different food security and vulnerability statistics into maps, combinations of recurring food insecurity and exposure to shocks can be identified geographically. These in turn help identify overall programmatic strategies and guide where to focus deeper thematic analysis to inform the selection of program activities.

2. The integrated context analysis (ica)
2.1 Objectives of the ICA

The integrated context analysis (ICA) is an analytical process that contributes to the identification of broad national programmatic strategies such as resilience building, disaster risk reduction and social protection for the most vulnerable and food insecure populations. The ICA can be used to identify more specific program responses at sub-national levels, and identify areas where further in-depth studies or food security monitoring and assessment are needed.

As WFP's periodical food security monitoring from 2010 to 2013 identified, chronic poverty, high and volatile food prices and exposure to natural disasters, including climatic shocks are the key drivers of food insecurity in the Kyrgyz Republic /1,2,3,4/. The ICA is based on historical trend analyses of these dimensions, providing an understanding of what has happened in the past and what may be changing. As such these analyses act as a proxy for what may occur in the future, and where short, medium and longer term programming efforts may be required.

2.2 Methodology (Integrated Context Analysis (ICA) – GIS Training Manual, WFP 2015)

An ICA consists of a set of historical trend analyses /5/. The core dimensions of an ICA analyse data on food security, natural shocks and land degradation. The main preparatory steps of the ICA process include:
1) Deciding which factors are of most concern in the country in terms of the core dimensions;
2) Deciding on the most appropriate administrative level for the analyses based on the likelihood of data being available for the chosen administrative level (unit) across all core dimensions;
3) Determining appropriate data sources; and
4) Determining the most relevant type of analysis based on the actual indicators, data formats and time series ultimately selected.

1)Deciding which factors are of most concern in the country in terms of the core dimensions

Chronic poverty, high and volatile food prices and exposure to natural disasters including climatic shocks are the key drivers of food insecurity in the Kyrgyz Republic.

2)Deciding on the most appropriate administrative level for the analyses based on the likelihood of data being available for the chosen administrative level (unit) across all core dimensions

While the frequency of natural disasters is calculated at district (rayon) level, official poverty headcount ratio is representative only at province (oblast) level and cannot be disaggregated

downwards. It was decided to use the proportion of the Monthly Benefit for Poor Family with Children (MBPF)[1] as a proxy for poverty rate at district level.

3)Determining appropriate data sources
The ICA for the Kyrgyz Republic is based on the use and analysis of the data sets listed below.
Poverty:
Proportion of Monthly Benefit for Poor Families (MBPF) recipients (2014)
Flood and mudflow:
Regular monitoring by the Ministry of Emergency Situation (1999-2009)
Drought:
The number of poor growing seasons (NPGS) between 2004 and 2013 as a proxy to measure recent exposure to drought (Nationwide historical data on drought occurrences are not available in the Kyrgyz Republic)

4)Determining the most relevant type of analysis based on the actual indicators, data formats and time series ultimately selected
Proportion of the Monthly Benefit for Poor Families (MBPF) recipient: Using the latest proportion of the MBPF recipient, classifications were given to each district as 'Low, Medium, High' based on natural breaks.

Flood and mudflow: Frequency of floods and mudflows was aggregated at district level and grouped into three groups (Low, Medium, High) based on natural breaks.

Drought: The following analysis was conducted to produce the Number of Poof Growing Seasons, a proxy for drought frequency:

1. Vegetation performance for each growing season was evaluated against a long-term average, using Normalized Difference of Vegetation Index (NDVI).

2. Average vegetation growth for each growing season over the last 10 years was calculated as a benchmark.

3. Each year in the last five years was compared with the long-term average to see how often the growing season was considerably below the benchmark.

Between 2004 and 2013, none of the districts in the Kyrgyz Republic experienced more than 1 Poor Growing Seasons. Therefore, districts were grouped into two groups (Experienced Poor Growing Season, Not Experienced Poor Growing Season).

Finally, five distinct patterns of overlap between levels of poverty and exposure to natural shocks were identified and illustrated as a map and table (Figure 1).
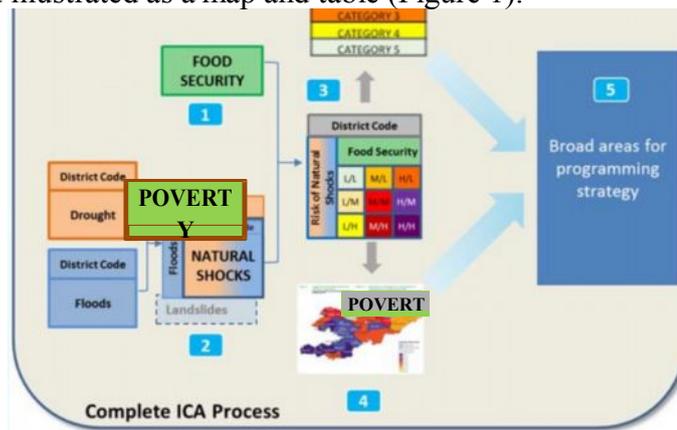

Figure 1. ICA process Source: WFP (2015)

[1] The Monthly Benefits for Poor Families with Children (MBPF) are conditional cash transfers that are targeted at poor households with children. A family's eligibility for the benefit depends on the level of total family income not exceeding the guaranteed minimum income (GMI) for each family member. When per capita family income is below GMI, the government pays the difference to the family.

3. Results
3.1 Poverty

There is an established link between poverty and food insecurity because poor households cannot afford to access enough nutritious food to live a healthy and active life. Poor farmers cannot make the necessary investments to increase yields and are often compelled to sell their surplus crops shortly or soon after harvest to earn income and repay debts, which means they cannot benefit from selling when prices rise.

The percentage of the population living in 'extreme poverty' falling from 19.1 percent in 1996 to 3.1 percent in 2009. The country has achieved its Millennium Development Goal target of halving the number of extreme poor by 2015, set at 12.9 percent of the population. However, the prevalence of extreme poverty increased markedly from 2009 to 2012 (3.1 percent to 4.4 percent2), likely as a result of increased market prices for essential items including food in 2012 and civil unrest in 2010.

The prevalence of absolute poverty was 31 percent in 2014. As Map 1 shows, a clear geographical disparity was observed; five provinces (Batken, Jalalabad, Naryn, Osh and Issyk-Kul) had poverty levels higher than the national average in 2013, with Batken province having the highest proportion of poor at some 54 percent /6/.

Map 1. Poverty incidence (%, average of 2011-2014)
Data source: National Statistics Committee of the Kyrgyz Republic

Map 2 shows the proportion of MBPF beneficiaries in each district. Similarly to Map 1 (poverty rate by province), a clear geographical disparity was observed between the three northern provinces (Chuy, Issyk-Kul, Talas), where fewer than 10 percent of households were MBPF recipients and the other four provinces (Naryn, Osh, Jalalabad, Batken), where more than 15 percent of households were MBPF recipient in all districts except Nooken district in Jalalabad and Kara-Suu district in Osh province. The proportion of MBPF beneficiaries can be used as a proxy of poverty level at district level, because more than 70 percent of allocated transfers was received by the poorest 40 percent of the population /7/.

Map 2. Proportion of Monthly Benefit for Poor Families (MBPF) recipients (%, 2014)
Data source: Ministry of Social Development of the Kyrgyz Republic

3.2 Floods

According to 1999–2009 data from the Ministry of Emergency Situations of the Kyrgyz

Republic, districts experiencing a high number of flood disasters were dispersed around the country. As Map 3 shows, districts in the provinces of Chuy (Alamudun and Chuy districts) Jalalabad (Bazar-Korgon district) and Talas (Bakai-Ata) were most frequently affected by floods.
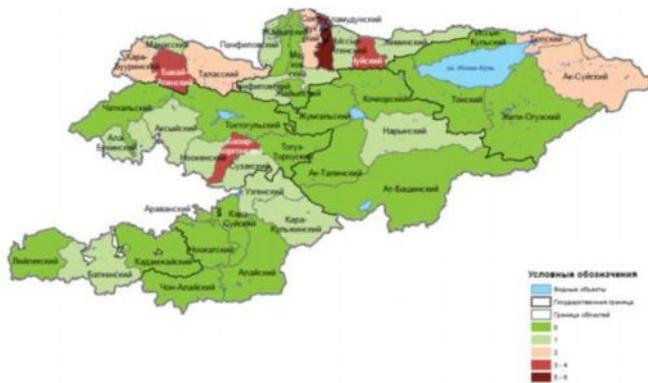
Map 3. Recurrence of floods (1999-2009)
Data source: Ministry of Emergency
Situations of the Kyrgyz Republic

3.3 Mudflows

The analysis of the Ministry of Emergency Situations' 1999–2009 mudflow data revealed that districts in the southern and western parts of the country experienced the highest number of mudflows. Districts in the provinces of Batken (Leilek, Batken, Kadamjai districts), Osh (Alai, Aravan and Kara-Suu districts), Jalalabad (Nooken, Ala-Buka, Aksyi, Bazak-Korgon and Togus-Toro districts), Chuy (Panfilov district) and Issyk-Kul (Ton district) were particularly badly affected (Map).
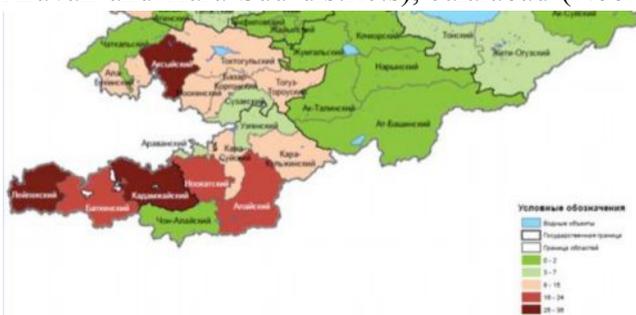
Map 4. Recurrence of mudflows (1999–2009)
Data source: Ministry of Emergency Situations of the Kyrgyz Republic

3.4 Merging flood and mudflow data

Since both floods and mudflows are associated with heavy rainfall and increased melt-water from glacial lakes in the mountains, the flood and mudflow data were merged to yield a single classification of risk. Flood and mudflow data are summarized in the Table 1. The risk assessment revealed that the most vulnerable districts were in the southern and western parts of the country, particularly in the provinces of Osh (Nookat, Kara-Suu and Alai districts), Jalalabad, (Ala-Buka, Aksy, Bazar-Korgon and Togus-Toro districts), just one district in Talas (Kara-Bura) and all districts in the Batken province (Map 5).
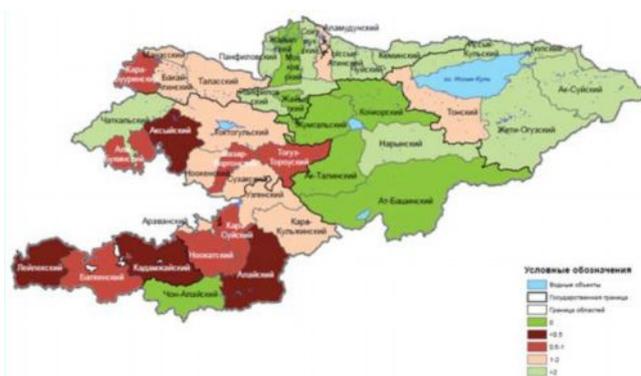
Return period of mudflows by district	Return period of floods by district		
	More than 2 years	Between 1 and 2 years	Less than 1 year
More than 2 years	Very Low risk	Low risk	Moderate risk
Between 1 and 2 years	Low risk	Moderate risk	High risk
Less than 1 year	Moderate risk	High risk	Very High risk

Table 1. Combining levels of floods and mudflows

Map 5. Combined recurrence of floods and mudflows (1999–2009)

3.5 Drought

The number of poor growing seasons (NPGS) between 2004 and 2013 was used as a proxy to measure recent exposure to drought because nationwide data on drought occurrences were not available in the Kyrgyz Republic. The analysis revealed that districts in lowland areas in Chuy (Jayil, Moskovskiy, Sokuluk, Alamudin and Yssik-Ata districts), Talas (Kara- Buura, Bakay-Ata and Manas districts), Naryn (Jumgal, Naryn, Ak-Talaa, At-Bashy districts), Jalalabad (Nooken district), Batken (Leilek and Batken districts) and Osh (Aravan district) experienced poor growing seasons from 2003–2014 (Map 6).

Map 6. The number of poor growing seasons (2004–2013)
Data source: Normalized Difference Vegetation Index (NDVI) analysis by WFP OMEP

3.6 Main natural shocks

As we have seen above, the natural shocks of most concern in the Kyrgyz Republic are floods, mudflows and drought. Geographic characteristics of all three shocks were analysed in Map 3 to 6 which showed levels of flood and mudflow occurrence, combined levels of flood and mudflow occurrence and the number of poor growing seasons.

In order to yield a single natural shock map, findings on all three natural shocks were combined as in Table 2.

Table 2. Combining levels of floods, mudflows and droughts

		Drought occurrence (measured by the number of poor growing seasons – NPGS)	
		0	1
Return period of floods and mudflows	No floods and mudflows	Low	Low
	More than every 2 years	Low	Moderate
	Between 1-2 years	Moderate	Moderate
	Less than 1 year	Moderate	High
	Less than 0.5 year	High	High

Map 6. Combined levels of natural shocks (floods, mudflows, and drought)

Map 6 shows the result of overlaying the occurrence of floods, mudflows and drought. Districts exposed to a high risk of natural shocks were mostly found in the southern and western parts of the country, particularly in the Alai district in Osh province, Aksy and Bazar-Korgon

districts in Jalalabad province, Kara-Bura district in Talas province, and all districts in Batken province.

3.7 Overlap of recurrent of poverty and exposure to shocks

The final ICA map overlays the maps of poverty and natural shocks to identify where people have been most affected by recurrent food insecurity and what main shocks they endured. The table below shows how the recurrence of poverty and level of exposure to natural shocks are combined and categorized. The geographical spread of categories is presented in Map 7.

Table 3. Combining levels of natural shocks and poverty

Risk of exposure to natural shocks	Recurrence of poverty		
	Low	Medium	High
Low	Area 5	Area 3B	Area 3A
Medium	Area 4B	Area 2B	Area 1B
High	Area 4A	Area 2A	Area 1A

Category 1	**High recurrence** of poverty (prevalence above 30 percent) AND **high (1a)** or **medium (1b)** risk of natural shocks
Category 2	**Medium** recurrence of poverty (prevalence above 30 percent) AND **high (2a)** or **medium (2b)** risk of natural shocks
Category 3	**High (3a)** or **medium (3b)** recurrence of poverty (prevalence above 30 percent); AND Low risk of natural shocks
Category 4	**Low** recurrence of poverty (prevalence above 30 percent) AND **high (4a)** or **medium (4b)** risk of natural shocks
Category 5	**Low** recurrence of poverty (prevalence above 30 percent) AND low risk of natural shocks

4. Program implications

The following sections present programmatic implications of the above findings for the Kyrgyz Republic. These findings can form the basis of discussions to help target specific populations and geographical areas with broad programs that different players can deliver. They also provide an opportunity for multiple partners to identify complementary, multi-sectoral activities so as to deliver support through a package of interventions. These considerations are not exhaustive and are relevant across all categories when discussing the design of program strategies and planning.

Map 7. Categories of areas based on poverty and exposure to natural shocks

Category 1

Category 1 areas have seen high or medium levels of natural shocks and high recurrence of poverty among 30 percent or more of the population during the last seven years. Frequent exposure to natural shocks reduces recovery time between crises, eroding people's coping capacities and their surrounding natural resource base, which then increases risks associated with future shocks. In these areas, development gains face constant setbacks and people's abilities to move out of food insecurity are seriously challenged.

Category 2

Locations in category 2 areas have experienced some recovery periods during the previous seven years – i.e., poverty prevalence was not always above the 30 percent threshold. Moderate levels of recurrence of poverty (as opposed to persistent or chronic recurrence as seen in category 1 areas) coupled with high or medium exposure to natural shocks suggest that people may have experienced seasonal stresses or a specific event or shock which stopped them from meeting their full food requirements for a finite period of time.

Category 3

Locations in category 3 have seen high or moderate levels of recurrence of poverty over the past 7 years, but a relatively low level of exposure to natural shocks. Populations living in these areas recurrently or consistently do not meet their food needs, which suggests that food insecurity is pervasive, and while it could be seasonal, it is not highly affected by natural shocks. It is likely that food insecurity in these areas is more associated with chronic poverty and deteriorated livelihoods.

Category 4

Category 4 areas have seen a low recurrence of poverty over the last 7 years and high or medium exposure to natural shocks. If mitigating measures are not put in place regarding the high levels of exposure to natural shocks, food secure populations could be pushed into food insecurity if and when shock events occur.

Category 5

Locations in category 5 have seen a low recurrence of poverty over the 7 years and a low risk of exposure to natural shocks. This does not mean, however, that there are no pockets of food insecurity or that the risk of exposure to natural shocks is completely absent.

Overall poverty reduction and development programs would be beneficial in these areas, with a strong focus on halting and reversing land degradation which could compromise future food security and livelihoods. Early warning and preparedness efforts need to be maintained, in order to safeguard and protect the gains made by people and programs in the event of shocks and crises.

5. Conclusion

The ICA showed the basic differences and similarities of food security challenges between districts by grouping all districts into five categories based on food security and exposure to natural shocks. It helps decision makers and development practitioners to take appropriate steps to address the most critical issues in each area. Spatial mapping (GIS) of the results can illustrate the geographical distribution of the categories.

However, it should be noted that not all people living in a district have the same characters. In category 1 districts (high/medium levels of natural shocks and high recurrence of poverty), for example, there are population living above the poverty line and less likely to experience natural disasters. Similarly, not all population living in category 6 are free from the risk of food insecurity. While the ICA is useful to illustrate the food security overview and its sub-national level characteristics of a country, community and household-level analysis would be required for deeper thematic analysis to inform the designing of programme activities.

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